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TECHNICIAN GRADE-I SIGNAL PRACTICE BOOK

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Tentative Subject-wise break-up of questions and marks for CBT of Technician Gr-I Signal		
Subjects	**No. of Questions**	**Marks for Each Section**
General Awareness	10	10
General Intelligence and Reasoning	15	15
Basics of Computers and Applications	20	20
Mathematics	20	20
Basic Science & Engineering	35	35
Total	100	100

1. Duration : 90 minutes (with 30 minutes extra time for PwBD candidates using scribe).
2. The Subject-wise distribution give above is merely indicative. The question papers may vary.

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PRACTICE SET - 1

1. In which projects did ISRO succeeded in September 2014?
(a) Launched policy load vehicle
(b) Launched synchronous satellite
(c) Launched rockets to mars
(d) Mars orbiter spacecraft successfully entered orbit around planet Mars.

2. Sachin Tendulkar scored his 100th international cricket century against which team?
(a) England (b) Australia
(c) Bangladesh (d) Pakistan

3. In which of the following states is the Gambhira- a popular dance, performed using various wooden masks?
(a) Rajasthan (b) Telangana
(c) West Bengal (d) Gujarat

4. Kailash Satyarthi was the founder of:
(a) Bachpan Bachao Andolan
(b) Sabko Padhao Andolan
(c) Stree Bachao Andolan
(d) Beti Padhao Andolan

5. Securities sold by the Central Bank with a clear specification of repurchase date and price is called .....
(a) outright open market operations
(b) Interest Rate Swap
(c) repurchase agreement
(d) reverse repo

6. How many members nominated by the President of India to the Rajya Sabha?
(a) 12 (b) 10
(c) 8 (d) 6

7. Which of the following is the lowermost layer of the earth's atmosphere?
(a) Thermosphere (b) Mesosphere
(c) Stratosphere (d) Troposphere

8. Which of the following is NOT a Himalayan Mountain Pass connecting Uttarakhand with Tibet ?
(a) Shipki La (b) Mana Pass
(c) Mangsha Dhura (d) Niti Pass

9. ____was Bairam Khan son, who became an important person in Akbar court.
(a) Abdul Rahim Khan -i- Khanan
(b) Amir Khusrow
(c) Abul Fazl
(d) Birbal

10. The Tri-Color which was hoisted in Stuttgart by Madam Cama was smuggled into British India by:
(a) Indulal Yagnik (b) Bhikaji Cama
(c) Kishan Singh (d) Veer Savarkar

11. Select the option that is related to the third term in the same way as the second term is related to the first term.
Book : Reading :: Poetry : ?
(a) Rhyming (b) Singing
(c) Recitation (d) Teaching

12. If
'A # B' means 'A is the father of B,
'A $ B' means 'A is the mother of B,
'A @ B' means 'A is the husband of B,
'A % B' means 'A is the wife of B,
'A =B' means 'A is the brother of B
then how is P related to V in the following expression?
P @ Q $ U = R % S # V
(a) Paternal grandfather
(b) Maternal grandfather
(c) Father's brother
(d) Mother's brother

13. If J denotes addition, G denotes subtraction, M denotes multiplication and B denotes division, then which of the following equations will not be correct?
(a) 6M5J4B2G10 = 22 (b) 4G16B2J6M5 = 26
(c) 6B2M8G10J4 = 20 (d) 8M2G6B3J7= 21

14. Statements:
Politicians marry only beautiful girls. X is beautiful.
Conclusions:
1. X will marry a politician
2. X won't marry a politician
(a) Only conclusion 1 follows
(b) Only conclusion 2 follows
(c) Either 1 or 2 follows
(d) Both 1 and 2 follow

15. Consider the given statement and decide which of the given assumption is/are implicit in the statement :
Statement:
"We use platinum, the lustrous metal, for jewellery"_____ An advertisement
Assumption:
I. Platinum is a lustrous metal
II. Platinum is use for making jewellery
(a) Only assumption II implicit
(b) Neither assumption I nor II is implicit
(c) Only assumption I is implicit
(d) Both assumption I and II are implicit

16. A question and three statements labelled (I), (II) and (III) are given, You have to decide which statement(s) is/are sufficient to answer the question.
Question: Who is the shortest among A, B, C, D and E?

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Statement :
I. A is taller than E but shorter than D.
II. B is shorter than C but taller than E.
III. D is taller than C and A is taller than B.
(a) Statements I, II and III are insufficient
(b) Statements I and II together are sufficient.
(c) Statements I and III together are sufficient
(d) Statements I, II and III together are sufficient

17. From among the given options, select the word which cannot be formed using the letters of the given word.
LAUGHTER
(a) GRUNT (b) GATE
(c) HATE (d) RATE

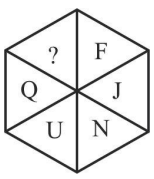
18. Select the option that is related to the third term in the same way as the second term is related to the first term.
India : Tiger :: Nepal :?
(a) Lion (b) Cow
(c) Rhinoceros (d) Leopard

19. In a certain code language, PAINT is coded as 83527 and SCORE is coded as 49061. How would you code RECENT in the same language?
(a) 921235 (b) 190985
(c) 648497 (d) 619127

20. Three pairs are similar in one way and one pair is different from following four pair of terms. Which one is different from other three?
(a) Captain : Team
(b) Boss : Gang
(c) Prime Minister : Cabinet
(d) Artist : Troupe

21. Select the number from among the given options that can replace the question mark (?) and continue the given series.
113, 115, 119, 125, 133, ?
(a) 143 (b) 152
(c) 147 (d) 141

22. Study the given pattern carefully and select the letter that can replace the question mark (?) in it



(a) P (b) Q
(c) M (d) O

23. One day, Rekha was standing facing the east. She then turned 90 degrees right and then turned 45 degrees in the anti-clockwise direction. She then turned 90 degrees clockwise. Which direction is she facing now?
(a) North-east (b) South-west
(c) North (d) South

24. A family consists of 7 people with three couples. The artist is married to the politician and they have three children. The teacher is the sister-in-law of the accountant, who is the wife of the engineer. The doctor and businessman are brothers. Who among the following could be the husband of the teacher?
(a) Engineer (b) Doctor
(c) Politician (d) Accountant

25. If 'A' represents 'subtraction', 'B' represents 'Multiplication', 'C' represents 'division' and 'D' represents 'addition', then what is the value of (3 B 4 D 5 A 6) C 1?
(a) 1 (b) 11
(c) 0 (d) 10

26. Who built the analytical engine, one of the early computing devices?
(a) John Napier (b) Herman Hollerith
(c) Blaise Pascal (d) Charles Babbage

27. Which of the following is a special purpose application software?
(a) Payroll system (b) Linux
(c) Windows
(d) Database management system

28. Which of the following input devices is used as a personal computer peripheral or general control device consisting of a hand - held stick that rotates around a loose and moves the screen cursor around rotates?
(a) Microphone (b) MICR
(c) Biometric (d) Joystick

29. Which of the following types of mouse uses laser rays for cursor movement on the computer screen?
(a) Optical (b) Electrical
(c) Gyroscopic (d) Mechanical

30. Which among the following statements is/are correct with respect to types of memory?
A. Internal processor memories
B. Primary memory or main memory
C. Secondary or auxiliary memory
(a) All of the options
(b) Both B and C
(c) Both A and B
(d) Both C and A

31. Where is the cache memory located?
(a) RAM (b) CPU
(c) CU (d) Monitor

32. The main memory of a computer is made using which of the following technique?
(a) Magnetic (b) Optical
(c) Semi-conductor (d) Vacuum tube

33. Which of the following communication protocols is used to interconnect network devices on the internet?
(a) HTTP (b) FTP
(c) TCP/IP (d) WWW

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34. A cell phone connected to a Bluetooth headset or a mobile computer connected to a portable Bluetooth thermal printer is an example of a _____.
(a) SAN (b) MAN
(c) PAN (d) LAN

35. Which of the following is a disadvantage of the Dial-up Internet Access method when compared with DSL and cable modem?
(a) Low speed
(b) Limited perimeter
(c) Security risk
(d) Expensive

36. The term 'wide ', 'Mirrored,' 'Narrow' describe which of the following options in MS word 365 in terms of the layout the document?
(a) Breaks (b) Margins
(c) Size (d) Orientation

37. In MS - Word 365 which of the following function keys, if possible repeats the last command or action?
(a) F3 (b) F1
(c) F4 (d) F2

38. Select the correct sequence of steps showing how to double underline text in MS Word.
(a) a-select text.
b-click Insert tab; then on arrow of 'Font' group.
c-Select Underline Style as double line.
(b) a- select text.
b- click page Layout tab; then click on arrow of 'Font' group.
c-Select Underline Style as double line.
(c) a- Select text.
b- Click Home tab; then click on arrow of 'Font' group.
c- Select Underline style as double line.
(d) a- Select text.
b- Click Layout tab; then click on arrow of 'Font' group.
c- Select Underline as double line.

39. Which of the following terms is a world-wide network of computers also known as network of networks?
(a) VLAN (b) MAN
(c) Internet (d) World Wide Web

40. If you are replying to an email, which of the following fields are filled in automatically?
(a) "To" and "From" field both
(b) Only "From" field
(c) Neither "To" field nor "From" field
(d) Only "To" field

41. What does HTTPS stand for?
(a) Hyper Text Transport Protocol Secure
(b) Hyper Text Transfer Protocol Secure
(c) Hyper Transfer Tariff Protocol System
(d) Hyper Transport Tariff Protocol System

42. Which of the following is not a web browser?
(a) Netscape (b) Military
(c) Yandex (d) Opera

43. Which of the following is not web mail provider?
(a) upGrad (b) Yahoo
(c) Outlook (d) Google

44. Which of the following keyboard shortcuts is used to activate the first tab when multiple tabs are opened in Google Chrome?
(a) Ctrl + 1 (b) Alt + 9
(c) Alt + 1 (d) Ctrl + 9

45. Which of the following characteristics refers to the use of technology to complete a task with as little human interaction as possible?
(a) Remembrance power
(b) No EQ
(c) No IQ
(d) Automation

46. Which of the following numbers is NOT divisible by 9 ?
(a) 49104 (b) 77832
(c) 35253 (d) 45390

47. $(64 \times 5^4) - (5^4 \times 16) = ?$
(a) 40,000 (b) 35,000
(c) 30,000 (d) 25,000

48. Which of the following fractions is the largest?
$\frac{7}{9}, \frac{6}{7}, \frac{22}{25}$ and $\frac{11}{13}$
(a) $\frac{11}{13}$ (b) $\frac{22}{25}$
(c) $\frac{7}{9}$ (d) $\frac{6}{7}$

49. The value of $\frac{3}{15}+\frac{13}{14}-\frac{19}{21}+\frac{31}{35}-\frac{23}{30}=?$
(a) $\frac{8}{21}$ (b) $\frac{1}{3}$
(c) $\frac{2}{5}$ (d) $\frac{12}{35}$

50. The LCM of the numbers 36, 54, 72 and 96 is :
(a) 1064 (b) 764
(c) 864 (d) 964

51. What is the largest number by which, dividing 63, 77 and 98, gives remainders 3, 5 and 2 respectively?
(a) 10 (b) 9
(c) 6 (d) 8

52. x and y are in direct proportion and y = 92.5 when x = 37. What will be the value of y when x = 16?
(a) 32 (b) 40
(c) 48 (d) 24

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53. The current population of a town is 15,625. It increases by 8% and 12% in two successive years but decreases by 22% in the third year. What is the population of the town at the end of the third year?
(a) 13,230 (b) 15,120
(c) 14,742 (d) 14,042

54. The length of the three sides of a triangle are 12 cm, 15 cm and 21 cm, respectively, Find the area (in cm^2) of the triangle.
(a) $36\sqrt{6}$ (b) $30\sqrt{6}$
(c) $72\sqrt{6}$ (d) $48\sqrt{6}$

55. Paras can complete 40% of the work in 8 days while Deepti & Paras together can complete 10% of the work in a day. Find the time taken by Deepti alone to complete the work.
(a) 23 days (b) 21 days
(c) 22 days (d) 20 days

56. Two buses from a house run at a speed of 25 km/h at an interval of 15 minutes. How much more speed (km/h) does a woman coming from the opposite side of the house have to walk so that the buses meet at an interval of 10 minutes.
(a) 12 (b) 12.25
(c) 12.5 (d) 12.75

57. The compound interest on a sum of money at 5% per annum for 3 years is ₹ 6305 Find the simple interest (in ₹) for the same sum at the same rate of interest for the same number of years.
(a) ₹4,000 (b) ₹6,000
(c) ₹5,000 (d) ₹3,600

58. If the cost price of an item is ₹4,500 and its selling price is ₹3,500 then the loss percentage is :
(a) $44\frac{2}{9}\%$ (b) $55\frac{2}{9}\%$
(c) $22\frac{2}{9}\%$ (d) $33\frac{2}{9}\%$

59. What is the sum of the first 25 odd numbers?
(a) 150 (b) 625
(c) 250 (d) 144

60. Simplify $\sqrt{\frac{1+\cos A}{1-\cos A}}$
(a) sec A + tan A
(b) sec A – tan A
(c) cosec A – cot A
(d) cosec A + cot A

61. The scores obtained by 10 students in a test are 82, 60, 62, 63, 78, 75, 86, 75, 91, 46
Find the arithmetic mean of their scores.
(a) 70.6 (b) 71.8
(c) 72.2 (d) 72.8

62. The positive square root of $\left(6+2\sqrt{3}\right)\left(6-2\sqrt{3}\right)$ is _____.
(a) 12 (b) $6\sqrt{2}$
(c) 24 (d) $2\sqrt{6}$

63. Three times the present age of P is 25 years more than the present age of Q. After 10 years, twice the age of Q will be 18 years less than thrice the age of P. Find the present age (in years) of Q.
(a) 21 (b) 16
(c) 19 (d) 17

64. Two pipes A and B can fill a tank in 21 hours and 18 hours, respectively. If both the pipes are opened simultaneously, then the time taken to fill the tank is:
(a) $9\frac{27}{39}$ hours (b) $11\frac{27}{39}$ hours
(c) $10\frac{27}{39}$ hours (d) $8\frac{27}{39}$ hours

65. An amount of ₹ 1,470 is shared between Anant and Mohan in the ratio 3:4. What is the amount received by Mohan?
(a) ₹ 1,050 (b) ₹ 630
(c) ₹ 1,650 (d) ₹ 840

66. Which one of the following physical quantities is a vector quantity?
(a) Gravitational Potential energy
(b) Electric Power
(c) Electric current
(d) Dipole Moment

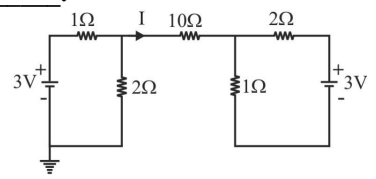
67. A 10 N force is applied on a body which produces in it an acceleration of 2 m/s^2. The mass of the body is
(a) 5 kg (b) 10 kg
(c) 15 kg (d) 20 kg

68. A car accelerates uniformly from 5 ms^{-1} to 10ms^{-1} in five seconds. Find the acceleration of the car
(a) 1 ms^2 (b) 1 ms^{-2}
(c) 1 ms^1 (d) 1 ms^{-1}

69. An object of mass 10kg is moving with a uniform velocity of 6ms^{-1}. What is the kinetic energy possessed by the object
(a) 180J (b) 18J
(c) 360J (d) 1800J

70. The efficiency of a heat energy can never be
(a) 10% (b) 80%
(c) 100% (d) 50%

71. Consider the circuit shown in the figure. The current I flowing through the 10Ω resistor is _____.



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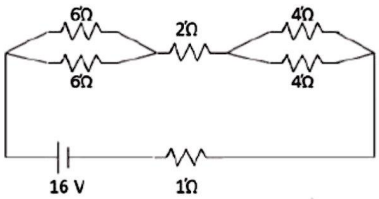
(a) 0A (b) 10A
(c) 0.1A (d) 1A

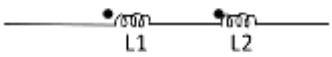
72. What is the dimensional formula of mutual induction?
(a) $[M\,L\,T^{-2}\,A^{-1}]$
(b) $[M\,L^{2}\,T^{-1}\,A^{-3}]$
(c) $[M\,L^{2}\,T^{-2}\,A^{-2}]$
(d) $[M\,L^{2}\,T^{-1}\,A^{-2}]$

73. A network of resistors is connected to a 16 V battery with an internal resistance of 1 Ω, as shown in the figure. Compute the equivalent resistance of the network.



(a) 13 Ω (b) 8 Ω
(c) 12 Ω (d) 7 Ω

74. If 'M' is the mutual inductance between two coils connected in series cummulatively coupled, the equivalent inductance is



(a) $L_{eq} = L_1 + L_2 + 2M$ (b) $L_{eq} = L_1 = L_2 - 2M$
(c) $L_{eq} = L_1 + L_2 - 2M$ (d) None of the above

75. In a two-watt power meter, for all lagging power factors, first meter shows positive and second meter shows negative reading. What is the power factor?
(a) 0 to 0.5 (b) 0.866 to 1
(c) 0 to 1 (d) 0.5 to 1

76. What is the unit of magnetic field intensity?
(a) Volt per meter (b) Ampere per meter
(c) Volt per square meter (d) Weber per meter

77. Which of the following provides maximum capacitance in the smallest space with the least cost?
(a) Electrolytic capacitor (b) Paper
(c) Ceramic (d) Mica

78. Magnetic flux can be measured by-
(a) Capacitive pick-up
(b) Inductive pick-up
(c) Resistive pick-up
(d) Hall effect pick-up

79. A parallel plate capacitor with plates separated by distance 1 mm is filled with dielectric with relative permittivity 2. The electric field inside the capacitor when it is connected to 1V Battery is
(a) 1 N/C
(b) 1000 N/C
(c) 2000 N/C
(d) 500 N/C

80. Which material has the highest electrical conductivity?
(a) Aluminium (b) Steel
(c) Silver (d) Lead

81. The operating temperature of PVC, paper, silk or cotton without impregnation is:
(a) 105ºC (b) 180ºC
(c) 155ºC (d) 90ºC

82. A resistor reads following colours from left to right: brown, black, red, golden. What is the value of the resistor?
(a) 100 Ω with plus-or-minus 5% tolerance.
(b) 1 kΩ with plus-or-minus 5% tolerance.
(c) 100 kΩ with plus-or-minus 5% tolerance.
(d) 10 kΩ with plus-or-minus 5% tolerance.

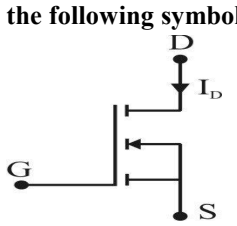
83. Match items in Group 1 with items in Group II, most suitably :

	Group - 1		Group - II
(A)	LED	(i)	Heavy doping
(B)	Avalanche photodiode	(ii)	Coherent radiation
(C)	Tunnel diode	(iii)	Spontaneous emission
(D)	Laser	(iv)	Current gain

(a) (A)-(i), (B)-(ii), (C)-(iv), (D)-(iii)
(b) (A)-(ii), (B)-(iii), (C)-(i), (D)-(iv)
(c) (A)-(iii), (B)-(iv), (C)-(i), (D)-(ii)
(d) (A)-(ii), (B)-(i), (C)-(iv), (D)-(iii)

84. The value of current gain (α) lies in the range of :
(a) 1 to 99
(b) 0.9 to 0.998
(c) 0.9 to 1
(d) 0 to 0.998

85. What does the following symbol represent?



(a) N– channel depletion MOSFET
(b) Silicon Controlled rectifier
(c) P–channel enhancement MOSFET
(d) N–channel enhancement MOSFET

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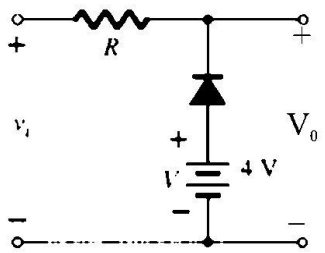
86.



Which of the following circuits is represented by the given figure?
(a) Series clipper (b) Clamper
(c) Shunt clipper (d) Amplifier

87. When emitter bypass capacitor in a CE amplifier is removed, it considerably reduces:
(a) Input resistance
(b) Output load resistance
(c) Emitter current
(d) Voltage gain

88. In an amplifier, the coupling capacitors are employed for
(a) Limiting the bandwidth
(b) Matching the impedance
(c) Preventing of DC mixing with input or output
(d) Controlling the output

89. Which of the following options represents the effect current shunt feedback on input impedance (Z_i) and output impedance (Z_0)?
(a) Z_i - Increase, Z_0- Decreases
(b) Z_i - Decreases, Z_0-Increases
(c) Z_i - Increases, Z_0-Increases
(d) Z_i - Decrease, Z_0- Decreases

90. A simple PN junction diode is connected in the feedback path of an inverting op-amp. The circuit can be used as _____.
(a) high-pass filter (b) log amplifier
(c) low-pass filter
(d) tuner in AM communication

91. What is the operation of pin 4 of the 555 timer IC?
(a) Output
(b) Control Voltage
(c) Reset
(d) Threshold voltage

92. The ratio of maximum displacement deviation to full scale deviation of the instrument is known as :
(a) Static sensitivity
(b) Dynamic deviation
(c) Linearity
(d) Precision or accuracy

93. A galvanometer is converted to a voltmeter by….
(a) Adding a high resistance in series with the galvanometer
(b) Adding a low resistance across with the galvanometer
(c) Increase the number of turns of the galvanometer coil
(d) Decreases the number of turns of the galvanometer coil

94. A power factor meter has
(a) one current and one pressure circuit
(b) one current circuit and two pressure circuits
(c) two current circuits and two pressure circuits
(d) two current circuits and one pressure circuit

95. A Wheatstone bridge is balanced if?
(a) The ratio of resistors on one side of the bridge is one while the ratio of resistors on the other side is infinity
(b) The ratio of resistors on one side of the bridge is greater than the ratio of resistors on the other side
(c) The ratio of resistors on one side of the bridge equals to the ratio of resistors on the other side
(d) None of the above

96. Strain gauge converts ____ into ____ signals.
(a) electrical signals; mechanical
(b) mechanical displacement; electrical
(c) mechanical displacement; vibrational
(d) force; mechanical

97. What is the value of K in the given number system expression?
$(347)_{16} = (3515)_K$
(a) 6 (b) 5
(c) 7 (d) 4

98. A_____ is a well-defined relationship between binary variables specified by either a boolean equation or a truth table
(a) Boolean function
(b) Boolean algebra
(c) logical equation
(d) logical relationship

99. How many control lines do we have in a 32 : 1 MUX?
(a) 32 (b) 1
(c) 4 (d) 5

100. The digital logic family that has the lowest propagation delay time is :
(a) ECL (b) TTL
(c) CMOS (d) NMOS

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SOLUTION : PRACTICE SET- 1

ANSWER KEY

1. (d)	11. (c)	21. (a)	31. (b)	41. (b)	51. (c)	61. (b)	71. (a)	81. (d)	91. (c)
2. (c)	12. (b)	22. (c)	32. (c)	42. (c)	52. (b)	62. (d)	72. (c)	82. (b)	92. (c)
3. (c)	13. (c)	23. (b)	33. (c)	43. (a)	53. (c)	63. (d)	73. (d)	83. (c)	93. (a)
4. (a)	14. (c)	24. (b)	34. (c)	44. (a)	54. (a)	64. (a)	74. (a)	84. (b)	94. (b)
5. (a)	15. (d)	25. (b)	35.(a)	45. (d)	55. (d)	65. (d)	75. (a)	85. (d)	95. (c)
6. (a)	16. (d)	26. (d)	36. (b)	46. (d)	56. (c)	66.(d)	76. (b)	86. (c)	96. (b)
7. (d)	17. (a)	27. (a)	37. (c)	47. (c)	57. (b)	67. (a)	77. (a)	87. (d)	97. (a)
8. (a)	18. (b)	28. (d)	38. (c)	48. (b)	58. (c)	68. (b)	78. (d)	88.(c)	98. (a)
9.(a)	19. (d)	29. (a)	39. (c)	49. (d)	59. (b)	69. (a)	79. (c)	89. (b)	99. (d)
10. (a)	20. (d)	30. (a)	40. (a)	50. (c)	60. (d)	70. (c)	80. (c)	90. (b)	100. (a)

SOLUTION

1. (d)
Mars orbiter spacecraft successfully entered into an orbit around planet Mars projects did ISRO succeed in September 24, 2014.

2. (c)
The former Indian Cricket team batsman Sachin Tendulkar made his 100th century against Bangladesh. Sachin is the only person in the world to have 100 centuries in ICC test and One day international matches.

3. (c)
Famous folk dances and their concerned states are as follow:

State		Folk Dances
Rajasthan	–	Ghumar, Chakri, Ganagor, Jhulan, Leela, Jhuma, Suisini, Ghapal, Bhavai
Telangana	–	Perani Thandvam or Perani Shivtan Davam
West Bengal	–	Kathi, Gambhira, Dhali, Jatra, Baul, Marasia, Mahal, Keertam
Gujarat	–	Garba, Dandiya Ras, Tippani Jurium, Bhavai

4. (a)
Kailash Satyarthi was the founder of 'Bachpan Bachao Andolan'. He founded the Bachpan Bachao Andolan in 1980. Kailash Satyarthi was awarded the Nobel Peace Prize in 2014 along with Malala Yousafzai for his struggle against the suppression of children and young people and right of children to education. The book titled 'COVID-19: Crisis of Civilisation and Solutions' is penned by Kailash Satyarthi.

5. (a)
Securities sold by the central Bank with a clear specification of repurchase date and price is called open market operations.

6. (a)
Article 80 consists of the council of states.
The council of states shall consist of-
(a) Twelve members to be nominated by the president in accordance with the provisions of the clause (3); and
(b) Not more than two hundred and thirty eight representatives of the states and of the Union Territories. Rajya Sabha members are elected for 6 years and 1/3 of its members retire every second year.

7. (d)
The troposphere is the lowest layer of our atmosphere. extending roughly to a height of 8 km. near the poles and about 18 km. at the equator. All changes in climate and weather take place in this layer.
Others layers of atmosphere–

Stratosphere	-	13-50 km
Mesosphere	-	50-80 km
Thermosphere	-	80-400 km
(Ionosphere is part of this layer)		
Exosphere	-	400km-above

Exosphere is the highest layer of the atmosphere.

8. (a)
Shipki La Pass is located through Sutlej Gorge. It connects Himachal Pradesh with Tibet. It is
India's third border post for trade with China after Lipu Lekh and Nathula Pass.

State/Union territory	Pass
Jammu and Kashmir	Burzail pass, Banihal Pass, Pir-Panjal Pass
Ladakh	Zoji La, Chang-La, Khardung La
Himachal Pradesh	Rohtang Pass, Shipki La, Bara-lacha La
Uttarakhand	Niti Pass, Mana Pass,Muling La, Mangsha Dhura
Arunachal Pradesh	Diphu pass,Pangsau Pass, Bomdi-La

9.(a)
Bairam Khan's son was Abdul Rahim-Khan-i-Khanan, who was one of the Navratnas of Akbar. Akbar gave him the title of Khan-i-Khanan due to his prestigeous performance in Gujarat war. Rahim was a brilliant scholar of Arabian, Turkey, Persian and Sanskrit language. Rahim was born in 1556 in Delhi.

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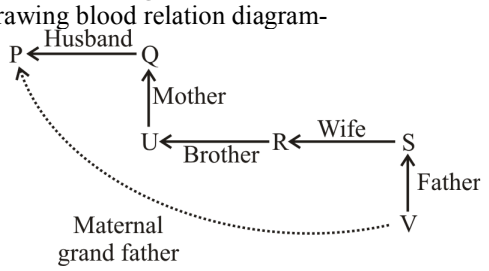
10. (a)
Madam Bhikaji Cama unfurled the first version of the Indian National flag-a tricolour of green, saffron, and red stripes-at the International Socialist Congress held at Stuttgart, Germany, in 1907. She is also known as the 'Mother of Indian Revolution'. One thousand representatives from across the world had come to attend the conference. Madam Bhikaji Cama became the first person to hoist Indian flag on foreign soil in that conference. The same flag was later smuggled into India by socialist leader Indulal Yagnik and is now on display at the Maratha and Kesari Library in Pune.

11. (c)
Just as, book is read. Same as, poetry is read as recitation.

12. (b)
Expression $\rightarrow$ P @ Q $ U = R % S # V
On drawing blood relation diagram-



Hence, it is clear from above diagram that P is V's maternal grandfather.

13. (c)
Given,
$J \rightarrow (+)$, $G \rightarrow (-)$
$M \rightarrow (\times)$, $B \rightarrow (\div)$
From option (a)
6M5J4B2G10 = 22
$6 \times 5 + 4 \div 2 - 10 = 22 \Rightarrow 6 \times 5 + \frac{4}{2} - 10 = 22$
$32 - 10 = 22$
$22 = 22$ This is equal
From option (b)
4G16B2J6M5 = 26
$4 - 16 \div 2 + 6 \times 5 = 26$
$4 - \frac{16}{2} + 30 = 26$
$-4 + 30 = 26$
$26 = 26$ This is equal too
From option (c)
6B2M8G10J4 = 20
$6 \div 2 \times 8 - 10 + 4 = 20$
$\frac{6}{2} \times 8 - 10 + 4 = 20$
$24 - 10 + 4 = 20$
$14 + 4 = 20$
$18 = 20$ This is not equal
So option (c) will not be correct.

14. (c)
It is clear from the statement that politician only marry beautiful girls and 'X' is a beautiful girl but depends on 'X' that she may or may not marry a politician. Hence, option (c) is true.

15. (d)
According to the question it is clear from the statement that assumption I and II both are implicit.

16. (d)
From statement-I,
D>A>E
From statement-II,
C>B>E
From statement-III,
D>C
A>B
From statement (I), (II) and (III),
D>C/A>B>E
It is clear that E is the shortest.
Hence, the statement I, II and III together are sufficient to answer the given question.

17. (a)
The word GRUNT can't be formed from 'LAUGHTER' because it doesn't contain letter 'N'.

18. (b)
Just as, Tiger is the National animal of India. Similarly, Cow is the National animal of Nepal.

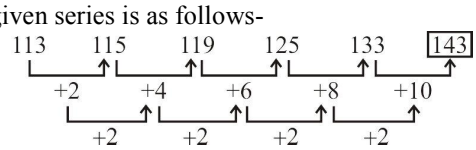
19. (d)
According to the question,

$P \rightarrow 8$	and,	$S \rightarrow 4$
$A \rightarrow 3$		$C \rightarrow 9$
$I \rightarrow 5$		$O \rightarrow 0$
$N \rightarrow 2$	,	$R \rightarrow 6$
$T \rightarrow 7$		$E \rightarrow 1$

On using the given code
$R \rightarrow 6$
$E \rightarrow 1$
$C \rightarrow 9$
$E \rightarrow 1$
$N \rightarrow 2$
$T \rightarrow 7$
Hence, RECENT = 619127

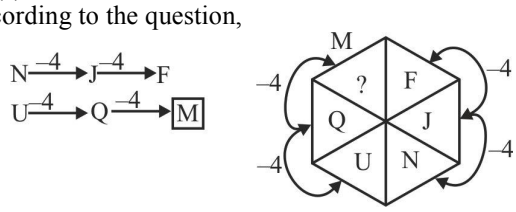
20. (d)
Just as, Team's head is called Captain. Gang's head is called Boss. Cabinet's head is called Prime Minister whereas Troupe word is used for group of artist. So, option (d) is different.

21. (a)
The given series is as follows-



Hence, $\boxed{? = 143}$

22. (c)
According to the question,



Hence, $\boxed{? = M}$

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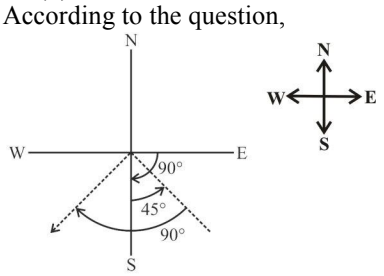
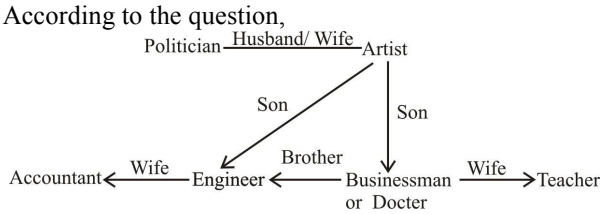
23. (b)
According to the question,



Hence, Rekha is facing South-West direction now.

24. (b)
According to the question,



So, Doctor may be the husband of Teacher because Artist is married to Politician and Accountant is married to Engineer and it is said that there are only three married couples and Business man is not in option.

25. (b)
Given,

(3 B 4 D 5 A 6) C1
[A → –, B → ×, C → ÷, D → +]

On changing the sign-

(3 × 4 + 5 – 6) ÷ 1= ?
= (12 + 5 – 6) ÷ 1
= (17 – 6) ÷ 1
= 11 ÷ 1 =11

26. (d)
The analytical engine was built by Charles Babbage. Blaise Pascal built the first calculator machine.
Herman Hollerith invented an electromechanical tabulating of punch card machine.

27. (a)
Payroll software is an on-premises or cloud - based solution that manages, maintains and automates payments to employees.

28. (d)
Joystick is an input device which works like a trackball. The ball has a stick attached to it that rotates on a base and reports its angle or direction to the CPU. It is used in video games, simulator training etc.

29. (a)
Optical mouse uses a laser to detect the movement of the mouse. An optical mouse uses LEDs, optical sensor, and digital signal processing in place of traditional mouse ball and electromechanical transducers.

30. (a)
Memory is a device in a computer where instruction and other data are stored, their types are as follows.

- Internal Processor Memory
- Primary Memory or Main Memory
- Secondary or Auxiliary Memory

Register is a type of internal processor memory while main memory is RAM, but both of them interact directly with the processor. There are two types of primary memory RAM and ROM. Secondary memory is also called auxiliary memory. In this data can be stored for a long time.

31. (b)
Cache memory is an extremely fast memory that act as a buffer between RAM and the CPU. It holds frequently requested data and instructions so that they are immediately available to the CPU when needed, cache is usually located inside the CPU Chip.

32. (c)
A semiconductor substance lies between the conductor and insulator. It control and manage the flow of electric current in electronic equipment and devices. As a result, it is a popular component of electronic chips made for computing components and a variety of electronic devices, including solid state storage.

33. (c)
TCP/IP Transmission Control Protocol/Internet Protocol is an application layer protocol that enables application programs and Internet devices to exchange messages over a network.

34. (c)
A cell phone connected to a Bluetooth headset or a mobile computer connected to a portable Bluetooth thermal printer is an example of a Personal Area Network (PAN). PAN is a computer network that is used to connect personal devices such as laptops, mobile phones, media players and play stations. This network was developed by Thomas Zimmerman. This network helps in communication.

35.(a)
Dial-up Internet access is a low-speed Internet connection when compared with DSL (Digital Subscriber Line) and cable modem.
Dial-up connections use a standard phone line and analog modem to access the Internet at data transfer rates of up to approximately 56–64 Kbps. Dial-up connections are the cheapest way to access the Internet, but they are also the slowest connections.

36. (b)
The Margins options in the Page Setup group of MS Word, page layout includes wide, Mirrored, Narrow, Normal, Moderate, default and custom.
Apply a predefined margin setting
(1) Select Layout - Margins
(2) Select the margin measurements you want.
(3) You can also create custom margins.

37. (c)
F4 → Repeat the last command or action, if possible.
F1 → Displays the word help Task Pane.
F2 → Move the selected text or graphic.
Shift + F3 → switch case.
F5 → Display the Go to dialog box.

38. (c)
The correct sequence of steps which adds to double underline text in MS Word are
a – select text
b – Click Home tab; then click on arrow of 'Font' group.
c – Select underline style as double line.

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39. (c)
The internet is a World Wide Network of computers which is also called a network of networks.

40. (a)
If an email user wants to reply an email then he would filled "To" and "From" field both automatically.
To → Email address of receiver
From → Email address of sender

41. (b)
HTTPS is short form of Hyper Text Transfer Protocol Secure. It is the secure version of HTTP. It is used to secure communication internet.

42. (c)
Yandex is a search engine.
Search engines - Google, Bing, Yahoo, DuckDuckGo, Baidu, Ask.com, Never.
Web browser - Chrome, Firefox, Opera, Microsoft Edge, Safari, Vivaldi, Brave, Netscape Navigator, Mosaic, Internet Explorer, Chromium etc.

43. (a)
Google, Outlook and Yahoo are web mail provider, these are usually free e-mail accounts that operate from a website, whereas upGrad is not related to Webmail.

44. (a)
Table for chrome tab action

Action	**Shortcut**
Active the first tab	Ctrl + 1
Active the right most tab	Ctrl + 9
Move tabs right or left	Ctrl + Shift +Pg Dn Ctrl + Shift + Pg Up

45. (d)
In general usage, automation can be defined as a technology concerned with performing a process by means of programmed commands combined with automatic feedback control to ensure proper execution of the instructions.

46. (d)
Divisibility rule of 9 : A number whose sum of its digit is exactly divisible by 9 then the number is always divisible by 9.
from options -
(a) 49104 → 4 + 9 + 1 + 0 + 4 = 18, divisible by 9.
(b) 77832 → 7 + 7 + 8 + 3 + 2 = 27, divisible by 9.
(c) 35253 → 3 + 5 + 2 + 5 + 3 = 18, divisible by 9.
(d) 45390 → 4 + 5 + 3 + 9 + 0 = 21, not divisible by 9.

47. (c) From question-
$(64 \times 5^4) - (5^4 \times 16)$
$= (64 \times 625) - (625 \times 16)$
$\Rightarrow 40{,}000 - 10{,}000 = 30{,}000$

48. (b) From question-
$\frac{7}{9} = 0.777$
$\frac{6}{7} = 0.857$
$\frac{22}{25} = 0.88$
$\frac{11}{13} = 0.846$
Hence, fraction $\frac{22}{25} = 0.88$ is the largest in which.

49. (d)
$\frac{3}{15} + \frac{13}{14} - \frac{19}{21} + \frac{31}{35} - \frac{23}{30}$
(LCM of 15, 14, 21, 35 and 30 is 210)
$= \frac{42 + 195 - 190 + 186 - 161}{210}$
$\Rightarrow \frac{423 - 351}{210}$
$\Rightarrow \frac{72}{210} = \frac{12}{35}$
Hence, the required value is $\frac{12}{35}$.

50. (c)
The LCM of the numbers 36, 54, 72 and 96 is
$36 = 2 \times 2 \times 3 \times 3$
$54 = 2 \times 3 \times 3 \times 3$
$72 = 2 \times 2 \times 2 \times 3 \times 3$
$96 = 2 \times 2 \times 2 \times 2 \times 2 \times 3$
Hence the LCM of 36, 54, 72, 96
$= 2\times2\times2\times 2 \times 2 \times 3 \times 3 \times 3$
$= 32 \times 27$
$= 864$

51. (c)
According to the question,
$63 - 3 = 60$
$77 - 5 = 72$
$98 - 2 = 96$
So, the required number = HCF of 60, 72 and 96.
$60 = 2\times2\times3\times5$
$72 = 2\times2\times2\times3\times3$
$96 = 2\times2\times2\times2\times2\times3$
HCF = $2\times2\times3 = 12$
While 12 is not in the option but 12 will be divisible by 6.
So, option (c) is required answer.

52. (b)
$\frac{x}{y} = \frac{37}{92.5} = \frac{1}{2.5}$
When $x = 16$
then $\frac{16}{y} = \frac{1}{2.5}$
$y = 40$

53. (c)
Population increased in two successive years by 8% and 12% respectively.
Increase percentage in 2 years = $8+12+\frac{12\times8}{100} = 20.96$
Population decreased in 3rd year = 22%
Compound increases in 3rd year = $20.96–22–\frac{20.96\times22}{100}$
$= –5.65\%$
Thus, the population of the town at the end of 3rd year

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$$= 15625 \times \frac{(100-5.65)}{100}$$

$$= 15625 \times \frac{94.35}{100} = 14742.18 \approx 14742$$

54. (a)

Given,

Length of the three sides of a triangle are-

a = 12 cm, b = 15 cm, c = 21 cm

Semi-perimeter(s) = $\frac{a+b+c}{2}$

$$= \frac{12+15+21}{2} = \frac{48}{2}$$

= 24 cm

Hence, Area of triangle (Δ) = $\sqrt{s(s-a)(s-b)(s-c)}$

$$= \sqrt{24(24-12)(24-15)(24-21)}$$

$$= \sqrt{24 \times 12 \times 9 \times 3}$$

$$= 36\sqrt{6}\ cm^2$$

55. (d)

Paras can complete 40% of work in 8 day then,

Time taken by Paras to complete whole work

$$= 8 \times \frac{100}{40}$$

$$= \frac{5}{2} \times 8$$

= 20 days

(Deepti + Paras) can do 10% of work in 1 day.

Then, they can complete whole work = $1 \times \frac{100}{10}$

= 10 days

According to the question,

Then, $\frac{1}{10} = \frac{1}{20} + \frac{1}{Deepti}$

$$\frac{1}{Deepti} = \frac{1}{10} - \frac{1}{20} = \frac{2-1}{20} = \frac{1}{20}$$

Hence Time taken by Deepti to complete the whole work = 20 days

56. (c)

Speed of bus = 25 km./hr.

Let the speed of woman = x km/h

Distance = D, Time = 15 minutes $= \frac{15}{60} = \frac{1}{4}$ hours

then new time interval = 10 minutes $= \frac{10}{60} = \frac{1}{6}$ hours

Then relative speed $(S) = \frac{D}{T}$

$\Rightarrow$ $D = S \times T$

$$D = 25 \times \frac{1}{4}$$

$\because$ $D = \frac{25}{4}$ .....(i)

$D = \frac{25+x}{6}$ .....(ii)

From equation (i) and equation (ii)

$$\frac{25+x}{6} = \frac{25}{4}$$

$$25 + x = \frac{150}{4}$$

$$x = \frac{150}{4} - 25$$

$$x = \frac{150-100}{4}$$

$$x = \frac{50}{4}$$

Speed of woman (x) = 12.5 Km./hr.

57. (b)

Let amount = ₹P

Given,

r = 5% yearly

n = 3 years

$$C.I. = P\left[\left(1+\frac{r}{100}\right)^n - 1\right]$$

$$6305 = P\left[\left(1+\frac{5}{100}\right)^3 - 1\right]$$

$$6305 = P\left[\frac{21}{20} \times \frac{21}{20} \times \frac{21}{20} - 1\right]$$

$$6305 = P\left[\frac{9261-8000}{8000}\right]$$

$$6305 = P\left[\frac{1261}{8000}\right]$$

P = 5 × 8000

P = ₹40,000

$$S.I. = \frac{P \times r \times t}{100}$$

$$= \frac{40000 \times 5 \times 3}{100} = ₹6000$$

58. (c)

The cost price of an item (CP) = ₹4500

Selling price (SP) = ₹ 3500

$$loss\% = \frac{CP-SP}{CP} \times 100$$

$$= \frac{4500-3500}{4500} \times 100$$

$$= \frac{1000}{4500} \times 100$$

$$= \frac{1000}{45}$$

$$= 22\frac{2}{9}\%$$

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59. (b)

The first 25 odd numbers will be 1,3,5,7,9.....49 respectively which are in the arithmetic progression.

Where first term (a) = 1

and common difference (d) = 3 – 1 = 2

And number of terms (n) = 25

So, sum of n numbers of term in arithmetic progression

$$S_n = \frac{n}{2}[2a+(n-1)d]$$

$$= \frac{25}{2}[2\times1+(25-1)\times2]$$

$$= \frac{25}{2}\left[2+(24)\times2\right]$$

$$= \frac{25}{2}[2+48]$$

$$= \frac{25\times50}{2}$$

$$= 25 \times 25 = 625$$

Hence, sum of the first 25 odd number = 625

60. (d)

$$\sqrt{\frac{1+\cos A}{1-\cos A}}$$

$$= \sqrt{\frac{1+\cos A}{1-\cos A}\times\frac{1+\cos A}{1+\cos A}}$$

$$= \sqrt{\frac{(1+\cos A)^2}{\sin^2 A}}$$

$$= \frac{1+\cos A}{\sin A}$$

$$= \frac{1}{\sin A}+\frac{\cos A}{\sin A}$$

= cosecA + cotA

61. (b)

$$\text{Arithmetic Mean} = \frac{\text{Total sum of Scores}}{\text{Number of Students}}$$

$$= \frac{82+60+62+63+78+75+86+75+91+46}{10}$$

$$= \frac{718}{10}$$

= 71.8

62. (d)

square root of $\left(6+2\sqrt{3}\right)\left(6-2\sqrt{3}\right)$

$$= \sqrt{\left(6+2\sqrt{3}\right)\left(6-2\sqrt{3}\right)}$$

$$= \sqrt{(6)^2-\left(2\sqrt{3}\right)^2}$$

$$= \sqrt{36-12}$$

$$= \sqrt{24}$$

$$= 2\sqrt{6}$$

63. (d)

Let the present age of P be x years and the present age of Q be y years.

According to the question -

3x – 25 = y

3x – y = 25 ..... (i)

After 10 years age of P = (x + 10) years

After 10 years age of Q = (y + 10) years

Then

3(x + 10) = 2(y + 10) + 18

3x – 2y = 8 ..... (ii)

on solving equation (i) and (ii) -

6x – 2y = 50 ..... (on multiplying 2 in equation (i))

$$\underline{_3x \mp 2y = _8}$$

3x = 42

x = 14

Putting the value of x in equation (i) -

42 – y = 25

or

y = 17 years

Hence the present age of Q is 17 years

64. (a)

Part filled by pipe A in hour $= \frac{1}{21}$ part

Part filled by B in 1 hour $= \frac{1}{18}$ part

Part filled by both (A + B) in 1 hour

$$= \frac{1}{21}+\frac{1}{18} = \frac{6+7}{126} = \frac{13}{126}$$

So, time taken to fill the tank $= \frac{126}{13} = 9\frac{9\times3}{13\times3}$

$$= 9\frac{27}{39} \text{ hours.}$$

65. (d)

Given, Amount

₹ 1,470

Anant : Mohan

3 : 4

Mohan's Share $= \frac{4}{7}\times1470 =$ ₹ 840

66.(d)

Dipole moment - The product of the charge and the distance between the two charges is called dipole moment. It is a vector quantity.

$$\vec{P} = q\times\vec{d}$$

Where, p = dipole moment

q = charge

d = distance.

Electric Current - The rate of flow of charge is called electric current. It is a scalar quantity.

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Gravitational Potential Energy- The energy stored in an object due to its position above the earth's surface is called gravitational potential energy. It is scalar quantity.

Electric Power: It is electrical energy per unit time.It is a scalar quantity.

67. (a)

Given,

F = 10 Newton

Acceleration (a) = 2 m/s^2

The mass of the body = ?

F = m × a

10 = m × 2

m = 5 kg

68. (b)

Given :

Initial velocity = 5 m/sec.

Final velocity = 10 m/sec.

Time = 5sec.

ΔV = Final velocity – Initial velocity

= 10 – 5

= 5 m/sec.

Acceleration of car (a) = $\frac{\Delta V}{t}$

$= \frac{5\,m/sec}{5\,sec}$

= 1 m/sec^2 or, 1ms^{-2}

69. (a)

Given,

Mass (m) = 10 kg

Velocity (v) = 6 m /sec.

We know that, Kinetic Energy (K.E) = $\frac{1}{2}mv^2$, where m is mass and v is the velocity

$\Rightarrow$ K.E = $\frac{1}{2}\times 10\times 6\times 6$

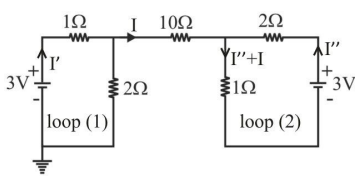
So, K.E = 180 Joule

70. (c)

Heat energy is the result of the movement of tiny particles called atoms, molecules or ions in solids, liquid and gases.

- Heat energy can be transferred from one object to another. Its transfer or flow is done by the difference in temperature between the two bodies.
- According to second law of thermodynamics, it is impossible to get 100% of efficiency because of environmental changes and some other factors. So, the efficiency of a heat energy can never be 100%.

71. (a)



According to the law of conservation in loop (1)

I′ = I′–I

I = 0A

According to the law of conservation in loop (2)

I″ = I″+I

I= 0A

It proves that, there is no current flowing through 10Ω resistance because not a complete path for current flow.

72. (c)

As we know that,

Magnetic flux $\phi = LI$

So, Mutual inductance $(L) = \frac{\phi}{I} = \frac{[BA]}{[I]}$

$[B] = [M^1T^{-2}A^{-1}]$

$[A] = [L^2]$

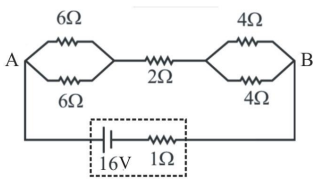
$[I] = [A]$

Dimensional formula of mutual inductance

$$L = \frac{[M^1T^{-2}A^{-1}][L^2]}{[A]}$$

$$\boxed{L = [M^1L^2T^{-2}A^{-2}]}$$

73. (d)



$R_{AB} = R_{eq} = \frac{6\times 6}{6+6} + 2 + \frac{4\times 4}{4+4}$

$= 3 + 2 + 2$

$\boxed{R_{eq} = 7\Omega}$

74. (a)

Equivalent inductance with the combination of two inductor either in same polarity or opposite polarity may be defined as

$$L_{eq} = L_1 + L_2 \pm 2M$$

For series cumulatively coupled the equivalent inductance

$$\boxed{L_{eq} = L_1 + L_2 + 2M}$$

75. (a)

In a two-watt power meter, for all lagging power factors, first meter shows positive and second meter shows negative reading. 0 to 0.5 is the power factor.

76. (b)

Ampere per meter is the unit of magnetic field intensity.

$$H = \frac{NI}{\ell}$$

Where,

H = magnetic field intensity

N = Number of turn

I = coil current

ℓ = length of the coil

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77. (a)
Electrolytic capacitor provide maximum capacitance in the smallest space with the least cost.
- This type of capacitors are usually polarized. They provide very high capacitance (Usually more than 1μF)

78. (d)
Magnetic flux can be measured by hall effect pick-up.
Hall effect- When a current (I) carrying conductor, placed in a transverse magnetic field (B), an electric field E is induced in the conductor which is per-perpendicular to both I and B. This phenomenon is called the hall effect.
(i) The carrier concentration of charge is measure by hall effect.
(ii) Measures magnetic flux.
(iii) Hall voltage and current density are measured.

79. (c)
Capacitance of a capacitor filled with dielectric-

$$C = \frac{\varepsilon A}{d}$$

$$C = \frac{\varepsilon_0 \varepsilon_r A}{d}$$

Store charge (Q) = CV
Electric field inside a parallel plate capacitor-

$$E = \frac{Q}{\varepsilon_0 A} = \frac{CV}{\varepsilon_0 A}$$

$$E = \frac{\varepsilon_0 \varepsilon_r AV}{\varepsilon_0 d.A} = \frac{\varepsilon_r V}{d} = \frac{2\times 1}{1\times 10^{-3}}$$

E = 2000 N/C

80. (c)
Silver has the highest electrical conductivity. It is a conducting material with a large number of free electrons. Due to large number of free electron it has a high electrical conductivity. The resistivity of silver is 1.59×10^{-8} Ωm and the conductivity is $6.29\times10^{7}\ \Omega^{-1}m^{-1}$

81. (d)
The operating temperature of PVC, paper, silk or cotton without impregnation is 90ºC.

Insulation classes	Maximum permissible temperature
Y	90ºC
A	105ºC
E	120ºC
B	130ºC
F	155ºC
H	180ºC
C	180ºC above

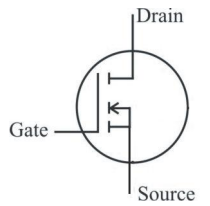
82. (b)
Colour coding of resistance–
Brown→ 1
Black→ 0
Red→ 10^2
golden→ ±5%
R = $10\times10^2 \pm 5\%$
R = 1kΩ ± 5%

83. (c)

	Group - I		Group - II
(A)	LED	(iii)	Spontaneous emission
(B)	Avalanche Photodiode	(iv)	Current gain
(C)	Tunnel diode	(i)	Heavy doping
(D)	Laser	(ii)	Coherent radiation

84. (b)
The current gain of a transistor in CB configuration is defined as the ratio of collector current (I_C) to the emitter current (I_E). The current gain of a transistor is CB configuration is less than unity. The value of current gain lies in the range of CB configuration is 0.9 to 0.998.

85. (d)
The given symbol of n-channel enhancement MOSFET,



In enhancement mode there is no channel between drain and source. It is formed by given positive gate source voltage.

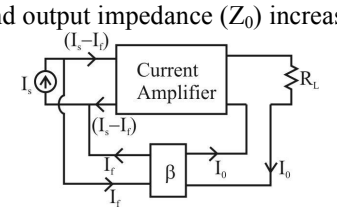
86. (c)
Negative shunt clipper circuit is represented by the given figure.
Shunt clipper-
- In shunt clipper, the diode is connected in parallel with the output load resistance.
- The operating principles of the shunt clipper are near opposite to the series clipper

Types of shunt clipper-
- Positive shunt clipper
- Negative shunt clipper

87. (d)
With the removal of emitter bypass capacitor the effect of emitter resistor is predominant and gain will be reduced.

88.(c)
The main purpose of using coupling capacitor is to prevent d.c. mixing with input and output. These capacitor block unwanted dc components and decouple or insolate dc from input and output.

89. (b)
Current shunt feedback has input impedance (Z_i) decreases and output impedance (Z_0) increases.



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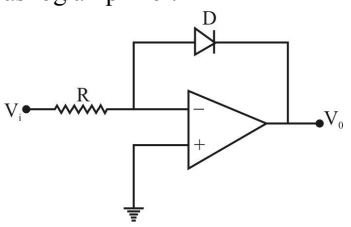
90. (b)
A simple PN junction diode is connected in the feedback path of an inverting op-amplifier, the circuit can be used as log amplifier.



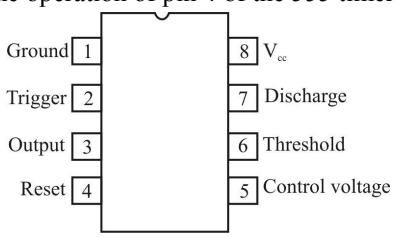
Log. amplifier

$$V_o = -\eta V_T \ell_n \frac{V_i}{I_o R}$$

Where,

η = Recombination factor
V_T = Thermal voltage
I_o = Reverse saturation current

91. (c)
Reset is the operation of pin 4 of the 555 timer IC.



92. (c)
The ratio of maximum displacement deviation to full scale deviation of the instrument is known as linearity.

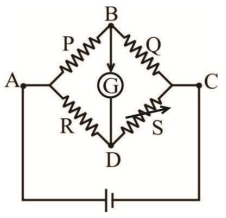
93. (a)
A galvanometer is converted to a voltmeter by adding a high resistance in series with the galvanometer.

- A galvanometer is converted to an ammeter by adding a low resistance in parallel with the galvanometer.

94. (b)
A power factor meter has one current circuit and two pressure circuits.

- The meter has two identical pressure coils. Both the coils are pivoted on spindle.
- A power factor meter has no control springs.

95. (c)
A Wheatstone bridge is balanced if the ratio of resistance on one side of the bridge equals to ratio of resistors on the other side.



$$\frac{P}{Q} = \frac{R}{S}$$

96. (b)
Strain gauge converts mechanical displacement into electrical signals. A strain gauge type transducer converts physical quantity such as load, pressure or displacement into mechanical strain on the strain generating body (elastic body) and the mechanical strain is converted into electrical output using strain gauges mounted on the elastic body.

97. (a)
$(347)_{16} = (3515)_K$

$3\times16^2 + 4\times16^1 + 7\times16^0 = 3\times K^3 + 5\times K^2 + 1\times K^1 + 5\times K^0$

$3\times256 + 4\times16 + 7\times1 = 3K^3 + 5K^2 + K + 5$

$768 + 64 + 7 = 3K^3 + 5K^2 + K + 5$

$839 = 3K^3 + 5K^2 + K + 5$

$3K^3 + 5K^2 + K + 5 - 839 = 0$

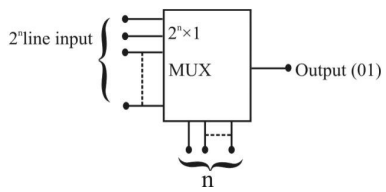
$3K^3 + 5K^2 + K - 834 = 0$

Putting K=6 in this equation satisfies the equation. Thus K=6 a factor of the given equation.
Therefore K = 6

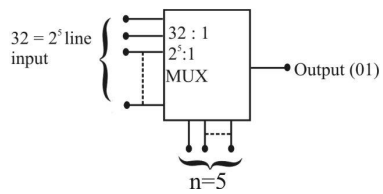
98. (a)
A Boolean function operation of binary variables can be described by mean of appropriate mathematical function called Boolean function.

- An implementation of a Boolean function requires the use of logic gates.

99. (d)



n = number of select line or control lines



n=5 select line or control lines
32:1 MUX have a 5 control lines

100. (a)

logic family	Propagation delay by time
ECL	2 ns
TTL	10 n s
CMOS	70 n s
RTL	12 n s
I^2L	25-100 n s
HTL	90 n s
DCTL	10 n s

So, ECL has the lowest propagation delay time.

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PRACTICE SET - 2

1. Who was the first person to walk on the Moon?
(a) Katherine Johnson
(b) Neil Armstrong
(c) Buzz Aldrin
(d) George Tailor

2. Indentify the Indian batsman who scored three consecutive test centuries in his first three International Cricket test matches.
(a) Virat Kohli
(b) Sachin Tendulkar
(c) Mohammad Azharuddin
(d) Rahul Dravid

3. Below are fours pairs, each representing a state and a folk dance. Which pairing of state and folk dance in incorrect?
(a) Assam– Bihu
(b) Chhatisgarh–Dagla
(c) Gujarat– Garba
(d) Uttarakhand–Tapali

4. What was the real name of the Hindi literary writer Munshi Premchand?
(a) Atmaram
(b) Sachchidanand
(c) Dhanpat Rai
(d) Nawab Rai

5. Which regulatory body is the only note issuing authority in India?
(a) Reserve Bank of India
(b) Small Industries Development Bank of India
(c) Securities and Exchange Board of India
(d) Insurance Regulatory and Development Authority of India

6. During a no-confidence motion against his own government, the Prime Minister of India cannot participate in voting, if he-
(a) Is a Rajya Sabha Member.
(b) Is prohibited by opposing parties of the Lok Sabha.
(c) Is in a majority
(d) Is a member of the Lok Sabha.

7. The amount of carbon dioxide in the atmosphere is :
(a) 71% (b) 21%
(c) 0.03% (d) 0.3%

8. _____is a type of crescent-shaped sand dune formed in desert regions where the wind direction is very constant.
(a) Blowhole (b) Bluff
(c) Bergschrund (d) Barchan

9. Which of the following was not Akbar's nine gems or navratna?
(a) Ustad Ali Khan (b) Raja todarmal
(c) Abul fazal (d) Fakir Aziao Din

10. Who shot dead Rand, the commissioner of Police, Pune due to failure to check the plague in India at the end of the 19th century in India?
(a) Damodar Chapekar (b) Veer Savarkar
(c) Bhagat Singh (d) Vasudev B. Phadke

11. Rafting is related to water as Skiing is related to
(a) Ice (b) Surface
(c) Sceeze (d) Sky

12. B's mother is the daughter of F. C is the son of F and D, G is the son of C and E. D is the mother of R. How is F related to G?
(a) Father's mother (b) Brother
(c) Father's father (d) Mother's father

13. If '÷' is replaced with '+', '×' is replaced with '–' '+' is replaced with '×' and '–' is replaced with '÷', then what will be the value of the given expression?
8 + 5 × 54 – 9 ÷ 3 = ?
(a) 44 (b) 46
(c) 37 (d) 33

14. Statement:
This scale is transparent.
Conclusion:
1. The scale is made up of glass.
2. The scale is made up of plastic.
(a) Only II follow
(b) Both I and II follows
(c) Only I follow
(d) Neither I nor II follow

15. Consider the given statement and decide which of the given assumptions is/are implicit in the statement.
Statement :
"The Indian cricket team is expected to win the World Cup in 2019" –Mahendra Singh Dhoni.
Assumptions :
1. Indian cricket team is good
2. Indians want the Indian cricket team to win the World Cup 2019
(a) Neither assumption 1 nor 2 is implicit
(b) Only assumption 1 is implicit
(c) Only assumption 2 is implicit
(d) Both assumptions 1 and 2 are implicit

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16. Question :
Who is smallest in age among A, B, C and D?
Statements :
1. A is greater than D and B
2. C is greater than A
(a) Both statement are not sufficient
(b) Only statement 2 is sufficient
(c) Both statement together are sufficient
(d) Only statement 1 is sufficient

17. From among the given options, select the word which cannot be formed using the letters of the given word.
DAUGHTER
(a) DATE (b) HURT
(c) TOUGH (d) GET

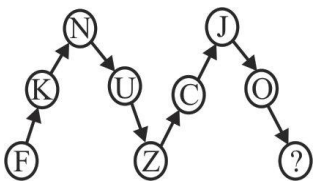
18. The option which is related to the third word. In the same way as the second word is related to the first word is -
Poem : Verse :: Book: ?
(a) Story (b) Page
(c) Printing (d) Language

19. In a code language, if KARAN is written as 45, then how will ARUN be written as in that language?
(a) 54 (b) 56
(c) 41 (d) 42

20. Four words have been given, out of which three are alike in some manner and one is different. Select the odd one.
(a) Chalk (b) Marker
(c) Book (d) Pen

21. In the series 11, 19, 27, 35, 43, …….. which of the following will NOT be a number of the series?
(a) 195 (b) 434
(c) 107 (d) 307

22. Study the given pattern carefully and select the letter that can replace the question mark (?) in it,



(a) P (b) S
(c) R (d) L

23. Umesh is standing facing the south-west direction. He then takes a 90° clockwise turn. After that, he takes a 135° clockwise turn. He finally takes a 90° anticlockwise turn. In which direction is he facing now?
(a) West (b) North
(c) North-east (d) North-west

24. Geet and Anshuman are the children of Aditya's Mother's brother. Roop has only one brother-Manjeet and no sister. Ayushman is the son of Rajkumar. Ayushman is the Manjeet's father. Roop's husband and Manjeet's wife have no siblings. If Aditya is Roop's son, how is Manjeet related to Geet?
(a) Father (b) Uncle
(c) Husband (d) Mother's brother

25. If Q means addition, J means multiplication, T means Subtraction and K means division, then find the value
18K 6J 7Q 5T 2
(a) 30 (b) 34
(c) 26 (d) 24

26. ENIAC, EDVAC, etc are examples of _____ generation computers.
(a) Third (b) First
(c) Second (d) Fourth

27. Which of the following statements is incorrect with reference to the visual display unit (VDU) of a computer system?
(a) VDU creates images by arranging tiny dots known as pixels, in a rectangular pattern
(b) VDU is the primary output device of a computer
(c) VDU has differences between cathode-ray tube and flat-panel display
(d) The size of the pixel determines the clarity of the image displayed on the VDU

28. Which of the following statements is correct about the output devices of a computer?
(a) It is used to send data to the computer
(b) Mouse is an output device
(c) It converts digital data into a form understandable by humans
(d) It converts data into digital form

29. Which of the following statements is incorrect regarding computer output devices?
(a) It converts digital data into a form that is human understanding
(b) It converts data into digital form
(c) It receives data from the computer system for display
(d) Printer is an output device

30. Moving data from one system buffer to the process and reading data from the I/O device to the other buffer may be performed simultaneously in which of the following buffering schemes?

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(a) Circular buffering
(b) User-level buffering
(c) Double buffering
(d) Single buffering

31. In a multitasking system, the ____ is a fixed amount of RAM that is allocated as a temporary holding area, so, that the CPU can perform calculations on the data before transferring the data to a particular device.
(a) Helix (b) Wizard
(c) Bounce (d) Buffer

32. Which of the following is a communication service provided by the internet?
(a) Gopher (b) Archie
(c) Telnet (d) FTP

33. Which of the following statements is false about HTTPS?
(a) It ensures protection against man-in-the - middle attacks
(b) Due to the use of encryption, communication between two hosts using HTTPS is secure
(c) It is more secure than HTTP
(d) It cannot be used for financial transaction

34. Which layer protocol is in DNS internet architecture?
(a) Transport (b) Application
(c) Data Link (d) Network

35. In MS - Word 365 which the following refers to the use of a short, dashed line to break a word when it reaches the edge of a document or container?
(a) Hyphenation (b) Strikethrough
(c) Wrap text (d) Merge and Center

36. Which of the following options best describes the words regular, bold and Italic in MS Word 365?
(a) Font Size (b) Color
(c) Effects (d) Size

37. In MS - word 365, when we click on 'Delete' option in the Mini toolbar, which is displayed by right - clicking on the table cell, row or column which you want to delete. If you click, which of the following option is not available?
(a) Delete Rows (b) Delete Columns
(c) Delete Cells (d) Delete Pages

38. Match the points under the column 'LIST-I to those under the column 'LIST-II'.

List-I	List-II
a)Email server	i) A free email (Webmail) tool provided by Microsoft
b) LinkedIn	ii) Postfix
c) Orkut	iii) A social networking portal for business professionals
d) Hotmail	iv) The service was designed to help users meet new and old friends.

(a) a-ii, b-iii, c-i, d-iv
(b) a-iii, b-ii, c-iv, d-i
(c) a-ii, b-iii, c-iv, d-i
(d) a-ii, b-iv, c-iii, d-i

39. Verification of a login name and password on a computer is known as.....
(a) Authentication (b) Synchronization
(c) Identification (d) Accessibility

40. Which of the following is a computer based application for exchanging message between users?
(a) e-kyc (b) e-mail
(c) e-aadhar (d) e-sharm

41. Which of the following is a graphical web browser developed by Apple?
(a) Edge (b) Chrome
(c) Safari (d) Firefox

42. Which of the following is an incorrect statement about search engines?
(a) Bing was launched by Microsoft in 2009.
(b) Google search engine was originally known as Backrub
(c) AltaVista was launched by Apple.
(d) Ask was launched in 1996.

43. Which of the following web browsers was developed by Apple?
(a) Mozilla Firefox (b) Safari
(c) Opera (d) Internet Explorer

44. Which of the following operations refers to the process of converting information, corresponding text, numbers photos or music into digital data that can be manipulated by electronic devices?
(a) Normalization (b) Unification
(c) Regularization (d) Digitization

45. Several studies have shown that _____video games have negative effects on the younger generation.
(a) puzzle (b) violent
(c) racing (d) adventure

46. If the number 6484y6 is divisible by 8, then find the least value of y?
(a) 3 (b) 4
(c) 1 (d) 7

47. Simplify the following expression :
(15 ÷ 3) –[{(19 – 1) ÷ 2} – {5 × 20 – (7 × 9 – (–2))}]
(a) 21 (b) 31
(c) – 21 (d) 35

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48. Find the greatest fraction out of $-\frac{3}{2}, \frac{3}{2}, \frac{11}{4}, \frac{5}{2}$:

(a) $\frac{3}{2}$ (b) $\frac{11}{4}$

(c) $\frac{5}{2}$ (d) $-\frac{3}{2}$

49. Which of the following fraction will be subtracted from $\frac{3}{4}$ to give the result $\frac{5}{12}$?

(a) $\frac{1}{3}$ (b) $\frac{2}{8}$

(c) $\frac{1}{6}$ (d) $\frac{2}{3}$

50. The LCM of 6, 9 and x is 72. Which of the given options can be a possible value of x?

(a) 18 (b) 12

(c) 36 (d) 24

51. The LCM of $\frac{2}{3}, \frac{4}{9}, \frac{7}{12}, \frac{3}{5}$ is:

(a) 98 (b) 94

(c) 84 (d) 86

52. The difference of two numbers is equal to 30% of their sum find the ratio of the larger number to the smaller number.

(a) 15 : 7 (b) 13 : 7

(c) 2 : 1 (d) 17 : 15

53. The total population of a village is 4,000. The number of males and females increases by 10% and 20% respectively and consequently the population of the village becomes 4500. What was the number of males in the village prior to the new members coming in?

(a) 2500 (b) 3000

(c) 4000 (d) 2000

54. In any triangle ABC, a + b + c = 2s with usual notation, then the value of $\sin\left(\frac{A}{2}\right)$ is

(a) $\sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$ (b) $\sqrt{\frac{(s-c)(s-a)}{ac}}$

(c) $\sqrt{\frac{(s-b)(s-c)}{bc}}$ (d) $\sqrt{\frac{s(s-a)}{bc}}$

55. A and B can complete a piece of work in 10 days and 12 days respectively. If they work on alternate days beginning with A, then in how many days will the work be completed?

(a) 10 (b) $10\frac{1}{2}$

(c) $10\frac{1}{4}$ (d) $10\frac{5}{6}$

56. Two cars A and B starting at the same time meet each other in opposite direction after t hours and after arriving they reach their destination after 5 hours and 6 hours. If the speed of car A is 55 km/hr, what will be the speed of the car B?

(a) $66\sqrt{12}$ km/hr (b) $110\sqrt{3}$ km/hr

(c) $\frac{110}{\sqrt{6}}$ km/hr (d) $\frac{55}{6}\sqrt{30}$ km/hr

57. Amount of ₹1250 becomes ₹1550 in 4 years. What is the rate of simple interest?

(a) 4% (b) 6%

(c) 8% (d) 1%

58. A shopkeeper sells wheat at ₹20/kg that he purchased at ₹18/kg and he gives only 900 gm of wheat instead of 1 kg while selling. The actual percentage profit of the shopkeeper is:

(a) 22.45 % (b) 24.45 %

(c) 23.45 % (d) 20.45 %

59. What is the sum of the following two series?
(8 + 27 + 64 + ... +1000) + (2 + 4 + 6 + ... + 20)

(a) 3136 (b) 3134

(c) 3135 (d) 3133

60. In a triangle ABC, tanA + tanB + tanC = ?

(a) 1

(b) -tanA.tanB.tanC

(c) tanA.tanB + tanB.tanC + tanC.tanA

(d) tanA.tanB.tanC

61. The following table gives a frequency distribution whose arithmetic mean is 33. Find the product of the possible values of k from the distribution.

Value (X)	Frequency (f)
29	4
30	3
30 + k	3k
34	2
62	1

(a) 5 (b) 2

(c) 3 (d) 4

62. The square root of 519841 is-

(a) 721 (b) 629

(c) 631 (d) 731

63. Two years ago, the ratio of the respective ages of subash and Pranav was 4 : 5. Three years hence, this ratio will become 5 : 6. The present age of Pranav is-

(a) 22 years (b) 25 years

(c) 20 years (d) 27 years

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64. If two flood gates A and B work together then the reservoir will be filled in 6 hours gate A fills the reservoir 5 hour faster than gate B. The fast flood gate A will fill the reservoir in how many hours?
(a) 5 Hours (b) 10 Hours
(c) 7 Hours (d) 13 Hours

65. Two numbers are in the ratio 3 : 2. If 8 and 6 are subtracted from the first and the second number respectively, the ratio becomes 8 : 5. The numbers are :
(a) 32, 24 (b) 24, 16
(c) 40, 30 (d) 3, 2

66. Which of the following is not a vector quantity?
(a) Speed (b) Velocity
(c) Displacement (d) Acceleration

67. If a force of 250 N acts on a body at rest, the momentum required is 125 kgm/s. The time for which the force acts on the body is
(a) 0.5 s (b) 0.2 s
(c) 0.1 s (d) 0.3 s

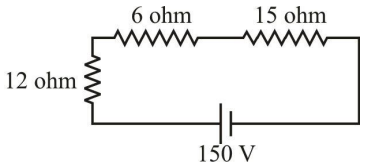
68. A particle starts moving from rest under uniform acceleration. It travels a distance 'x' in the first two seconds and a distance 'y' in the next two seconds. If y = nx, then n =
(a) 1 (b) 3
(c) 2 (d) 4

69. An electric motor is marked 2 HP. The work done by the electric motor in 3 seconds will be nearly.
(a) 373 J (b) 497 J
(c) 1.5 kJ (d) 4.4 kJ

70. The heat generated while transferring 96000 coulomb of charge is one hour through a potential difference of 50 V is
(a) 4.8×10^4 J (b) 1.33×10^3J
(c) 4.8×10^6J (d) 1.33×10^4 J

71. What is the unit of electric potential?
(a) Volt (b) Ampere
(c) Newton per meter (d) Volt per meter

72. Find the voltage across the 6 ohm resistor.



(a) 150V (b) 181.6 V
(c) 27.27 V (d) 54.48 V

73. A light bulb is rated for 60 W, 240 V. Find the resistance of the bulb.
(a) 960 Ω (b) 4 Ω
(c) 1000 Ω (d) 860 Ω

74. The property of a material which opposes the creation of magnetic flux in it
(a) Resistance (b) Reluctance
(c) Permeance (d) Conductance

75. What happens to the energy meter if supply is more than rated value?
(a) It will run slow.
(b) It will run fast.
(c) It will remain constant
(d) It will stop

76. Electric flux is a _____field, and its density is a _____field.
(a) vector, vector (b) vector, scalar
(c) scalar, scalar (d) scalar, vector

77. The coils on the iron core have coefficient of coupling _____.
(a) equals to unity (b) zero
(c) from 0.05 to 0.3 (d) 0.5

78. According to Ampere's circuital Law the line integral of H about any closed path is exactly _____ to the direct current enclosed by that path.
(a) Double (b) Equal
(c) 4 Times (d) Half

79. The induced e.m.f in a coil of 0.08 mH carrying 2A current is reversed in 0.4 seconds
(a) 0.16 mV (b) 0.4 mV
(c) 0.8 mV (d) 0.064 mV

80. A material is said to have become superconductor when
(a) its resistance becomes negative
(b) its resistance becomes very small
(c) its resistance decreases
(d) its resistance becomes zero

81. For an insulating material, dielectric strength and dielectric loss should be respectively :
(a) High and high (b) Low and high
(c) High and low (d) Low and low

82. When a semiconductor is doped with a p-type impurity, each impurity atom will :
(a) Acquire negative charge
(b) Acquire positive charge
(c) Remain electrically neutral
(d) Give away one electron

83. Tunnel diode and Avalanche photodiode are operated in _____ bias and _____ bias respectively.
(a) Reverse, reverse.
(b) Reverse, forward
(c) Forward, reverse
(d) Forward, forward

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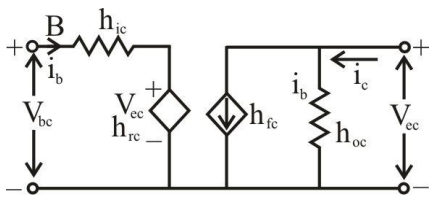
84. The emitter region in N-P-N junction transistor is more heavily doped than the base region so that
(a) The flow across the base region will be mainly due to electrons
(b) The flow across the base region will be mainly due to holes
(c) Base current will be high
(d) There will be increase recombination in base region

85. An n-channel E-MOSFET is turned ON, the gate-to-source voltage must be _____.
(a) less than $V_{threshold}$
(b) greater than V_{peak}
(c) less than V_{peak}
(d) greater than $V_{threshold}$

86. We get percentage ripple if multiply _____ with 100.
(a) Ratio of the input resistance and input voltage
(b) Product of AC current and DC current
(c) Ratio of AC rms voltage to DC voltage
(d) Addition of the AC and DC component of given signal

87. The main advantage of emitter follower is:
(a) Voltage gain is less than unity.
(b) Output impedance is high and input impedance is low.
(c) Voltage gain is very high.
(d) Output impendence is low and input impedance is high.

88. Identify the above configuration of circuit?



(a) hybrid equivalent circuit of common base
(b) hybrid equivalent circuit of common Emitter
(c) hybrid equivalent circuit of common collector
(d) Inverse hybrid equivalent circuit of common base

89. Voltage series feedback (also called series shunt feedback) results in :
(a) Increase in both input and output impedance.
(b) Decrease in both input and output impedance.
(c) Increase in input impedance and decrease in output impedance.
(d) Decrease in input impedance and increase in output impedance.

90. Slew rate of output op amp refers to
(a) Maximum rate of change of output voltage.
(b) Maximum time required by the output to go from zero to 90% of final value
(c) Large signal voltage gain
(d) Maximum rate at which input can change

91. _____ multivibrator is used as a gating circuit and as a delay element.
(a) Astable (b) Monostable
(c) Bistable (d) Oscillator

92. A 0-200 V voltmeter has an accuracy of 0.75% of full scale reading. If voltage measured is 100 V, the error is-
(a) 3% (b) 2%
(c) 1.5% (d) 0.75%

93. Which is an example of Absolute Instrument?
(a) Indicating Ammeter
(b) Deflecting voltmeter
(c) Tangent galvanometer
(d) Digital meter

94. Which of the following types of instruments are not used as ammeters or voltmeters?
(a) PMMC (b) Hotwire
(c) Moving coil (d) Electromagnetic

95. Which of the following methods can not be used to measure capacitance?
(a) De-Sauty's Bridge (b) Schering Bridge
(c) Wien Bridge (d) Anderson's Bridge

96. _____ is used to measure pressure directly.
(a) Rotameter (b) LVDT
(c) Strain gauge (d) Bourdon tube

97. The binary equivalent of $(FA)_{16}$ is :
(a) 1010 1111 (b) 1111 1010
(c) 1000 1111 (d) 1111 1000

98. The function F = ABC'+ABC+A'BC+A'BC' can be reduced to which one of the following?
(a) F = A (b) F = AB
(c) F = ABC (d) F = B

99. For a full Adder
(a) Sum = XY ⊕ YZ ⊕ ZX
Carry = X.Y.Z
(b) Sum = X.Y.Z
Carry = X ⊕ Y ⊕ Z
(c) Sum = X ⊕ Y ⊕ Z
Carry = X.Y.Z
(d) Sum = X ⊕ Y ⊕ Z
Carry = XY + YZ + ZX

100. CMOS offers high ……..
(a) Switching (b) gain
(c) Input impedance (d) Output impedance

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SOLUTION : PRACTICE SET- 2

ANSWER KEY

1. (b)	11. (a)	21. (b)	31. (d)	41. (c)	51. (c)	61. (b)	71. (a)	81. (c)	91. (b)
2. (c)	12. (c)	22. (c)	32. (c)	42. (c)	52. (b)	62. (a)	72. (c)	82. (c)	92. (c)
3. (d)	13. (c)	23. (b)	33. (d)	43. (b)	53. (b)	63. (d)	73. (a)	83. (c)	93. (c)
4. (c)	14. (d)	24. (a)	34. (b)	44. (d)	54. (c)	64. (b)	74. (b)	84. (a)	94. (d)
5. (a)	15. (b)	25. (d)	35. (a)	45. (b)	55. (d)	65. (b)	75. (b)	85. (d)	95. (d)
6. (a)	16. (a)	26. (b)	36. (a)	46. (c)	56. (d)	66. (a)	76. (d)	86. (c)	96. (d)
7. (c)	17. (c)	27. (d)	37. (d)	47. (b)	57. (b)	67. (a)	77. (a)	87. (d)	97. (b)
8. (d)	18. (b)	28. (c)	38.(c)	48. (b)	58. (c)	68. (b)	78. (b)	88. (c)	98. (d)
9. (a)	19. (a)	29. (b)	39. (a)	49. (a)	59. (b)	69. (d)	79. (b)	89. (c)	99. (d)
10. (a)	20. (c)	30. (c)	40. (b)	50. (d)	60. (d)	70. (c)	80. (d)	90. (a)	100. (c)

SOLUTION

1. (b)
Neil Armstrong was the first man to put feet on the moon. He reached on the moon on 21st July, 1969 via Apolo-11 mission. Neil was an American. In 2019 China sent 2 rovers via its Lunar mission.

2. (c)
Mohd. Azharuddin made three consecutive centuries in his first three test matches. His international playing career came to an end when he was found to be involved in a match-fixing scandal in 2000 and subsequently banned by the BCCI for life. In 2012, the Andhra Pradesh High Court lifted the life ban.

3. (d)
Famous folk dances and their concerned states are as follow:

Name of States	Folk Dances
Assam	Bihu, Bichhua, Natpuja, Maharas, Kaligopal, Bagurumba, Naga dance, Khel Gopal, Tabal Chongli, Canoe, Jhumura Hobjanai
Chhattisgarh	Tapali, Goudi, Karma, Jhumar, Dagla, Pali, Navrani, Diwari, Mundari
Gujarat	Garba, Dandiya Ras, Tippani Juriun, Bhavai.
Uttarakhand	Garhwali, Kumayuni, Kajari, Jhora, Raslila, Chappeli.

4. (c)
Premchand, pseudonym of Dhanpat Rai Srivastava, (born July 31, 1880, Lamhi, near Varanasi, India—died October 8, 1936, Varanasi), was an Indian author of novels and short stories in Hindi and Urdu who pioneered in adapting Indian themes to Western literary styles.
He is regarded as one of the foremost Hindi writers of the early twentieth century. His works include Godaan, Karmabhoomi, Gaban, Mansarovar, Idgah.

5. (a)
Reserve Bank of India is the only note issuing authority in India. It is India's central bank and regulatory body responsible for regulation of the Indian banking system. The Reserve Bank of India was established on 1st April 1935 as per Reserve Bank of India Act 1934.

6. (a)
According to Article 75 (3) of the Indian Constitution, the council of ministers is collectively responsible to the Lok Sabha, that is, the council of minister can remain in office only if a majority is elected in this house. The cabinet, including the Prime Minister, has to resign when a motion of no confidence is passed against it. Only members of Lok Sabha can participate in the motion of no confidence, so the Prime Minister cannot participate in voting if he is a Rajya Sabha member.

7. (c)
Different types of gases present in the air and their percentage-
Nitrogen – 78.8%
Oxygen – 20.95%
Argon – 0.93%
Carbon dioxide – 0.03%

8. (d)
Barchan is a type of crescent-shaped sand dune formed in desert regions where the wind direction is very constant.

9. (a)
Nine gems of Akbar's court were Abul Fazal, Tansen, Birbal, Todarmal, Mansingh, Abdul Rahim Khan-i-Khana, Fakir Aziano-Din, Mulla Do-Piyaza and Faizi.

10. (a)
In 1897, the Plague Commissioner had resorted to tyranny and force while managing the epidemic of plague in Pune. As a revenge the Chapekar brothers, Damodar and Balkrishna, shot him dead on 22 June1897. Damodar, Balkrishna and Vasudev these three brothers and their associate Vinayak Ranade were hanged to death.

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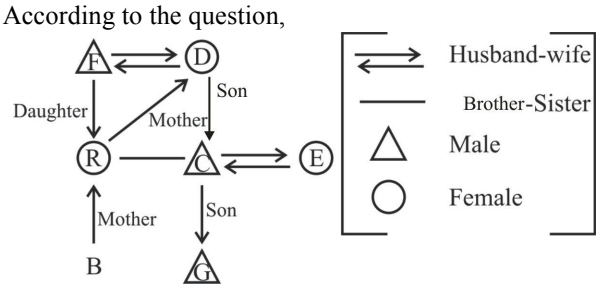
11. (a)
Just as rafting is related to water, in the same way Skiing is related to Ice/Snow.

12. (c)
According to the question,



Hence, It is clear from above that F is father's father of G.

13. (c)
Given,

$\div \rightarrow +$

$\times \rightarrow -$

$+ \rightarrow \times$

$- \rightarrow \div$

Expression $= 8 + 5 \times 54 - 9 \div 3$

On changing the symbols,

$8 \times 5 - 54 \div 9 + 3$

$= 40 - 6 + 3$

$= 37$

14. (d)
According to the statement conclusion I states that the scale is made of glass. So, it is not necessary that the scale can be made of plastic iron etc. Conclusion II states that the scale is made of plastic. So, it is also not necessary that the scale is made of plastic because such information does not come out of the statement.

15. (b)
According to the question it is clear from the statement that only assumption 1 is implicit.

16. (a)
Given that,
A > D, A > B and C > A
but information is insufficient related to D and B. Hence both the statements are not sufficient to answer the question.

17. (c)
The word TOUGH can't be formed from letter DAUGHTER because it doesn't contain the letter 'O'.

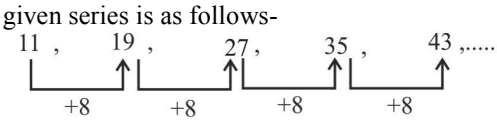
18. (b)
Just as Verse comes under Poem, in the same way Page comes under Book.

19. (a)

Just as,	Same as,
K A R A N	A R U N
11+1+18+1+14 = 45	1+18+21+14 = 54

20. (c)
Pen, Marker and Chalk is used for writing, while Book is used for reading. Hence option (c) is different among all.

21. (b)
The given series is as follows-



Since adding 8 to each number gives each subsequent number. And in each number, when divided by 8, 3 remainder is obtained, while in option (b) 434, when divided by 8, 2 remainder is obtained.
Hence option (b) is odd.

22. (c)
The series is as follows–

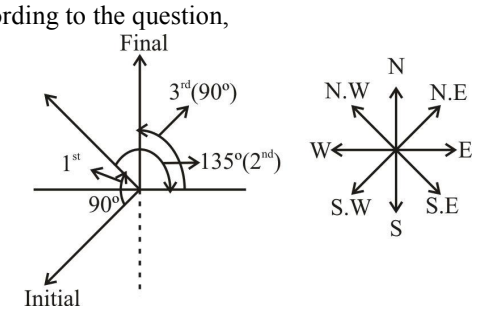
$F \xrightarrow{+5} K \xrightarrow{+3} N \xrightarrow{+7} U$

$U \xrightarrow{+5} Z \xrightarrow{+3} C \xrightarrow{+7} J$

$J \xrightarrow{+5} O \xrightarrow{+3} \boxed{R}$

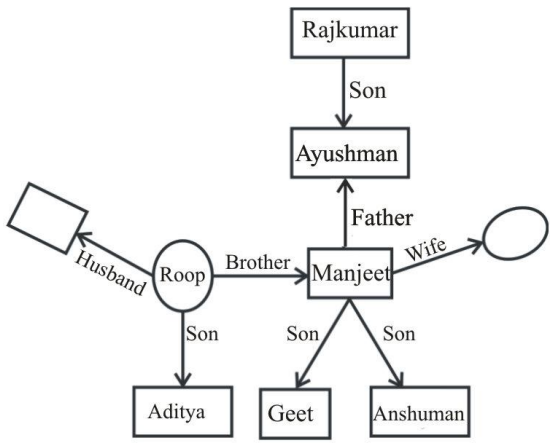
Hence, $\boxed{? + R}$

23. (b)
According to the question,



Hence, it is clear from above that Umesh is facing North direction.

24. (a)
On drawing blood relation diagram according to the question,



Hence, it is clear from above diagram that Manjeet is father of Geet.

25. (d)
Given,

18K 6J 7Q 5T 2

[Q = +, J = ×, T = – , K = ÷]

According to the question, on changing signs-

$18 \div 6 \times 7 + 5 - 2$

$3 \times 7 + 3 = 24$

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26. (b)
ENIAC, EDVAC and EDSAC are examples of the first generation of computers. ENIAC was the first general purpose programmable computer, developed during World War II with the aim of helping to calculate artillery firing tables.

27. (d)
The size of the pixel determines the clarity of the image displayed on the VDU.

28. (c)
Output devices are hardware components of a computer system that displays or presents information to the user or another machine. They convert digital data generated by computer in to human - readable or machine readable form. Ex- Monitors, Printers, Speakers, Projectors, Headphones etc. Mouse is an input device. So, option (c) is correct.

29. (b)
Output device is a component of computer system which displays data or instructions as result after processing. Example - Monitor, Printer, Speaker, Plotter video card. It converts digital data into a form that is human understandable.

30. (c)
A buffer is a memory area that store data temporarily. Buffering is an act of storing data temporarily in the buffer.
Double buffering– In double buffering two buffer are used in the place of one. In this buffering the producer produces one buffer while the consumer consumes another buffer, simultaneously. So the producer not needs to wait for filling the buffer.

31. (d)
Buffer Memory, is a temporary storage area in the main memory (RAM) that stores data transferring between two or more devices or between an application and a device. Buffering compensates for the difference in transfer speeds between the sender and receiver of the data.

32. (c)
Telnet is an application layer protocol that enables one computer to connect to local computer. It is a used as a standard TCP/IP protocol for virtual terminal service. It provides bi-directional text - oriented communication in the network.

33. (d)
HTTPS is short form of Hyper Text Transfer Protocol Secure. It is secure version of the HTTP protocol which is used for communication between a web browser and a websites. HTTPS uses encryption protocols, such as SSL (Secure Sockets Layer) or its successor, TLS (Transport Layer Security) to establish a secure connection. It can be used for financial. Transaction, so statement (d) is false to HTTPS.

34. (b)
The full name of DNS is 'Domain Name System'. It converts domain names to IP addresses.
The full name of OSI model is 'Open System Inter Connection. It was developed by ISO in 1984 and this model consists of 7 layers.
(i) Physical layer
(ii) Data link layer
(iii) Network layer
(iv) Transport layer
(v) Session layer
(vi) Presentation layer
(vii) Application layer
Protocols like HTTP, FTP, SMTP and NFS are used in the application layer. DNS is an application layer protocol in the internet architecture.

35. (a)
In MS word 365, hyphenation refers to the use of a short dashed line to break up a word when it reaches the edge of a document or container.

36. (a)
Font size option best describes the words- regular, Bold and Italic in MS Word 365.

37. (d)
In MS word 365 when we see the mini toolbar which is displayed when we right click in those table cell row or column. In this, on clicking 'Delete' option the following options are displayed -
→ Delete cell
→ Delete columns
→ Delete Rows
→ Delete Table.

38.(c)
Postfix is a hugely-popular Mail Transfer Agent (MTA) designed to determine routes and send emails. LinkedIn is a social networking site or portal designed specifically for the business community/professionals. Orkut was a social networking service owned and operated by Google. This service was designed to help users meet new and old friends and maintain existing relationships. Accounts such as hotmail, outlook, MSN etc. are provided by Microsoft.

39. (a)
The process of verifying the login name and password is known as authentication.

40. (b)
Email is a computer based application. It allows an internet user to send a message in formatted manner (mail) to the other internet user in any part of world.

41. (c)
Safari is a web browser developed by Apple. It is built into Apple's operating systems, including Mac OS, iOS, and iPad OS are used Apple's open source browser engine website.

42. (c)
About search engine Bing, Google search engine, Ask are correct based on the given statements, while AltaVista is incorrect because it was not launched by Apple, AltaVista was launched by Digital Equipment Corporation on December 15, 1995.

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43. (b)
Safari is a graphical web browser developed by Apple that is based on open-source software such as WebKit. It was first released for desktop in 2003 with Mac OSx Panther on Mac. It was presented first time with iphone in 2007 with iOS devie for mobile.

44. (d)
Digitization refers to the process of converting analog information such as text numbers, photos or music into digital data that can be manipulated by electronic devices.

45. (b)
Several studies have shown that violent video games have negative effects on the younger generation.

46. (c)
Divisibility rule of 8 - If the last three digits of the given number are divisible by 8 then it will be divisible by 8.
On putting Least value of y = 1
Number = 648416

Divided by = $\frac{416}{8} = 52$

47. (b)
$(15 \div 3) - [\{(19 - 1) \div 2\} - \{5 \times 20 - (7 \times 9 - (-2))\}]$
$= 5 - [\{18 \div 2\} - \{100 - (63 + 2)\}]$
$= 5 - [9 - \{100 - 65\}]$
$= 5 - [9 - 35]$
$= 5 + 26$
$= 31$

48. (b)

$-\frac{3}{2} = -1.5$

$\frac{3}{2} = 1.5$

$\frac{11}{4} = 2.75$

$\frac{5}{2} = 2.5$

It is clear that greatest fraction is $\frac{11}{4}$

49. (a)

Let the fraction be $\frac{1}{x}$,

According to the question,

$$\frac{3}{4} - \frac{1}{x} = \frac{5}{12}$$
$$-\frac{1}{x} = \frac{5}{12} - \frac{3}{4}$$
$$-\frac{1}{x} = \frac{20-36}{48}$$
$$-\frac{1}{x} = \frac{-16}{48}$$
$$\frac{1}{x} = \frac{1}{3}$$

Hence the required fraction is $\frac{1}{3}$.

50. (d)
LCM = 72
$= 2 \times 2 \times 2 \times 3 \times 3$
Number = 6, 9, x
$6 = 2 \times 3$
$9 = 3 \times 3$
HCF = 3

Number $x = \frac{72}{3}$

Hence it is clear that x = 24

51. (c)

L. C. M of $\frac{2}{3}, \frac{4}{9}, \frac{7}{12}, \frac{3}{5}$

$$\frac{\text{L.C.M. of numerator}}{\text{H.C.F. of denominator}} = \frac{\text{L.C.M. of 2, 4, 7 and 3}}{\text{H.C.F. of 3, 9, 12 and 5}}$$
$$= \frac{4 \times 7 \times 3}{1}$$
$$= 84$$

52. (b)
Let the larger number and smaller number be x and y respectively.
According to the question,

$(x - y) = (x + y) \times \frac{30}{100}$

10(x–y) = 3(x+y)
10x-10y = 3x+3y
7x = 13y
x : y = 13 : 7

53. (b)
Let, the no. of males = x
And number of females = y
From the initial part of the question,
x + y = 4000
x = 4000 – y ... (1)
From the second part of the question,

$$x + x \times \frac{10}{100} + y + y\frac{20}{100} = 4500$$
$$\frac{110x + 120y}{100} = 4500$$

110x+ 120y = 450000 ...(2)

On putting the value of x from eq^n–1 in eq^n –2,
110 (4000 – y) + 120y = 450000
440000 – 110y + 120y = 450000
10y = 10000
y = 1000

∴ Number of females (y) = 1000
And number of males (x) = 4000 – y
= 4000 – 1000 = 3000

54. (c)
Given-
a + b + c = 2s ...(i)

Area of triangle = $\frac{1}{2}$bc sin A

By formula:-

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$$\text{Area of triangle} = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\frac{1}{2}bc\sin A = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\sin A = \frac{2\times\sqrt{s(s-a)(s-b)(s-c)}}{bc} \qquad \left\{\begin{array}{l}\text{formula} - \\ \sin x = 2\sin\frac{x}{2}\cos\frac{x}{2}\end{array}\right\}$$

$$\sin\frac{A}{2}\cos\frac{A}{2} = \frac{\sqrt{s(s-a)(s-b)(s-c)}}{bc} \qquad \text{... (ii)}$$

We know that-

$$\cos A = \frac{b^2+c^2-a^2}{2bc}$$

$$2\cos^2\frac{A}{2} - 1 = \frac{b^2+c^2-a^2}{2bc} \qquad \left(\begin{array}{l}\text{Formula} - \cos 2A = 2\cos^2 A - 1 \\ \cos A = 2\cos^2\frac{A}{2} - 1\end{array}\right)$$

$$2\cos^2\frac{A}{2} = \frac{b^2+c^2-a^2+2bc}{2bc}$$

$$\cos^2\frac{A}{2} = \frac{(b+c-a)(b+c+a)}{4bc}$$

$$\cos^2\frac{A}{2} = \frac{(2s-a-a)2s}{4bc} \qquad \text{[From equ}^n\text{(i)]}$$

$$\cos^2\frac{A}{2} = \frac{(2s-2a)2s}{4bc}$$

$$\cos^2\frac{A}{2} = \frac{s(s-a)}{bc}$$

$$\cos\frac{A}{2} = \sqrt{\frac{s(s-a)}{bc}}$$

Putting the value of $\cos\frac{A}{2}$ in equation (ii)-

$$\sin\frac{A}{2}\sqrt{\frac{s(s-a)}{bc}} = \frac{\sqrt{s(s-a)(s-b)(s-c)}}{bc}$$

$$\boxed{\sin\frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{bc}}}$$

55. (d)

According to the question -

LCM of 10 and 12 = 60

Total work = 60 unit

1 day's work of A = 6 unit

1 day's work of B = 5 unit

2 day's work of (A + B) = 11 unit

$\times 5 \quad = \times 5$

By A+B → 10 days = 55 unit

Remaining work = 60 – 55

= 5 unit

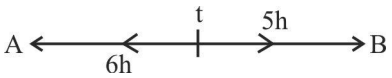
Time taken by A to complete 5 unit work = $\frac{5}{6}$ day

Hence required time = $\left(10+\frac{5}{6}\right)$ days

$= 10\frac{5}{6}$ days

56. (d)

Given,



Time taken to reach destination after meeting (A) = 5 hr.

Time taken to reach destination after meeting (B) = 6 hr.

Speed of A = 55 Km./hr.

Let Speed of B = x Km./hr.

$$\therefore \frac{S_B}{S_A} = \sqrt{\frac{t_A}{t_B}}$$

$$\frac{x}{55} = \sqrt{\frac{5}{6}}$$

$$x = 55\times\sqrt{\frac{5}{6}}$$

$$x = 55\times\sqrt{\frac{5\times 6}{6\times 6}}$$

$$x = \frac{55}{6}\times\sqrt{30}$$

$$x = \frac{55}{6}\sqrt{30}\ \text{km/hr}$$

57. (b)

According to the question,

Principal (P) = ₹1250

Amount (A) = ₹1550

Time (T) = 4 years

A = SI + P

$$1550 = \frac{P\times R\times T}{100} + 1250$$

$$1550 = \frac{1250\times 4\times R}{100} + 1250$$

$$1550 = \frac{5000\times R}{100} + 1250$$

50R = 1550 – 1250

$$R = \frac{300}{50}$$

R = 6%

58. (c)

Cost price of 1000 gm wheat = ₹18

$$1\,\text{gm cost price} = ₹\frac{18}{1000}$$

Selling price of 900 gm = ₹ 20

$$1\,\text{gm selling price} = ₹\frac{20}{900}$$

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Actual profit percentage $= \dfrac{\left(\dfrac{20}{900}-\dfrac{18}{1000}\right)}{\dfrac{18}{1000}}\times 100$

$= \dfrac{\dfrac{20000-16200}{900000}}{\dfrac{18}{1000}}\times 100$

$= \dfrac{3800\times 1000}{900000\times 18}\times 100$

$= \dfrac{3800}{162}$

$= 23.45\%$

59. (b)

$(8 + 27 + 64 + ... + 1000) + (2 + 4 + 6 + ... + 20)$

$= [(2)^3+(3)^3+(4)^3+ ..... +(10)^3] + 2(1+2+3+ ..... +10)$

$= [\{(1)^3 + (2)^3 + (3)^3 + (4)^3+.....+ (10)^3\} - (1)^3] +2$ $(1+2+3+ ..... + 10)$

$\because$ The sum of cubes of the first 'n' natural numbers $=\left[\dfrac{n(n+1)}{2}\right]^2$

And, sum of the first 'n' natural numbers $= \dfrac{n(n+1)}{2}$

$= \left[\dfrac{10(10+1)}{2}\right]^2 - 1 + 10(10+1)$

$= (5 \times 11)^2 - 1 + 10 \times 11$

$= (55)^2 - 1 + 110$

$= 3025 - 1 + 110$

$= 3024 + 110$

$= 3134$

60. (d)

$\tan A + \tan B + \tan C = ?$

$A + B + C = 180°$

$A + B = 180° - C$

$\tan (A+B) = \tan (180° - C)$

$\dfrac{\tan A + \tan B}{1 - \tan A \cdot \tan B} = -\tan C$

$\tan A + \tan B = -\tan C + \tan A \cdot \tan B \cdot \tan C$

$\tan A + \tan B + \tan C = \tan A \cdot \tan B \cdot \tan C$

61. (b)

Value (x)	Frequency (f)	f×x
29	4	116
30	3	90
30+k	3k	$90k+3k^2$
34	2	68
62	1	62
	$\Sigma f = 10+3k$	$\Sigma fx = 336+90k+3k^2$

We know that,

Arithmetic Mean $= \dfrac{\Sigma fx}{\Sigma f}$

$33 = \dfrac{336+90k+3k^2}{10+3k}$

$330 + 99k = 336 + 90k + 3k^2$

$3k^2 + 90k - 99k + 336 - 330 = 0$

$3k^2 - 9k + 6 = 0$

$k^2 - 3k + 2 = 0$

$(k - 2)(k - 1) = 0$

$k = 2, 1$

Hence, the number of possible value of k = 2

62. (a)

Square root of 519841

	721
7	519841
+7	49
142	298
+2	284
1441	1441
+ 1	1441
1442	××××

Hence the square root of 519841 is 721.

63. (d)

Let the ages of Subhash and Pranav 2 years ago be 4x and 5x years respectively.

Then,

The present age of Subhash = 4x + 2

The present age of Pranav = 5x + 2

According to the question,

$\dfrac{4x+2+3}{5x+2+3} = \dfrac{5}{6}$

$\Rightarrow \dfrac{4x+5}{5x+5} = \dfrac{5}{6}$

$\Rightarrow 24x + 30 = 25x + 25$

$\Rightarrow 25x - 24x = 30 - 25$

$\therefore x = 5$

Hence the present age of Pranav $= 5 \times 5 + 2$

$= 25 + 2$

$= 27$ years

64. (b)

Suppose flood gate A will fill the reservoir in x hrs. So flood gate B will fill the reservoir in (x + 5) hrs.

As per the question,

$\dfrac{1}{x} + \dfrac{1}{x+5} = \dfrac{1}{6}$

$\dfrac{x+5+x}{x^2+5x} = \dfrac{1}{6}$

$12x + 30 = x^2 + 5x$

$x^2 - 7x - 30 = 0$

$x^2 - 10x + 3x - 30 = 0$

$(x - 10)(x+3) = 0$

$\boxed{x = 10}$

Hence fast flood gate A will fill the reservoir in 10 hours.

65. (b)

Let the numbers be 3x and 2x respectively.

According to the question-

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$$\frac{3x-8}{2x-6}=\frac{8}{5}$$

$15x-40=16x-48$

$x = 8$

Hence the first number $= 3\times8 = 24$

And second number $= 2\times8 = 16$

66. (a)

Vector Quantity - A physical quantity which has both magnitude and direction. Displacement, velocity, acceleration, momentum, force, weight are examples of vector Quantity.

Scalar quantity- A scalar quantity only has a magnitude. Some common examples of scalar quantity are mass, speed, volume, temperature, density etc.

67. (a)

Given that,

$F = 250$ N

Change in momentum = Impulse (ΔP) = 125 Kgm/s

$\Delta t = ?$

$\Delta P = F\times\Delta t$

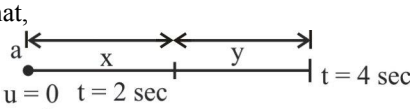
$$\Delta t = \frac{\Delta P}{F}$$

$$\Delta t = \frac{125}{250}$$

$\Delta t = 0.5$ sec

68. (b)

Given that,



$$S = ut + \frac{1}{2}\times at^2$$

$$x = \frac{1}{2}a\times4$$

$x = 2a$ .... (i)

and $$S = ut + \frac{1}{2}\times at^2$$

$$x + y = \frac{1}{2}\times a\times4\times4$$

$x + y = 8a$ .... (ii)

From equation (i) and (ii), we get

$x + y = 8a$

$2a + y = 8a$

$y = 6a$

Given, $y = nx$

$y = 3 \times 2a$

$\Rightarrow$ $n = 3$

69. (d)

Given:

Power of the motor (P) = 2 HP

Time (t) = 3 sec

From the work done formula- $W = P \times t$

$= 2 \times 746 \times 3$ [$\because$ 1 HP = 746 W]

= 4476 Joule

= 4.4 kJ

70. (c)

Given,

$V = 50$ V

$Q = 96000$

$t = 1$ hour = 3600 sec

We know that-

$$H = V\,I\,t = \frac{V\times Q.t}{t} = V\times Q = 50\times96000$$

$$\Rightarrow \quad \boxed{H = 4.8\times10^6\,J}$$

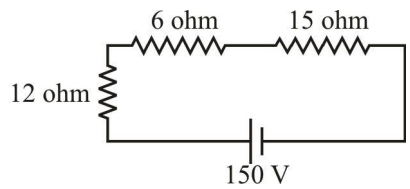
71. (a)

Electrical potential : The amount of work needed to move a unit charge from a reference point to specific point against an electric field known as electric potential.

$$V = \frac{W}{q}$$

The unit of electric potential is 'volt' or joule/coulomb.

72. (c)



Total resistance $= 12 + 6 + 15 = 33\Omega$

$\therefore$ Current $(I) = \frac{V}{R} = \frac{150}{33} = 4.54$

$\therefore$ Voltage of 6Ω (V) $= 4.54 \times 6 = 27.27$V

73. (a)

Given that,

$P = 60$ W, $V = 240$ V, $R = ?$

$$P = \frac{V^2}{R}$$

$$60 = \frac{240\times240}{R}$$

$$R = \frac{240\times240}{60}$$

$$\boxed{R = 960\Omega}$$

74. (b)

Reluctance is the property of a material which opposes the creation of magnetic flux in it.

$$\boxed{\text{Reluctance}(S) = \frac{MMF}{\phi}}$$

The unit of reluctance is 1/Henry or Ampere turn/Weber

75. (b)

If the voltage supply to the energy meter is higher than the rated value, the energy meter will typically run faster because the current flowing through the meter will be higher than what the meter is calibrated for, causing the meter to register more energy usage than is actually being consumed. This can result in an over-billing of energy usage to the customer. It important to

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make sure that the voltage supply to the energy meter is within the rated range to ensure accurate energy usage measurement.

76. (d)

Electric flux is a scalar quantity.

$$\boxed{\phi = EA\cos\theta}\ Nm^2/C$$

Electric flux density (D) is a vector quantity

$$\boxed{\vec{D} = \varepsilon\vec{E}}\ C/m^2$$

77. (a)

The coil on the iron core have co-efficient of coupling equal to unity.

$$\boxed{k = \frac{M}{\sqrt{L_1 L_2}}}$$

Where,

k = coefficient of coupling.
M = Mutual inductance
L_1 = Inductance of primary coil
L_2 = Inductance of secondary coil

78. (b)

According to ampere's circuital law, the line integral of H about any closed path is exactly equal to the direct current enclosed by that path.

Ampere's circuit law-

$$\oint H.dl = I$$

79. (b)

Given,

L = 0.08 mH
I = 2A and Δt = 0.4 sec

$$\text{e.m.f.} = L\frac{di}{dt} = L \times \frac{\Delta I}{\Delta t}$$

$$\text{e.m.f.} = 0.08 \times 10^{-3} \times \frac{2}{0.4}$$

$$\text{e.m.f.} = 0.4 \times 10^{-3}\ \text{Volt}$$

e.m.f. = 0.4mV

80. (d)

A material is said to have become superconductor when its resistance becomes zero. A superconductor is a material that attains, Superconductivity a state of matter with no electrical resistance. In a superconductor an electric current can persist indefinitely.

For Superconducting material (μ_r) = 0, Susceptibility (χ) = Negative,

81. (c)

For an insulating material dielectric strength and dielectric loss should be respectively high and low. An electrical insulator is a material in which electric current does not flow freely. The atoms of the insulator have tightly bound electron which cannot readily move.

82. (c)

When a semiconductor is doped with a p-type impurity each impurity atom will remain electrically neutral because they have large number of holes and small number of free electron but total number of hole is equal to total number of accepter ion which have opposite charge to the hole.

83. (c)

Tunnel diode and Avalanche photodiode are operated in forward bias and reverse bias respectively.

84. (a)

The emitter region in NPN junction transistor is more heavily doped than the base region the flow across the base region will be mainly due to electron.

Doping level- Base < collector < Emitter.

Transistor has three region-

Emitter-

- Highly doped and medium area.

Collector-Moderate doping and largest area.

- **Base-** lightly doping and small area.

85. (d)

The n-channel E-MOSFET will be ON when the value of gate to source voltage is greater than threshold voltage.

- Threshold voltage also known as gate to source voltage.
- In n-channel E only MOSFET, Threshold voltage (V_T) should be positive.

86. (c)

The ripple factor is the ratio between the rms value of the ac voltage and average value of dc voltage of the rectifier.

$$\%\,\text{Ripple factor} = \frac{\text{rms value}}{\text{dc or average value}} \times 100$$

87. (d)

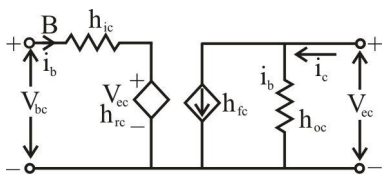
The main advantage of emitter follower –

- It has low output impedance.
- It has high input impedance.

Common collector configuration is also known as emitted follower or voltage buffer.

88. (c)

Given circuit is a hybrid equivalent circuit of common collector.



89. (c)

Voltage series feedback results in increase in input impedance and decrease in output impedance. Voltage series feedback is also known as shunt driven series-fed feedback, i.e. a parallel series circuit.

90. (a)

$$\boxed{\text{Slew Rate}(S) = \left.\frac{dV_o}{dt}\right|_{maximum}\ \text{Volt}/\mu s}$$

Slew rate of output op amp refers to maximum rate of change of output voltage.

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91. (b)

Monostable multivibrator is used as a gating circuit and as a delay element.

Monostable multivibrator is a one-shot multivibrator that has only one stable state as once externally triggered it returns back to its first stable state. It is generally used to convert short sharp pulses into much wider ones for timing applications.

92. (c)

Given -

Accuracy = 0.75%

Measured Value (V) = 100V

Full Scale deflection voltage (V_{FSD}) = 200V

% Limiting error

$$= \frac{\text{Accuracy\%} \times \text{Full Scale deflection voltage}}{\text{Measured Value}}$$

$$= \frac{0.75\% \times 200}{100} = 1.5\ \%$$

93. (c)

Type of instruments -

- Primary or absolute instruments
- Secondary instruments

Tangent galvanometer is an example of absolute instruments.

Absolute instruments - These are those instruments which gives the value of the quantity that has to be measured in terms of physical constants and their deflection only. They do not need to be calibrated and do not need any comparison with other standard instruments. Absolute instruments are used in laboratories as standardizing instruments, while secondary instruments are used in everyday work. In secondary instrument quantity being measured is given directly by the deflection of the instrument.

94. (d)

Electromagnetic instruments are not used as ammeters or voltmeters.

The various type of instruments are used as ammeters and voltmeters are -

- Moving iron type
- Moving coil type
- Hot-wire type
- Induction type
- Electrodynamometer type
- Thermocouple type
- Rectifier type

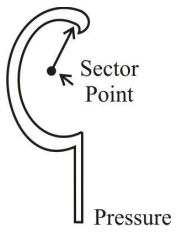
95. (d)

Anderson's bridge method can not be used to measure capacitance.

De-Sauty's bridge	- Suitable for perfect capacitor
Schering bridge	- Dielectric loss in a capacitor
Wien bridge	- Frequency and capacitance
Anderson's bridge	- Inductance

96. (d)

Bourdon tube is used to measure pressure directly.



Bourdon Tube

- Bourdon tubes are made up of an elliptically flattened tube. One end of the tube is sealed or closed. The other end is open so that fluid can enter. When the fluid whose pressure is to be measured enters the tube. The tube tends to straighten out an amount of pressure applied. This causes a displacement, which is amplified further and used to move a pointer on scale.

97. (b)

$(FA)_{16} = (?\ )_2$

$F \rightarrow 15 \rightarrow 1111$

$A \rightarrow 10 \rightarrow 1010$

So, $(FA)_{16} = (1111\ \ 1010)_2$

98. (d)

F = ABC' + ABC + A'BC + A'BC'

F = AB (C' + C) + A'.B(C + C')

F = AB + A'B

F = B (A + A')

F = B

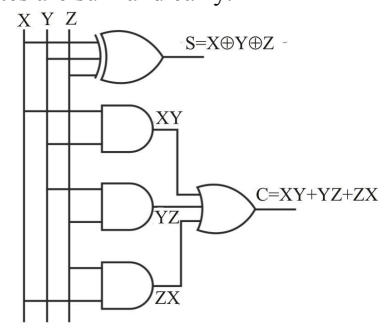
99. (d)

For a full adder

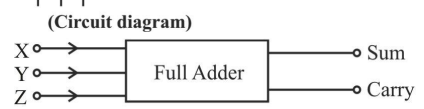
SUM = X ⊕ Y ⊕ Z

Carry = XY + YZ + ZX

The full adder is used to add three 1 bit binary numbers X,Y and Z. The full adder has three input states and two output states are sum and carry.



(Circuit diagram)



(Block diagram)

100. (c)

Input impedance of CMOS is high and output impedance is low. Its switching speed is less. Because its propagation delay is maximum.

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PRACTICE SET - 3

1. What is the name of India's first planned manned space flight?
(a) Vayuyaan (b) Gagan Viman
(c) Pushpakyaan (d) Gaganyaan

2. Who is the first batsman in the history of cricket to score 3 ODI double centuries?
(a) Sachin Tendulkar (b) Virender Sehwag
(c) Virat Kohli (d) Rohit Sharma

3. Raut Nacha is a famous tribal dance of which state ?
(a) Jharkhand (b) Chhattisgarh
(c) Odisha (d) Madhaya Pradesh

4. Who among the following is called 'Meera of modern India"?
(a) Kamala Das (b) Mahasweta Devi
(c) Aashapurna Devi (d) Mahadevi Verma

5. Which of the following depict the characteristics of the Reserve Bank of India?
A. It issue the currency of the country
B. It controls money supply of the country through various methods.
C. It acts as a banker to the government.
D. It accepts deposits from the public and lends out part of these funds to those who want to borrow.
(a) A, B and D (b) A, B and C
(c) B, C and D (d) A, C and D

6. The quorum required for the constitution of the Lok Sabha meeting is ____ of the total members of the House-
(a) Half (b) Two thirds
(c) Sixth (d) Tenth

7. At which of these places is the thickness of the troposphere the greatest?
(a) Above Mountains (b) South Pole
(c) North Pole (d) Equator

8. Phumdis, the floating islands are the unique features of which of the following lakes?
(a) Pangong Lake (b) Loktak Lake
(c) Sambhar Lake (d) Chilika Lake

9. Shah Jahan's daughter ——— participated in many architectural projects of the new capital of Shajahanabad (Delhi).
(a) Begum Ishrat (b) Gulbadan Begum
(c) Roshanara (d) Jahanara

10. With which of the following is the comment 'no dalil, no vakil, no appeal' associated?
(a) Charter Act (b) Rowlatt Act
(c) Regulating Act (d) Pitt's India Act

11. Select the option that is related to the sixth letter-cluster in the same way as the first letter-cluster is related to the second letter-cluster and the third letter-cluster is related to the fourth letter-cluster.
OSU : LQT ::IKL : FIK :: ? : JTB
(a) MVC (b) MWC
(c) NVD (d) NUD

12. Rubi and Juhi are sisters. Krishna is Juhi's father's father. Reshma is the mother of Arvind. Arvind is the father of Rohit, who is the only brother of Rubi. How is Krishna related to Rohit?
(a) Father's father (b) Mother's brother
(c) Mother's father (d) Father

13. If '<' means '–', '>' means '+', and '$' means '÷', then what would be the value of the following expression?
37 > 165 $ 3 < 5
(a) 95 (b) 63
(c) 72 (d) 87

14. Statements: There is an increase in the price of essential commodities due to a strike by the transporters.
Conclusions:
1. Government should buy their own vehicles to transport the essential goods.
2. Government should negotiate with transporters to withdraw the strike.
(a) Neither 1 nor 2 follows
(b) Both 1 and 2 follows
(c) Only conclusion 2 follows
(d) Only conclusion 1 follows

15. Consider the given question and decide which of the given assumptions is/are implicit in the question.
Question :
Could India become a terror free country in future?
Assumptions:
1. India has declared a zero-tolerance policy
2. India's security establishment is working hard on all the fronts
(a) Both assumptions 1 and 2 are implicit
(b) Either assumption 1 or 2 is implicit
(c) Only assumption 1 is implicit
(d) Only assumption 2 is implicit

16. Question:-
M, A, N and K are standing in a row. On the basis of following information, we arranged them from smallest to largest, then who stands at end.
Statement:
1. A is smaller than K.
2. M is smaller than A.
(a) Both statement 1 and 2 are not sufficient
(b) Both statement 1 and 2 are sufficient
(c) Statement 1 alone is sufficient
(d) Statement 2 alone is sufficient

17. The given table shows the number of students in a hostel speaking different languages:

Languages	Hindi	English	Marathi	Tamil	Bengali	Total
Number of Students	25	22	12	9	4	72

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Which language is spoken by atleast 1 out of 3 students residing in the hostel?
(a) English (b) Marathi
(c) Hindi (d) Tamil

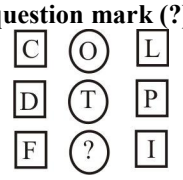
18. Select the option that is related to the third term in the same way as the second term is related to the first term.
Mason : Builds :: Mechanic : ?
(a) Cars (b) Tools
(c) Factory (d) Repairs

19. If A is equal to 1, M is equal to 13 and R is equal 18, how would you spell MISSION?
(a) 129191991314 (b) 149191991314
(c) 139191991514 (d) 139191991314

20. Four awards have been listed, out of which three are alike in some manner and one is different. Select the odd one.
(a) Padma Vibhushan (b) Padma Bhushan
(c) Param Vir Chakra (d) Padma Shri

21. Select the number from among the given options that can replace the question mark (?) in the following series.
3, 78, 9, 69, 15, 60, ?
(a) 19 (b) 23
(c) 22 (d) 21

22. Study the given pattern carefully and select the letter from among the given options that can replace the question mark (?) in it.



(a) O (b) S
(c) T (d) P

23. Anita is standing facing the north direction. Then, she turns 135° anticlockwise. After that, she turns 90° clockwise. In which direction is she facing now?
(a) North-east (b) South-west
(c) North-west (d) South-east

24. Jean and Catherine are the maternal aunts of Cinderella. Charles is the husband of Cinderella. Isabella is the mother of mother-in-law of Charles. How is Isabella related to Jean?
(a) Mother (b) Maternal Aunt
(c) Grand mother (d) Sister

25. If G stands for 'add', H stands for 'multiply', J stands for 'subtract' and K stands for 'division' then find the value of
125 J 110 K 5 G 7 H 2
(a) 117 (b) 133
(c) 89 (d) 114

26. Electronic Numerical Integrator and Computer (ENIAC) was first binary programmable computer based on____.
(a) Blaise Pascal's concept
(b) Von Neumann's architecture
(c) Charles Babbage's architecture
(d) Turing's machine concept

27. The default layout of most keyboards is called -
(a) ALPHBET (b) QWERTY
(c) ASCII (d) IEEE

28. In which of the following types of keyboard, both the M and L keys are present on the same row and the L key is present to the left of the M key?
(i) AZERTY
(ii) QWERTY
(a) Only (i) (b) (i) and (ii) both
(c) Only (ii) (d) Neither (i) nor (ii)

29. A device that allows you to take to a computer (such as a mouse or keyboard) is a/an _____ device.
(a) Storage (b) Process
(c) Input (d) Output

30. Which of the following is an example of volatile memory?
(a) Hard drive (b) ROM
(c) RAM (d) Flash memory

31. Which of the following statements related to primary memory of a computer is INCORRECT?
(a) RAM is a component of Arithmetic Logic Unit (ALU)
(b) The CPU interacts directly with the primary memory.
(c) Random Access Memor (RAM) is a volatile primary memory.
(d) ROM is a non-volatile primary memory.

32. Which of the following memories needs to be refreshed continuously at certain time intervals?
(a) Cache Memory (b) Secondary
(c) SRAM (d) DRAM

33. What does the Internet OSI Model stand for?
(a) Open System Interconnection Model
(b) Open Service International Model
(c) Open Space Internet Model
(d) Open Software Internet Model

34. Protocols that require a logical connection to established between two devices before transferring data are called:
(a) Connection-oriented protocols
(b) Link-to-connection protocols
(c) Data transfer protocols
(d) Broadcasting protocols

35. Consider the following communication technologies:
1. Closed-Circuit Television
2. Radio Frequency Identification
3. Wireless Local Area Network
Which of the above are considered Short-Range devices/technologies?
(a) 1 and 2 only (b) 2 and 3 only
(c) 1 and 3 only (d) 1, 2 and 3

36. Which of the following is the correct sequence of turning off bullets and numbering in MS Word 365?
1. Select auto correct options and then click the auto format as you type tab.

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2. File > Options > proofing
3. Select ok.
4. Select or clear automatic bulleted lists or automatic numbered list.

(a) 1, 2, 3, 4 (b) 2, 4, 1, 3
(c) 2, 1, 3, 4 (d) 2, 1, 4, 3

37. 'Screenshot' option is available in ------- tab of MS - Word 2010.
(a) Home (b) Review
(c) Insert (d) Design

38. Which of the following options in MS Word 365 is used to create your table by creating cell, row and column borders?
(a) Create table (b) Quick table
(c) Draw table (d) Insert table

39. If you use a font that is not supported by the browser, the original text
(a) Will be the one displayed using only the 'Arial' font
(b) Will be displayed with a distinctive background
(c) Will display in default font
(d) Will not be displayed

40. Which among the following is used to navigate through hypermedia structures?
(a) Nodes (b) Keys
(c) None of these (d) Buttons

41. Which among the following notation is usually used to represent an IP address in under stable format?
(a) Binary notation
(b) Hexadecimal notation
(c) Dotted-decimal notation
(d) Octal notation

42. Which of the following statement(s) is/are true about web browsers?
(i) They are application software that is used to search, retrieve and display information available on the World Wide Web.
(ii) They send requests to web servers across the Internet using HTTP.
(a) Both (i) and (ii) (b) Neither (i) nor (ii)
(c) Only (ii) (d) only (i)

43. Which of the following statements is/are true?
(i) Yahoo is a web portal, which is one of the main features of web search portal.
(ii) Google and Bing both are search engines.
(a) Neither (i) nor (ii) (b) Only (i)
(c) Only (ii) (d) Both (i) and (ii)

44. World Wide Web was the first web browser, named _____ to avoid any confusion with the World Wide Web.
(a) Nexus (b) Firefox
(c) Safari (d) Internet Explorer

45. Which of the following refers to communication by electronic means to place power in the hands of citizens to determine what laws need to be made and how these laws should be written?
(a) e-banking (b) e-marketing
(c) e-governance (d) e-mobility

46. How many numbers between 1 and 700 are completely divisible by 17?
(a) 42 (b) 41
(c) 45 (d) 46

47. Find the value of 72 ÷ 4 × { 8 × 4 – (14 – 19)}
(a) 666 (b) 444
(c) 222 (d) 1296

48. Find the greatest among these fractions.
5/11, 3/15, 12/11, 4/7, 9/12
(a) 12/11 (b) 3/15
(c) 9/12 (d) 4/7

49. A fraction when added to $\frac{7}{3}$, gives 4. Find the fraction.
(a) $1\frac{2}{3}$ (b) $\frac{11}{2}$ (c) $-\frac{1}{2}$ (d) $\frac{2}{3}$

50. LCM of $2^4 \times 3^4 \times 5^3$ and $2^2 \times 3^6 \times 5^5 \times 7^2$ is
(a) $2^3 \times 3^5 \times 5^4 \times 7$ (b) $2^2 \times 3^2 \times 5^2 \times 7^2$
(c) $2^6 \times 3^{10} \times 5^8 \times 7^2$ (d) $2^4 \times 3^6 \times 5^5 \times 7^2$

51. What is the LCM of $\frac{6}{25}, \frac{4}{45}$ and $\frac{3}{35}$?
(a) $\frac{1}{5}$ (b) $\frac{12}{5}$
(c) $\frac{210}{12}$ (d) $\frac{12}{210}$

52. If (m + n) : (m – n) = 7 : 3, then $(m^3 + n^3) : (m^3 - n^3)$ = ?
(a) 133 : 117 (b) 117 : 13
(c) 117 : 133 (d) 17 : 133

53. The population of a town increased by 10% and 20% in two successive years, but decreased by 25% in the third year. Find the ratio of the population in the third year to that of 3 year ago.
(a) 100 : 99 (b) 99 : 100
(c) 2 : 1 (d) 1 : 1

54. The perimeter of an isosceles triangle is 32 cm. Its base is $\frac{6}{5}$ times of equal sides. Find the area of triangle.
(a) 39 cm^2 (b) 64 cm^2
(c) 48 cm^2 (d) 57 cm^2

55. X does 25% of a work in 20 days. Y joins up with X and they together do the remaining work in 15 days. So in how many days can Y alone do the same work?
(a) 30 days (b) $25\frac{1}{2}$ days
(c) $26\frac{2}{3}$ days (d) $26\frac{1}{3}$ days

56. Akshita covers a distance of 300 km at the speed of 50km/h, then 360 km at 30 km/h and another 420km at 60km/h. If her average speed for the whole journey is k km/h, then how much time (in hours) will she take to cover 216 km at k km/h?
(a) 5 hours (b) 7 hours
(c) 6 hours (d) 4 hours

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57. The simple interest on a principal amount is Rs. 192 for a period of 2 years at the rate of 8% per annum. The principal amount is :
(a) ₹ 1,000 (b) ₹ 1,400
(c) ₹ 1,200 (d) ₹ 1,600

58. Mahathi purchases a cooker at $\frac{9}{10}$th of its marked price and sold it for 8% more than its marked price. Find the gain percentage.
(a) 20% (b) 14%
(c) 10% (d) 16%

59. The ratio of the sum of the first three terms of the geometric progression (G.P.) and the sum of the first six terms is 125 : 152. What is the common ratio of G.P.
(a) $\frac{4}{5}$ (b) $\frac{5}{3}$ (c) $\frac{5}{4}$ (d) $\frac{3}{5}$

60. Solve the following equation-
$$\frac{\tan A}{1+\sec A}+\frac{1+\sec A}{\tan A}=?$$
(a) 2 sec A (b) 2 cos A
(c) 2 sin A (d) 2 cosec A

61. Find the missing value of p for the following distribution, whose mean is 12.58.

x:	5	8	10	12	p	20	25
f:	2	5	8	22	7	4	2

(a) 20 (b) 15
(c) 10 (d) 13

62. The square root of 10816 is:
(a) 106 (b) 96
(c) 114 (d) 104

63. The present ages of Maya and Meera are in the ratio of 6 : 5 and after fifteen years the ratio will be 9 : 8. Meera's age is:
(a) 30 years (b) 35 years
(c) 20 years (d) 25 years

64. Two pipes 'P' and 'Q' together can fill a tank in 4 hrs. When both the pipes are opened individually then Q takes 6 hours more as compared to P to fill the tank. P alone can fill the tank in how much time?
(a) 5 hours (b) 6 hours
(c) 8 hours (d) 7 hours

65. Umesh and Kapil donated ₹750 and ₹975 respectively. The ratio of the amount of donation by Umesh to that by Kapil is:
(a) 13 : 10 (b) 10 : 13
(c) 3 : 1 (d) 1 : 3

66. $kgms^{-1}$ is the SI unit of ——
(a) Momentum (b) Pressure
(c) Force (d) Velocity

67. Two spheres of masses m and M are situated in air and the gravitational force between them is F. The space between the masses is now filled with a liquid of specific gravity 3. The gravitational force will now be
(a) F/3 (b) F/9
(c) 3F (d) F

68. An object of mass 3 kg is at rest. Now a 6 N force is applied on the object for 3 second. Find the velocity of the object acquired by it in m/s.
(a) 12 (b) 6
(c) 9 (d) 8

69. Dams are constructed to collect water flowing in high altitude river. The stored water has a lot of
(a) Both KE and PE
(b) Kinetic energy (KE)
(c) Potential energy (PE)
(d) Neither KE nor PE

70. The specific heat capacity of water is
(a) 540 J/kg°C (b) 4186 J/kg°C
(c) 2260 J/kg°C (d) 335 J/kg°C

71. What is the colour code of a 180k ohm resistor with a 5% tolerance?
(a) Black, Yellow, Gray, Golden
(b) Black, Yellow, Green, Golden
(c) Brown , Gray, Yellow, Golden
(d) Brown, Green, Yellow, Golden

72. An electronic circuit wire of conductivity 5.8×10^7 mho/m is subjected to an electric field of 40 mV/m. What will be its current density?
(a) 2.32×10^6 A/m^2 (b) 1.16×10^6 A/m^2
(c) 4.64×10^6 A/m^2 (d) 4.30×10^6 A/m^2

73. If 5000 kW power is transmitted at 220 kV in place of 11 kV. Reduction in current will be-
(a) 90% (b) 95%
(c) 5% (d) 10%

74. The force acting on electrons causing it to move directionally in an electrical circuit is called:
(a) electromotive force
(b) gravitational force
(c) fundamental force
(d) electromagnetic force

75. Energy meters fall into the category of:
(a) indicating instruments
(b) absolute instruments
(c) integrating instruments
(d) recording instruments

76. Two vectors have magnitude 15 units and 10 units the magnitude of the resultant vector of these two vectors can never be,
(a) 3 units (b) 5 units
(c) 8 units (d) 12 units

77. What is the approximate value of capacitance (in Farad) of earth if (radius = 6,400 km)?
(a) 0.0000007 (b) 0.000007
(c) 0.00007 (d) 0.0007

78. The direction of motion of a conductor in a magnetic field is given by
(a) Fleming's left hand rule
(b) Maxwell's right hand rule
(c) Ampere's rule
(d) Kirchhoff's law

79. Permeability is analogous to
(a) Resistivity (b) Retentivity
(c) Conductivity (d) Coercivity

80. 5×10^{16} electrons pass across the section of a conductor in 1 minute 20 sec. The current flowing is :
(a) 1 mA (b) 0.1 mA
(c) 0.01 mA (d) 10 mA

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81. In which of the following material's resistance is independent of change in temperature?
(a) Brass
(b) Platinum
(c) Tungsten
(d) Alloys of Constantan and Manganin

82. In the energy band diagram of a p-type semiconductor :
(a) The acceptor band is near the conduction band.
(b) The acceptor band is near the valence band.
(c) The donor band is near the conduction band.
(d) The donor band is near the valence band.

83. Negative resistance characteristics is exhibited by a :
(a) Zener diode (b) Schottky diode
(c) Photo diode (d) Tunnel diode

84. In a BJT transistor to maintain a fixed operating point, the bias stabilization/ compensation is achieved by using–
(a) Diode Compensation
(b) Resistor Compensation
(c) Thermistor Compensation
(d) Both diode and Thermistor compensation

85. The principle of operation of a VMOS device is similar to that of …….
(a) Insulated gate bipolar transistor
(b) Enhancement MOSFET
(c) Depletion MOSFET
(d) Junction FET

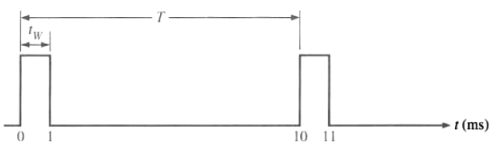
86. Which of the following in clamper circuit don't have a required component?
(a) Diode (b) Resistor
(c) Capacitor (d) D.C. supply

87. In a common base connection $I_E = 2mA$, $I_C = 1.9$ mA. The value of base current is
(a) 0.25 A (b) 3.80 mA
(c) 0.10 mA (d) 0 mA

88. Highest operating frequency can be expected in the case of:
(a) Bipolar transistor
(b) JFET
(c) MOSFET
(d) All the other given options have nearly same frequency

89. Which is known as Regenerative feedback?
(a) Negative feedback
(b) Positive feedback
(c) Direct feedback
(d) Recycling feedback

90.



Determine duty cycle.
(a) 15% (b) 5%
(c) 10% (d) 1%

91. Which of the following is NOT a feature of LM723 Voltage Regulator IC?
(a) It is a 16-pin line package IC
(b) It's Regulated Output ranges from 3V to 37V
(c) It's Output current is 150 mA without exterior pass transistor
(d) It includes Current Regulator

92. What is the definition of accuracy?
(a) A measure of how often an experimental value can be repeated
(b) The closeness of significant figures used in a measurement
(c) The number of significant figures used in a measurement
(d) None of these

93. The most efficient form of damping employed in electric instruments is:
(a) Air friction damping
(b) Fluid friction damping
(c) Eddy current damping
(d) None of the above

94. A voltmeter having a resistance of 1000 kilo ohms is used to measure voltage in an electrical circuit. In order to increase its range three times resistance to be added in series will be _____.
(a) 5000 kilo ohms (b) 2000 kilo ohms
(c) 3000 kilo ohms (d) 1000 kilo ohms

95. The scale of a meggar is calibrated between:
(a) Zero to 100 (b) Zero to 10,000
(c) Zero to 1,00,000 (d) Zero to infinity

96. Which of the following are the features of a capacitive transducer?
I. Highly sensitive to measure small displacements
II. Can be used to measure force and pressure
III. Can be used to measure humidity
IV. Can be used as strain gauge
(a) I and II only (b) I, II and III only
(c) I, II and IV only (d) II, III and IV only

97. Find the excess - 3 code for decimal 12:
(a) 01010100 (b) 0010010
(c) 01000110 (d) 01000101

98. Boolean Expression A+1 =1, and A. 0 = 0
Which type of Boolean Algebra Law or Rule represents the above expression?
(a) Identity (b) Idempotent
(c) Annulment (d) Double Negation

99. A full adder can be made of
(a) Two half adders
(b) Two half adders and a NOR gate
(c) Two half adders and a OR gate
(d) Two half adders and a AND gate

100. Among the following logic families, the one having the lowest power dissipation and highest noise margin is
(a) Schottky TTL (b) TTL
(c) ECL (d) CMOS

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SOLUTION : PRACTICE SET- 3

ANSWER KEY

1. (d)	11. (a)	21. (d)	31. (a)	41. (c)	51. (b)	61. (b)	71. (c)	81. (d)	91. (a)
2. (d)	12. (a)	22. (a)	32. (d)	42. (a)	52. (a)	62. (d)	72. (a)	82. (b)	92. (b)
3. (b)	13. (d)	23. (c)	33. (a)	43. (d)	53. (b)	63. (d)	73. (b)	83. (d)	93. (c)
4. (d)	14. (c)	24. (a)	34. (a)	44. (a)	54. (c)	64. (b)	74. (a)	84. (d)	94. (b)
5. (b)	15. (a)	25. (a)	35. (d)	45. (c)	55. (c)	65. (b)	75. (c)	85. (b)	95. (d)
6. (d)	16. (a)	26. (b)	36. (d)	46. (b)	56. (a)	66. (a)	76. (a)	86. (d)	96. (b)
7. (d)	17. (c)	27. (b)	37. (c)	47. (a)	57. (c)	67. (d)	77. (d)	87. (c)	97. (d)
8. (b)	18. (d)	28. (a)	38. (c)	48. (a)	58. (a)	68. (b)	78. (a)	88. (a)	98. (c)
9. (d)	19. (c)	29. (c)	39. (c)	49. (a)	59. (d)	69. (c)	79. (c)	89. (b)	99. (c)
10. (b)	20. (c)	30. (c)	40.(a)	50. (d)	60. (d)	70. (b)	80. (b)	90. (c)	100. (d)

SOLUTION

1. (d)

ISRO's Gaganyaan mission is India's maiden manned space mission. Gaganyaan is an Indian crewed orbital spacecraft intended to be the formative spacecraft of the Indian Human Spaceflight Programme. The first crewed mission was originally planned to be launched by ISRO's GSLV Mk III in December 2021, but it has now been pushed back to no earlier than 2023.

2. (d)

Rohit Sharma is the only player to have scored three One-day International(ODI) matches double centuries including 209, 264 and 208. Sachin Tendulkar was the first male cricketer who scored the first double century (200) in the ODI against South Africa in 2010.

3. (b)

Raut Nacha is a ceremonial dance performed mainly by the tribal community of Chhattisgarh. It is performed during the "dev udhni ekadashi", after the Diwali festival.

Famous folk dance of Chhattisgarh are Saila, Sua Nacha, Karma, Panthi, Gendi etc.

4. (d)

Mahadevi Verma is widely regarded as the "Modern Meera". She is considered one of the four major pillars of Chhayawadi era in Hindi literature. Her creations are as:- Nihar, Rashmi, Neerja, Sandhyageet & Path ke Sathi etc.

5. (b)

The mains characteristics of the Reserve Bank of India are as follows : It issues the currency of the country, controls money supply of the country through various methods, and acts as a banker of the government.

6. (d)

The quorum required to constitute a meeting of the Lok Sabha is the 1/10th of the total members of the house. According to Article 100 (3), quorum of Lok Sabha or Rajya Sabha is 1/10 of the total number of members. The same number is also necessary for the recognition of the main opposition party.

7. (d)

The troposphere is the lowermost layer of the atmosphere. Its average height is 13 km and extends roughly to a height of 8 km near the poles and about 18 km at the equator. The Thickness of the troposphere is greatest at the equator because heat is transported to great heights by strong convectional currents.

8. (b)

Loktak is the largest freshwater lake of Northeast India located in Manipur. It is known for its floating circular swamps, which are called phumdis. Located on this phumdi Keibul Lamjao National Park is the only floating national Park in the world.

9. (d)

Jahanara (Shah Jahan's daughter) participated in many architectural projects of the new capital established at Shahjahanabad, Delhi. Jahanara, Roshan Ara, were sisters. Roshanara supported Aurangzeb in the war of succession. Gulbadan Begum was the daughter of Babur who wrote 'Humayunnama'.

10. (b)

The Rowlatt Act said that any Indian could be detained without trial. This was preventive detention, meaning that the government would hold any citizen in jail without any crime having been committed. Essentially, it means that if someone inside the government suspects that a citizen might commit a crime later, that citizen can be put in jail. Indians were outraged by such a law and one Lahore newspaper described the Rowlatt Act with the headline: 'No dalil, No vakil, No appeal'.

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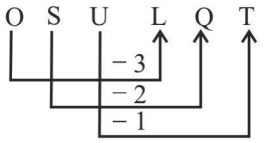
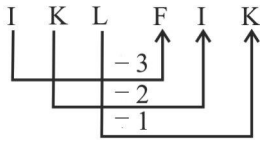
11. (a)

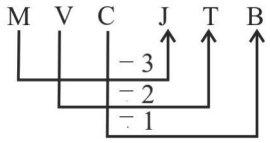
Just as,



and,



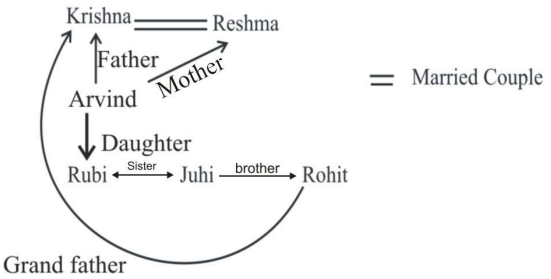
Same as,



Hence, ? = MVC

12. (a)

On drawing blood relation diagram according to the question,



Hence, Krishna is Grandfather (Father's father) of Rohit.

13. (d)

Given,

$< \Rightarrow -$

$> \Rightarrow +$

$\$ \Rightarrow \div$

On changing the symbol,

$37 > 165 \$ 3 < 5$

$= 37 + 165 \div 3 - 5$

$= 37 + 55 - 5$

$= 92 - 5$

$= 87$

14. (c)

Statement: The prices of essential commodities have increased due to strike by transporters. Hence, the statement concludes that the government should negotiate with the strike workers to stop the strike. Hence, it is clear that only conclusion 2 is true.

15. (a)

Since, India has declared a zero-tolerance policy thus, off course in a given course of time India will emerges as a terror free country provided that all our security intelligence are working with might and main. Hence, both assumptions 1 and 2 are implicit.

16. (a)

Statement:

I. $K > A$

II. $A > M$

Thus, $M < A < K$

Hence, both statements 1 and 2 are not sufficient to answer the question.

17. (c)

Total number of student = 72

$$\frac{72}{3} = 24 \text{ (Group)}$$

Thus, in the 24 group which is of 3-3 student must have spoken Hindi because, the total number of Hindi speakers is 25.

18. (d)

Just as, Mason builds home. Similarly, Mechanic repairs mechanical equipments.

19. (c)

Given, A = 1, M = 13 and R = 18 then,

M	I	S	S	I	O	N
↓	↓	↓	↓	↓	↓	↓
13	9	19	19	9	15	14

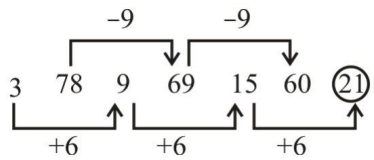
20. (c)

Param Vir Chakra is the honour given for the extraordinary valor and sacrifice of the soldiers. It was also given to the soldiers posthumously.

While, the Padma Vibhushan, Padma Bhushan and Padma Shri awards are given for exceptional and outstanding work in any field.

21. (d)

The given number series is as follows.

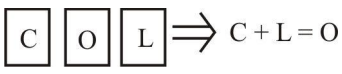


Hence, ? = 21

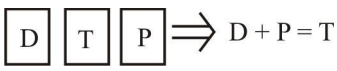
22. (a)

In the given pattern,

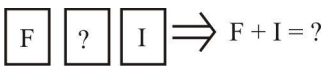
Just as,



And,



Same as,



So, ? = F + I = O

Note: The given letters are added with their place value in English alphabet.

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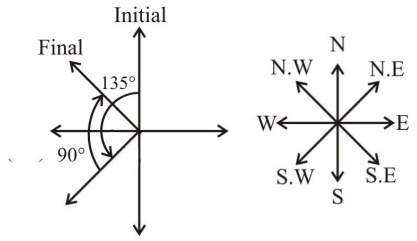
23. (c)

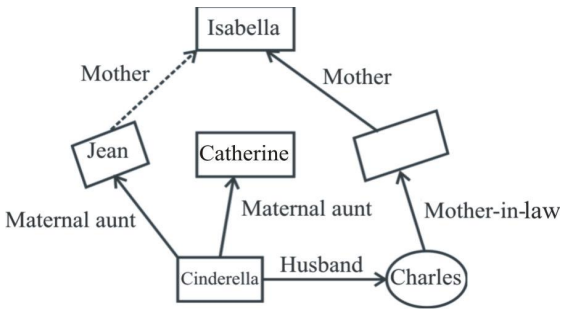
According to the question,



Hence, it is clear from above that Anita is facing in North-west direction.

24. (a)

According to the question blood relation diagram is follows as:



Hence, it is clear from above diagram that Isabella is mother of Jean.

25. (a)

Given,

G = +

H = ×

J = –

K = ÷

125 J 110 K 5 G 7 H 2 = ?

On changing letters by mathematical symbol,

125 – 110 ÷ 5 + 7 × 2 = ?

= 125 – 22 + 14

= 117

26. (b)

Electronic Numerical Integrator and Computer (ENIAC) was the first binary programmable computer based on Von Neumann's architecture. ENIAC was designed by John Mauchly and J. Presper Eckert. ENIAC was completed in 1945 and first put to work for practical purpose on December 10, 1945.

27. (b)

The default layout of most keyboards is QWERTY. It was first designed by shells and Glidden typewriter in 1868.

28. (a)

AZERTY is a keyboard layout. It is very similar to the QWERTY keyboard layout. It is mainly used in France and Belgium. In AZERTY, both the M and L keys are present in the same row and the L key is present to the left of the M key.

29. (c)

Input devices like keyboard, Mouse, Touchpad etc. are used to give instructions to the computer.

30. (c)

Random Access Memory (RAM) is an example of volatile memory because all its data is lost when the power supply is off.

Another example of volatile memory is cache memory.

31. (a)

RAM is a component of primary memory. Primary memory is a volatile memory and is the main memory of the computer and is also called temporary memory. The data and instruction processed by the CPU is used to store.

32. (d)

The full form of DRAM is Dynamic Random Access Memory. It needs to be refreshed constantly to maintain the data, otherwise it will lose the data. DRAM is slower than SRAM. SRAM does not need to be refreshed frequently DRAM is cheaper than SRAM.

33. (a)

The OSI Stands for Open System Interconnection Model. It is a conceptual model from the International Organization for standardization (ISO) that provides a common basis for the coordination of standards development for the purpose of systems Interconnection.

34. (a)

A connection-oriented protocols is a communication protocol that established a reliable/ dedicated connection between two devices before transmitting data.

35. (d)

Closed Circuit Television (CCTV), Radio Frequency Identification and Wireless Local Area Network (WLAN) are all communication technologies. **CCTV-** It is known as video surveillance. It transmits the signal to a specific location using a video camera.

RFID– It uses electromagnetic fields to automatically identify and track the tag attached to the object. It consists of a small radio transponder, radio, receiver and transmitter.

WLAN– WLAN is a type of wireless local network that connects two or more devices together.

36. (d)

The correct sequence to turn off automatic bullets and numbering is as follows:

2,1, 4,3.

37. (c)

To take a screenshot in MS Word 2010 follow the step -

1. Click the insert tab at the top of the window.
2. Click the screenshot drop-down menu, then choose the open window from which you want to pull the screenshot.

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38. (c)
Draw table option is used to create a table by creating cell, row and column manually, whereas create table, quick table and insert table create table by get command.

39. (c)
If we use a font which is not supported by the browser, then the original text will be displayed in the default font.

40.(a)
Nodes are used to navigate or transfer data from one place to another, through hypermedia structures.

41. (c)
Dotted-decimal notation is usually used to represent an IP address in an under stable format. IP4 address is written most of the times in dotted-decimal notation.

42. (a)
A web browser is application software that is used to search, retrieve and display information available on the World Wide Web and to send requests to web servers across the Internet using HTTP. Microsoft Edge, Internet Explorer, Mozila Firefox, Opera, Safari etc. are examples of web browser

43. (d)
Yahoo is a web service provider. It provides a web portal. Google and Bing both are search engines.

44. (a)
The World Wide Web was the first web browser, which was later named Nexus to avoid any confusion with World Wide Web. It was invented by 'Tim Berners-Lee' in 1990.

45. (c)
Electronic governance refers to the functioning of government with the application of Information and Communication Technology (ICT). There are 4 types of participation in e-governance.
(1) G2C (Government to citizen)
(2) G2B (Government to Business)
(3) G2G (Government to Government)
(4) G2E (Government to Employee)

46. (b)
Numbers between 1 and 700 which are exactly divisible by 17.
17, 34 .....697.
$l = a + (n-1) \times d$
$697 = 17 + (n-1) \times 17$
$680 = (n-1) \times 17$
$40 = n - 1$
$n = 41$
Hence, required number (n) = 41

47. (a)
$72 \div 4 \times \{8 \times 4 - (14 - 19)\}$
$= 72 \div 4\{8 \times 4 - (-5)\}$
$= 72 \div 4\{8 \times 4 + 5\}$
$= 72 \div 4\{32 + 5\}$
$= 72 \div 4 \times 37$
$= 18 \times 37$
$= 666$

48. (a)
$\frac{5}{11} = 0.45,\ \frac{3}{15} = 0.2,\ \frac{12}{11} = 1.09,\ \frac{4}{7} = 0.57,\ \frac{9}{12} = 0.75$
Hence, the required largest fraction will be $= \frac{12}{11}$

49. (a)
Let the required fraction be x.
According to the question,
$\Rightarrow \frac{x}{1} + \frac{7}{3} = 4$
$\Rightarrow \frac{3x+7}{3} = 4$
$\Rightarrow 3x + 7 = 4 \times 3$
$\Rightarrow 3x + 7 = 12 \Rightarrow 3x = 12 - 7 \Rightarrow 3x = 5$
$\Rightarrow x = \frac{5}{3} = \left(1\frac{2}{3}\right)$
Hence, the required fraction is $1\frac{2}{3}$.

50. (d)
Given,
$2^4 \times 3^4 \times 5^3 = 2^2 \times 2^2 \times 3^2 \times 3^2 \times 5^3$
$2^2 \times 3^6 \times 5^5 \times 7^2 = 2^2 \times 3^2 \times 3^2 \times 3^2 \times 5^5 \times 7^2$
LCM $= 2^4 \times 3^6 \times 5^5 \times 7^2$

51. (b)
Given fractions $= \frac{6}{25}, \frac{4}{45}, \frac{3}{35}$
L.C.M. of fractions $= \frac{\text{L.C.M. of Numerator}}{\text{H.C.F. of Denominator}}$
L.C.M. of Numerator $\Rightarrow$
$6 = 2 \times 3$
$4 = 2 \times 2$
$3 = 1 \times 3$
L.C.M. $= 2 \times 2 \times 3 = 12$
H.C.F. of Denominator $\Rightarrow$
$25 = 5 \times 5$
$45 = 5 \times 3 \times 3$
$35 = 5 \times 7$
HCF $= 5$
Hence, L.C.M. of given fraction $= \frac{12}{5}$

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52. (a)

Given,

$$\frac{m+n}{m-n}=\frac{7}{3}$$

On putting,

$m + n = 7$ and $m - n = 3$

$m = 5$ and $n = 2$

then, $\frac{m^3+n^3}{m^3-n^3}=\frac{(5)^3+(2)^3}{(5)^3-(2)^3}$

$=\frac{125+8}{125-8}$

$\frac{m^3+n^3}{m^3-n^3}=\frac{133}{117}$

Hence, $(m^3 + n^3) : (m^3 - n^3) = 133 : 117$

53. (b)

Let the population of the town is x.

Population after three years,

$$x\times\frac{(100+10)}{100}\times\frac{(100+20)}{100}\times\frac{(100-25)}{100}$$

$$x\times\frac{110}{100}\times\frac{120}{100}\times\frac{75}{100}=\frac{99x}{100}$$

$$\frac{\text{Population in third year}}{\text{Population before three years}}=\frac{\frac{99x}{100}}{x}$$

$$=\frac{99x}{100}\times\frac{1}{x}=\frac{99}{100}=99:100$$

54. (c)

Let the side of isosceles triangle is x.

According to the question-

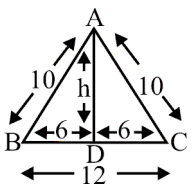
$$x+x+\frac{6x}{5}=32$$

$\Rightarrow \quad 2x+\frac{6x}{5}=32$

$\Rightarrow \quad 10x + 6x = 32 \times 5$

$\Rightarrow \quad x=\frac{32\times5}{16}$

$x = 10$



Sides of isosceles triangles are 10, 10 and 12 cm respectively.

$AD^2 = AB^2 - BD^2$

$= 10^2 - 6^2$

$AD = \sqrt{64} = 8$ cm.

Hence, height = 8 cm.

Area of isosceles triangle $=\frac{1}{2}\times$ base $\times$ height

$=\frac{1}{2}\times12\times8=6\times8=48\text{ cm}^2$

55. (c)

X can complete 25% of a work $=\frac{1}{4}$ part in 20 days

$\therefore$ X will complete whole work = 80 days

Remaining work $=1-\frac{1}{4}=\frac{3}{4}$ part

Both complete $\frac{3}{4}$ part of work together in 15 days

$\therefore$ Both will complete whole work together $=15\times\frac{4}{3}=20$ days

$\therefore$ One day work of Y $=\frac{1}{20}-\frac{1}{80}=\frac{4-1}{80}=\frac{3}{80}$ part

Y will complete the work $=\frac{80}{3}=26\frac{2}{3}$ days

56. (a)

Let time taken by Akshita covered distance is t_1, t_2 and t_3.

$$t_1=\frac{300}{50}=6\text{ h}$$

$$t_2=\frac{360}{30}=12\text{ h}$$

$$t_3=\frac{420}{60}=7\text{ h}$$

$$\text{Average speed}=\frac{\text{Total distance}}{\text{Total Time}}$$

$$k=\frac{300+360+420}{6+12+7}$$

$$k=\frac{1080}{25}$$

$k = 43.2$ km/h

According to the question,

$=\frac{216}{43.2}$

= 5 Hours.

57. (c)

Let the principal amount be ₹ P

Given,

R = 8%

T = 2 years

SI = ₹ 192

$\because \quad SI=\frac{P\times R\times T}{100}$

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$\Rightarrow \quad 192 = \frac{P \times 8 \times 2}{100}$

$\Rightarrow \quad P = \frac{192 \times 100}{16}$

P = ₹ 1200

58. (a)

Let the marked price of cooker = ₹x

Then cost price = $x \times \frac{9}{10} = \frac{9x}{10}$

And selling price = $x \times \frac{108}{100}$

$= ₹\frac{27x}{25}$

Profit percentage $= \frac{S.P - C.P}{C.P} \times 100$

$= \frac{\frac{27x}{25} - \frac{9x}{10}}{\frac{9x}{10}} \times 100$

$= \frac{\frac{270x - 225x}{250}}{\frac{9x}{10}} \times 100$

$= \frac{45x \times 10}{250 \times 9x} \times 100$

Profit percentage $= \frac{5}{25} \times 100$

= 20%

59. (d)

$\frac{\text{Sum of the six terms of geometric progression}}{\text{Sum of the three terms of geometric progression}} = \frac{152}{125}$

$\frac{\frac{a(r^6 - 1)}{r - 1}}{\frac{a(r^3 - 1)}{r - 1}} = \frac{152}{125}$

$\frac{r^6 - 1}{r^3 - 1} = \frac{152}{125}$

$\frac{(r^3 - 1)(r^3 + 1)}{(r^3 - 1)} = \frac{152}{162}$

$1 + r^3 = \frac{152}{125}$

$r^3 = \frac{152}{125} - 1, \qquad r^3 = \frac{152 - 125}{125}$

$r^3 = \frac{27}{125}, \qquad r = \frac{3}{5}$

60. (d)

From question,

$\frac{\tan A}{1 + \sec A} + \frac{1 + \sec A}{\tan A} = ?$

$= \frac{\sin A / \cos A}{1 + \frac{1}{\cos A}} + \frac{1 + \frac{1}{\cos A}}{\sin A / \cos A}$

$= \frac{\sin A}{1 + \cos A} + \frac{\cos A + 1}{\sin A}$

$= \frac{\sin^2 A + 1 + \cos^2 A + 2\cos A}{\sin A(1 + \cos A)}$ $[\because \sin^2 A + \cos^2 A = 1]$

$= \frac{2(1 + \cos A)}{\sin A(1 + \cos A)} = \frac{2}{\sin A}$

= 2 cosec A

61. (b)

$\sum fx = 5 \times 2 + 8 \times 5 + 10 \times 8 + 12 \times 22 + 7 \times p + 20 \times 4 + 25 \times 2$

= 10 + 40 + 80 +264 + 7p + 80 + 50

= 524 + 7p

Σf = 2 + 5 + 8 + 22 + 7 + 4 + 2

= 50

$\because \quad \text{Mean} = \frac{\Sigma f.x}{\Sigma f}$

$12.58 = \frac{524 + 7p}{50}$

7p = 629 – 524

7p = 105

p = 15

62. (d)

The square root of 10816

	104
1	10816
+1	1
20	08
+0	00
204	816
4	816
	×××

Hence, the required square root is 104.

63. (d)

Let present age of Maya = 6x years

And present age of Meera = 5x years

According to the question,

$\frac{6x + 15}{5x + 15} = \frac{9}{8}$

48x + 120 = 45x + 135

3x = 15

x = 5

So, the present age of Meera = 5 × 5 = 25 years

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64. (b)

Suppose pipe P takes x hours to fill the cistern

then Q will take time to fill cistern = x + 6 hrs

filled part by (P + Q) in 1 hour = $\frac{1}{4}$

filled part by P in 1 hour = $\frac{1}{x}$

filled part by Q in 1 hour = $\frac{1}{x+6}$

According to the question,

$$\frac{1}{x}+\frac{1}{x+6}=\frac{1}{4}$$

$$\frac{(x+6)+(x)}{x(x+6)}=\frac{1}{4}$$

$(2x + 6) \times 4 = x^2 + 6x$

$8x + 24 = x^2 + 6x$

$x^2 - 2x - 24 = 0$

$x^2 - (6-4)\,x - 24 = 0$

$(x^2 - 6x) + (4x - 24) = 0$

$x(x - 6) + 4\,(x - 6) = 0$

$(x + 4)\,(x - 6) = 0$

$x - 6 = 0,\ x = 6$

Hence P can fill the tank in 6 hours

65. (b)

Given:

Amount donated by Umesh = ₹750

Amount donated by Kapil = ₹975

Ratio of the amount donated by Umesh and Kapil

$$= \frac{750}{975}=\frac{30}{39}=\frac{10}{13}$$

= 10 : 13

66. (a)

Momentum - It is the product of the mass and velocity of an object whose change with respect to time gives force.

$P = m \times v$

Where P = momentum

m = mass of object

v = velocity

- The S.I. unit of momentum is kg-m/sec. and dimension is $[MLT^{-1}]$.

67. (d)

Gravitational force is given by

$$F = \frac{GMM}{R^2}$$

Clearly the Gravitational force is dependent only on mass of objects and distances between them. It does not depend on any medium between them. Hence, the force will remain same i.e. F.

68. (b)

Given,

An object of mass (m) = 3 kg

Force (F) = 6 N

time (t) = 3 second

v =?

From Newton's second law.

$$F = m\left(\frac{v-u}{t}\right)$$

$$\Rightarrow 6 = 3\left(\frac{v-0}{3}\right) \Rightarrow \boxed{v = 6m/s}$$

69. (c)

The energy possessed by a body (or water) by virtue of its position or height is called as potential energy .

- The water stored in dam posses potential energy.
- Kinetic energy is possessed by flowing water.

70. (b)

Specific heat capacity of water = 4186 J/kg°C

71. (c)

Colour	Digit	Multiplier	Tolerance
Black	0	$10^0 = 1$	
Brown	1	$10^1 = 10$	± 1%
Red	2	10^2	± 2%
Orange	3	10^3	
Yellow	4	10^4	
Green	5	10^5	
Blue	6	10^6	
Violet	7	10^7	
Grey	8	10^8	
White	9	10^9	
Gold	–	$10^{-1} = 0.1$	± 5%
Silver	–	$10^{-2} = 0.01$	± 10%

$ab \times 10^C \pm$ tolerance

Colour code of 180 k□□

$18 \times 10^4 \pm 5\%$

Brown, gray, yellow, golden

72. (a)

Given that -

Conductivity $(\sigma) = 5.8 \times 10^7$ mho/m

Electric field (E) = 40 m V/m

∴ Electric current density $(J_C) = \sigma E$ A/m^2

$= 5.8 \times 10^7 \times 40 \times 10^{-3}$

$= 232 \times 10^4$

$= 2.32 \times 10^6$ A/m^2

73. (b)

Given that- P = 5000 kW, V_1 = 11kV

V_2 = 220 kV

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We know that -

$$P = VI$$

So, $I_1 = \frac{P}{V_1}$

$$= \frac{5000}{11} = 454.54\ A$$

So, $I_2 = \frac{P}{V_2} = \frac{5000}{220} = 22.72\ A$

Reduction in current−

$$= \frac{I_1 - I_2}{I_1} \times 100$$

$$= \frac{454.54 - 22.72}{454.54} \times 100$$

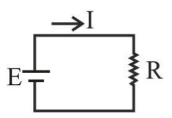
$$= \frac{431.81}{454.54} \times 100$$

Percentage reduction in current = 95%

74. (a)

Electromotive Force (EMF)- When a battery is connected to a circuit, electrons move from anode to cathode through the circuit. The force due to which electrons move from one place to another place is called electromotive force. The voltage of the battery is equal to the electromagnetic force.

The force is responsible for the flow charge through the circuit which is known as electric current.



$$E = \frac{\Delta W}{\Delta Q} = \frac{J}{C} = V$$

The unit of electromotive force = J/C or volt.

75. (c)

Energy meter is an integrating type instrument.

Integrating type instrument – These instruments give the integration of the inputs applied over a particular period of time.

Example- Watt hour meter, Energy meter

76. (a)

Maximum resultant of two vector = A+B

= 15+10

= 25

Minimum resultant of two vector = A - B

= 15 - 10 = 5

Hence, resultant vector must be in between 5 and 25, so 3 units can not be resultant of two vector.

77. (d)

Given,

$R = 6400\ km = 6.4 \times 10^6 m$

Capacitance $(C) = 4\pi\varepsilon_0 R = \frac{1}{9\times10^9} \times 6.4\times10^6$

$$C = \frac{6.4\times10^6}{9\times10^9} = 0.711\times10^{-3} F$$

$$\boxed{C = 0.000711\ F}$$

78. (a)

The direction of motion of a conductor in a magnetic field is given by Fleming's left hand rule. According to this rule when a current-carrying conductor is placed in an external magnetic field, the conductor experiences a force perpendicular to both the field and the direction of current flow.

79. (c)

Permeability is analogous to conductivity.

Permeability $\propto \frac{1}{\text{reluctivity}}$, conductivity $\propto \frac{1}{\text{Resistivity}}$

80. (b)

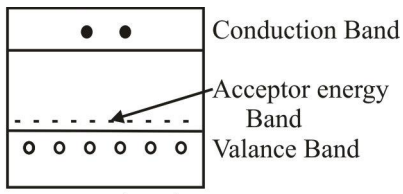
$Q = it$ and $Q = ne$ where $e = 1.6\times10^{-19}$ C

$$i = \frac{ne}{t} \Rightarrow \frac{5\times10^{16}\times1.6\times10^{-19}}{80} = 0.1mA$$

81. (d)

Alloy of Constantan and Manganin resistance is independent of change in temperature. Constantan is also known as Eureka. It is alloy of copper and nickel. Manganin is made of a mixture of copper manganese and nickel. Temperature has no effect on these alloy.

82. (b)

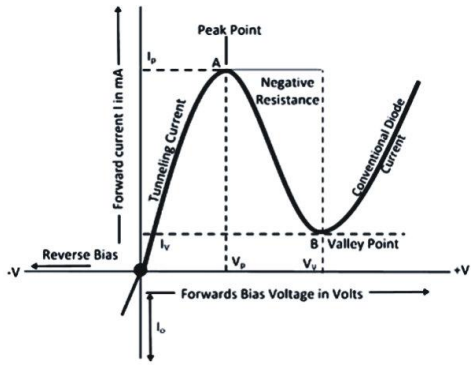


P-Type semiconductor

In P-type semiconductor acceptor energy band is near the valance band.

83. (d)

Tunnel diode has negative resistance characteristics. This diode is made by germanium or gallium arsenide. Doping is high in both its P and N region due to which the depletion region becomes very narrow. If the depletion region is too narrow then the charge carriers tunnel through the barrier.



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84. (d)

In a BJT transistor to maintain a fixed operating point the bias stabilization/compensation is achieved by using both diode and thermistor compensation. The purpose of the biasing is to switch on the BJT to work in the active region such that the DC collector current remains constant.

Independents of-

- β
- Temperature
- Load variation.

Diode compensation-

- Diode compensation for instability due to V_{BE} variation
- Diode compensation for instability due to I_{CO} Variation.

Thermistor compensation-

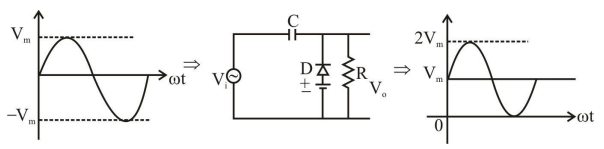
- A thermistor is a temperature-sensitive device.
- It is a negative temperature coefficient.

85. (b)

A Vertical Metal Oxide Semiconductor (VMOS) is a type of metal oxide semiconductor transistor its principle of operation is similar to that of the enhancement MOSFET.

86. (d)

Diode, capacitor and resistor are necessary for clamper circuit. Clamper is called a restorer since it adds DC voltage to wave, inserts DC. also. a positive clamper adds a positive D.C voltage, shifting the wave up, and vice versa for the negative clamper



87. (c)

Given that,

I_E= 2mA , I_C=1.9 mA

I_B=?

$\therefore I_B=I_E-I_C$

I_B=(2−1.9) mA

I_B=0.10mA

88. (a)

Highest operating frequency can be expected in the case of bipolar transistor. BJT is current controlled device. It has low input impedance and high output Impedance.

89. (b)

- Positive feedback is known as regenerative feedback.
- Negative feedback is known as degenerative feedback.

Gain of positive feedback,

$$A_f = \frac{A}{1-A\beta}$$

Positive feedback increases gain. Due to which the distortion increases.

90. (c)

From wave form,

T_{on} = 1 ms

T = 10 ms

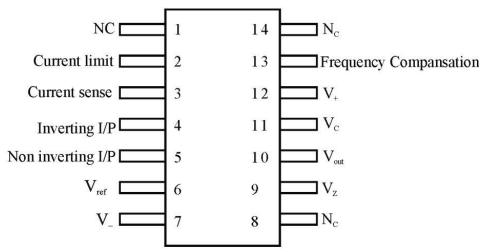
$[T = T_{ON} + T_{OFF}]$

$$\therefore \text{Duty cycle} = \frac{T_{ON}}{T} = \frac{1}{10}$$

$$\% \text{ Duty cycle} = \frac{1}{10} \times 100 = 10\%$$

91. (a)

LM 723 Voltage Regulator IC is 14 pin dual in line package IC.

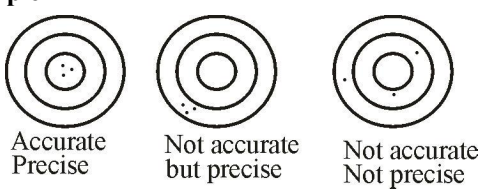


- LM723 voltage regulatior is generally used for series voltage regulator applications.
- It can be used as both positive and negative voltage regulator.

92. (b)

The closeness of significant figures used in a measurement is called accuracy.

Example -



93. (c)

Eddy current damping is a most efficient form of damping employed in electric instruments.

(i) Air friction damping - Moving iron, electrodynomometer type instruments.

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(ii) Fluid friction damping - Electrostatic voltmeter uses fluid friction damping.

(iii) Eddy current damping - Used in PMMC instruments.

Controlling torque - The controlling torque is provided by spring or gravity control.

- Gravity controlling torque is used in vertically mounted instruments only.

$T_C \propto \sin\theta$

- Hair spring is used to provides the controlling torque in both horizontal and vertical position.

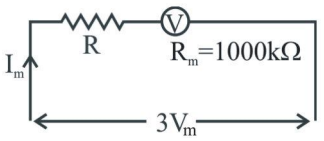
$T_C \propto \theta$

94. (b)

Given,

Meter resistance, $R_m = 1000\ k\Omega$

And in order to increase its range three times a resistance to be added in series.



To be measured $3V_m$,

$V_m = I_m \cdot R_m$ ..... (i)

$I_m (R+R_m) = 3V_m$

$I_mR + I_mR_m = 3V_m$

$I_mR = 3V_m - I_m R_m$ $(V_m = I_m \cdot R_m)$

$I_m R = 2I_m R_m$

$R = 2 \times 1000$

$R = 2000\ k\Omega$

95. (d)

Megger works on the principle of electromagnetic induction. The scale of a megger is calibrated between zero to infinity. It can be used to measure high value of resistance. e.g.

(i) Insulation resistance of cable.

(ii) Resistance in motor winding.

(iii) Resistance of Transformer winding.

96. (b)

Features of a capacitive transducer - Highly sensitive to measure small displacements.

- Can be used to measure force and pressure.
- Can be used to measure humidity.
- Capacitive transducer used for dynamic measurement.

97. (d)

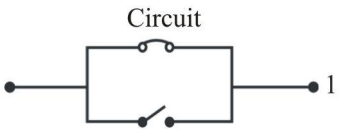
Excess - 3 code is obtained by adding 3 to each bit of any decimal number.

Decimal Number	1	2
Adding	+3	+3
Excess - 3 code	4	5
	↓	↓
	0100	0101
Excess - 3 code	01000101	

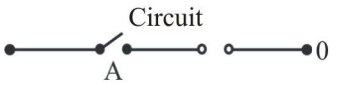
98. (c)

Annulment :

(i) A+1



(ii) A.0



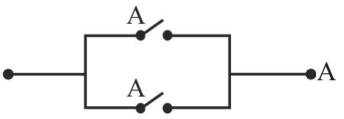
Identity ⇒

(i) A+0

(ii) A.1

Idempotent ⇒

(i) A+A



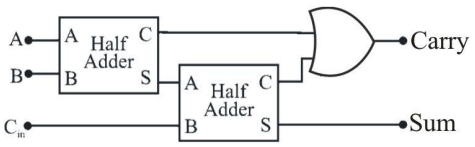
(ii) A.A

Double Negative

NOT $\overline{A} = A$

99. (c)

A full adder can be made from two half adders and an OR gate. A & B connected to the input of the first half adder and the output before the input of the second adder. Sum and carry C are the two carry output of an OR Gate.



100. (d)

CMOS has the least power dissipation and largest Noise margin among the following logic families, in CMOS margin logic p-type and n-type MOSFETs are fabricated on the same chip. Although CMOS is low compared to other logic families, its main advantage is almost zero power consumption no matter whether the output is High or Low.

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PRACTICE SET - 4

1. What is the Electric Power Generation Capability of Chandrayaan-2's Rover-Pragyan?
(a) 50 W (b) 25 W
(c) 75 W (d) 100 W

2. The Chinaman style of bowling in Cricket has been named after:
(a) An Indian bowler of Chinese origin
(b) An Australian bowler of Chinese origin
(c) An English bowler of Chinese origin
(d) West Indies bowler of Chinese origin

3. The Sikkimese are known for their amazing mask dance. What is this dance form called in Sikkim?
(a) Purulia Chhau (b) Mukha Bhaona
(c) Cham (d) Padayani

4. The first woman to swim the English Channel was:
(a) An Indian (b) A French
(c) A British (d) An American

5. In which year was the nationalization of banks
(a) 1969 (b) 1967
(c) 1968 (d) 1970

6. How many ministers can be included in the Union Council of Ministers?
(a) 15% of the total members of Lok Sabha
(b) 50% of the total members of Lok Sabha
(c) 10% to 15% of the total members of Lok Sabha
(d) As desired by the Prime Minister of India

7. Which of the following options has the correct types of planetary winds?
(a) Local Winds and Periodic Winds
(b) Trade Winds and Periodic Winds
(c) Trade Winds, Westerlies and Polar Easterlies
(d) Polar Winds and Westerlies

8. Umiam lake is also known as Barapani lake which is located in state ?
(a) Rajasthan
(b) Uttarakhand
(c) Meghalaya
(d) Madhya Pradesh

9. _____became an independent kingdom under the rule of Chinkilich khan, also known as Nizam-ul-mulk.
(a) Mysore (b) Hyderabad
(c) Awadh (d) Bengal

10. Rabindranath Tagore returned his Knighthood award because of the ———.
(a) Jallianwala Bagh Tragedy
(b) Kakori Episode
(c) Chauri Chaura Episode
(d) Execution of Bhagat Singh

11. Select the option in which the numbers share the same relationship as that shared by the given pair of numbers.
11 : 132
(a) 6 : 48 (b) 9 : 93
(c) 8 : 72 (d) 7 : 61

12. Abu's watch is 4:50, where the minute needle is towards the north-east. What direction is the hour needle?
(a) East (b) South-West
(c) South (d) South-East

13. Interchanging which two sign will make the following equation correct
5 × 15 ÷ 7 – 20 + 4 = 77
(a) – and + (b) × and ÷
(c) + and ÷ (d) + and ×

14. Statement: Public sector smoking has increased in the current year.
Conclusions:
1. Government should ban public sector smoking.
2. Government should create awareness about ill effects of public sector smoking.
(a) Only conclusion 1 follows
(b) Only conclusion 2 follows
(c) Neither 1 nor 2 follows
(d) Both 1 and 2 follow

15. Consider the given statement and decide which of the given assumptions is/are implicit in the statement.
Statement :
Many farmers are taking up organic farming
Assumptions
I. Organic farming is easy to practice
II. Organic farming is more beneficial to farmers
(a) Neither assumption I nor II is implicit
(b) Only assumption II is implicit
(c) Either assumption I or II is implicit
(d) Only assumption I is implicit

16. Read the given information and statements carefully and decide which option is True with respect to the statement.

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If a sum of money is lent at simple interest, then the:

Statements:

1. **Money gets doubled in 6 years if the rate of Interest is 16%.**
2. **Money gets doubled in 5 years if the rate of interest is 18%.**

(a) Both statements 1 and 2 are incorrect
(b) Only statement 1 is correct
(c) Only statement 2 is correct
(d) Statement 1 and 2 are correct

17. Which point on the given number line represents $\frac{6}{5}$?

(a) S (b) W
(c) K (d) R

18. Select the option that is related to the third term in the same way as the second term is related to the first term.

Dog : Guard : : Horse : ?

(a) Cart (b) Saddle
(c) Stable (d) Ride

19. In a certain code language. 'MISTAKE' is written as 'LHRUBLF' and 'PROBLEM' is written as 'OQNCMFN'. How will 'STRANGE' be written in the language?

(a) TUSBMFD (b) RSQBOHF
(c) RSQBMFD (d) TUSAOHF

20. Four letter-clusters have been given out of which three are alike in some manner and one is different. Select the one that is different.

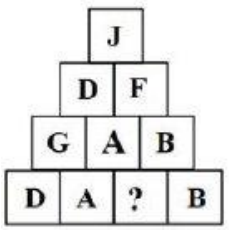
(a) GEM (b) JHQ
(c) KIQ (d) YWE

21. Select the letter-cluster from among the given options that can replace the question mark (?) in the following series.

DI, GO, LU, OA, TG, ?

(a) WM (b) UL
(c) WL (d) YM

22. Which letter will replaces the question mark in the given diagram?



(a) C (b) F
(c) A (d) D

23. If all the directions are moved 135 degrees clockwise, then which new direction does the original south point to?

(a) North-East (b) South-West
(c) South-East (d) North-West

24. Pushpa introduced her friends to Sujeeta and Radha by saying, 'Radha's maternal grandmother's only son-in-law is Sujeeta's father. From the options given below, how is Sujeeta related to Radha"?

(a) Mother-in-law (b) Maternal aunt
(c) Sister (d) Mother

25. If '+' means 'division', '÷' means 'subtraction', '–' means 'multiplication' and '×' means 'addition', then what is the value of X in the following equation?

200 + 10 – 25 × 60 ÷ 20 = X

(a) 560 (b) 500
(c) 540 (d) 520

26. In which generation were computers bulky, vacuum based and costly?

(a) Fourth generation (b) Fifth generation
(c) First generation (d) Third generation

27. Which of the following is an Input device?

(a) Joystick (b) Plotter
(c) Coder (d) Printer

28. Which of the following comprise(s) the input devices?

(a) keyboard
(b) mouse
(c) both keyboard and mouse
(d) None of these

29. Which among the following input devices consists of a stick which pivots on a base and reports its angle or direction of the CPU?

(a) Microphone (b) Light pen
(c) Keyboard (d) Joystick

30. Semiconductor memory, Dynamic RAM (DRAM) stores each bit of information in a _____.

(a) diode (b) encoder
(c) capacitor (d) resistor

31. Which of the following is widely used for implementing main memory?

(a) Magnetic drum memory
(b) Magnetic core memory
(c) Static RAM
(d) Dynamic RAM

32. Which of the following statement is incorrect regarding computer memory?

(a) Before processing, the program and data are loaded into primary memory
(b) RAM is a non - volatile memory
(c) The CPU of the computer cannot directly access the hard disk
(d) RAM is a primary memory

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33. Which of the following statement are correct?
(i) GSM mobiles support the transmission of both data and voice.
(ii) In CDMA mobiles, customer information is stored in the headset or phone
(a) Only (i) (b) Both (i) and (ii)
(c) Neither (i) nor (ii) (d) Only (ii)

34. Which of the following statement is wrong?
(i) Congestion control protocols ensure that the sender cannot send data faster than the limit on which the receiver can receive data.
(ii) Flow-control protocols ensure that the sender cannot send data faster than the network can transmit data.
(a) Neither (i) nor (ii)
(b) Both (i) and (ii)
(c) Only (ii)
(d) Only (i)

35. Which of the following statements is/are FALSE.
(i) The full form of SIM used in mobile phones is Subscriber Identity Module.
(ii) The size of micro and nano SIM cards is the same.
(a) Neither (i) nor (ii) (b) Both (i) and (ii)
(c) Only (ii) (d) Only (i)

36. The full form of SIM is?
(a) Subscriber Identity Module
(b) Subscriber Identity Machine
(c) Self Identity Machine
(d) Self Identity Module

37. Which of the following tabs MS- Word 365 has options likes Save, Save as, Open a New Document etc?
(a) Data (b) Review
(c) Home (d) File

38. Which of the following main menu items in MS-Word 2007 includes the 'Watermark' command?
(a) Page layout (b) Insert
(c) Home (d) References

39. Which of the following is the keyboard shortcut to save the contents of the currently open Word document in MS Word 2007?
(a) Alt + S (b) Shift + S
(c) Ctrl +Alt + S (d) Ctrl + S

40. In email, to search for messages after 02/22/2021, which of the following option should be entered?
(a) newer than : 02/22/2021
(b) newer : 02/22/2021
(c) after than : 02/22/2021
(d) after : 02/22/2021

41. Which of the following options is the correct sequence to print an entire web page in Google Chrome browser?
(a) Open the web page -> Press Ctrl + A -> Right click on the page and left click on 'Print'
(b) Open the web page -> click on page Setup -> Click on the 'Print' icon
(c) Open the web page -> Press Ctrl + S -> Right click on the page and left click on 'Print'
(d) Open the web page -> Click on Print Preview -> Click on the 'Print' icon

42. In the context of searching content on the Internet which of the following facts is NOT true?
(a) Use quotation marks
(b) Use complex search terms
(c) Use specific keywords
(d) Vary your search engine

43. The _____ browser was a text based browser, invented in _____.
(a) Lynx; 1985 (b) Safari; 1985
(c) Lynx; 1992 (d) Safari; 1992

44. Match the columns.

Web Browsers	Manufacturer
(i) Chrome	(a) Microsoft
(ii) Edge	(b) Apple
(iii) Safari	(c) Google

(a) (i)-(a), (ii)-(b), (iii)-(c)
(b) (i)-(c), (ii)-(b), (iii)-(a)
(c) (i)-(c), (ii)-(a), (iii)-(b)
(d) (i)-(b), (ii)-(a), (iii)-(c)

45. Which of the following provides a software interface that allows you to click on WWW hyperlinked resources?
(a) Browser (b) IP Address
(c) URL (d) URI

46. How many numbers between 300 and 1000 are divisible by 7?
(a) 994 (b) 301 (c) 101 (d) 100

47. Simplify the given expression using BODMAS :
$$\frac{4}{11}\times\frac{121}{16}\times 24(75^2-55^2)\times\frac{1}{100}$$
(a) 1736 (b) 1726
(c) 1746 (d) 1716

48. Arrange the following fractions in the ascending order.
$$\frac{2}{3},\frac{4}{8},\frac{5}{9}\text{ and }\frac{9}{11}$$
(a) $\frac{4}{8}<\frac{5}{9}<\frac{2}{3}<\frac{9}{11}$ (b) $\frac{5}{9}<\frac{2}{3}<\frac{4}{8}<\frac{9}{11}$
(c) $\frac{5}{9}<\frac{2}{3}<\frac{9}{11}<\frac{4}{8}$ (d) $\frac{4}{8}<\frac{5}{9}<\frac{9}{11}<\frac{2}{3}$

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49. The square root of a positive fraction, when added to 1, is $3\frac{1}{4}$. Find the fraction.

(a) $2\frac{1}{4}$ (b) $6\frac{1}{4}$
(c) $5\frac{1}{16}$ (d) $3\frac{1}{16}$

50. Find the LCM of 24, 96 and 36.

(a) 576 (b) 216
(c) 288 (d) 144

51. Find the LCM of 0.63, 10.5, 2.1 and 4.20.

(a) 63 (b) 0.63
(c) 6.30 (d) 6300

52. If (3x+2y) : (3x-2y) = 5 : 3 then find x : y.

(a) $\frac{4}{3}$ (b) $\frac{32}{3}$
(c) $\frac{16}{3}$ (d) $\frac{8}{3}$

53. Vimal secured 46% marks in the exam and failed to qualify in the exam by 10 marks. If he secured 52% marks, he would have secured 8 marks more than what was the minimum qualifying marks. What were the minimum marks one had to score to qualify in the exam?

(a) 148 (b) 146
(c) 156 (d) 138

54. The sides of a triangle are 16 m, 12 m and 20 m. Find altitude of the triangle.

(a) 9.2 m (b) 9.6 m
(c) 9.4 m (d) 9.8 m

55. A and B can do a work in 18 days. B and C can do the same work in 15 days. While A and C can do the work in 12 days. Working together, how much time will they take to complete the work ?

(a) $8\frac{27}{37}$ (b) $11\frac{27}{37}$
(c) $9\frac{27}{37}$ (d) $10\frac{27}{37}$

56. Nidhi takes 3 hours 45 minutes to walk from one place and return to the same place by bicycle, it takes 4 hours 20 minutes to walk. So how long will it take to get on the cycle.

(a) 3 hours 10 minutes
(b) 3 hours 35 minutes
(c) 3 hours 45 minutes
(d) 3 hours 15 minutes

57. P_1, P_2 and P_3 are invested at 4%, 6% and 8% respectively in such a way that the simple interest received from all the three amounts at the end of the year are equal. If the sum of the three invested amounts is ₹2600, find the values of P_1, P_2 P_3 respectively.

(a) ₹1100, ₹800, ₹ 700
(b) ₹1200, ₹ 600, ₹ 800
(c) ₹1000, ₹ 900, ₹ 700
(d) ₹1200, ₹ 800, ₹ 600

58. A shopkeeper sells an article at 20% profit. If he had bought the article at 10% less and sold it at ₹18 more than the previous selling price, he would have made 40% profit. What is the original cost price of the article? (in ₹)

(a) ₹ 350 (b) ₹ 320
(c) ₹ 300 (d) ₹ 280

59. Find the HCF of $(x^4 - y^4)$, $(x^8 - y^8)$ and $(x^2 - y^2)$

(a) (x – y) (x + y)
(b) (x – y) (x + y) (x + y)
(c) (x – y) (x + y) (x – y) (x + y)
(d) (x + y) (x + y)

60. If $\tan\theta = \frac{5}{6}$, then what is the value of $\frac{12\sin\theta - 5\cos\theta}{12\sin\theta + 5\cos\theta}$?

(a) $\frac{2}{3}$ (b) $\frac{1}{3}$
(c) $\frac{3}{4}$ (d) $\frac{1}{4}$

61. Find out the mean of the given below data– $1, \frac{1}{2}, \frac{1}{2}, \frac{3}{4}, \frac{1}{4}, 2, \frac{1}{2}, \frac{1}{4}, \frac{3}{4}$

(a) $\frac{15}{18}$ (b) $\frac{13}{18}$
(c) $\frac{7}{9}$ (d) $\frac{8}{9}$

62. $\sqrt{0.00069169}$ = ?

(a) 0.00243 (b) 0.000243
(c) 0.0263 (d) 0.243

63. After 4 years, the total age of the two members of a family will be 64 years. Four years ago the ratio of their age was 3 : 1. Find the age of the younger member.

(a) 10 (b) 16
(c) 12 (d) 15

64. A pipe can fill a tank in 7/4 hours while the other pipe can empty the full tank in 21/8 hours. Both pipes were opened at that time when the tank was 2/3 empty. How much time will be taken to fill the tank?

(a) 3 hours 20 minute (b) 3 hours 30 minute
(c) 3 hours 45 minute (d) 3 hours 15 minute

65. The ratio of the number of females to that of male employees in a small company is 2 : 3 If the number of male employees in the company is 90, then the total number of employees working in the company is:

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(a) 120 (b) 90
(c) 130 (d) 150

66. Which among the following is a derived unit ?
(a) Length (b) Density
(c) Time (d) Mass

67. The quantity of motion of a body is best represented by
(a) Its velocity
(b) Its speed
(c) Its mass
(d) Its linear momentum

68. When light travels from one medium to another, which of the following does not change?
(a) Wavelength (b) Intensity
(c) Velocity (d) Frequency

69. A pump is required to lift 600 kg of water per minute from a well 25 m deep and to eject it with a speed 50m/s. If g = 10m/s^2, the power required to perform the above task is
(a) 20 kW (b) 15 kW
(c) 10 kW (d) 22.5 kW

70. Find the specific latent heat of vaporisation of 1.25 g of (in Jg^{-1}), if it releases 250 joules of heat when it condenses at its boiling point of 196° C.
(a) 500 (b) 200
(c) 312.5 (d) 469

71. Which of the following formulas represents ohm's law?
(a) V = C.Q (b) V= I. R
(c) $V = \frac{L}{I}$ (d) $V = \frac{I}{R}$

72. The unit of absolute permittivity of a medium is:
(a) Joule/Coulomb (b) Newton/Meter
(c) Farad/Meter (d) Farad/Coulomb

73. The capacitive reactance of a 0.01 micro farad capacitor to a frequency of 100 kHz will be:
(a) 0.006 Ohm (b) 15Ohm
(c) 115 Ohm (d) 159 Ohm

74. Two coil with a coefficient of coupling of 0.5 between them are connected in series so as to magnetic in the same direction and in the opposite direction the corresponding value of total Inductances are 1.9 H and 0.7H, respectively identify the self inductances of the two coils.
(a) 0.6 H and 0.5 H
(b) 0.5 H and 0.9 H
(c) 0.9 H and 0.4 H
(d) 0.8 H and 0.6 H

75. _____ is a measuring device which can evaluate and record the electrical power passing through a circuit in a certain time. By implementing it, we can know how much amount of electrical energy is used by a consumer or a residence or an electrically powered device or a business.
(a) Watt hour meter (b) DC meter
(c) AC meter (d) Air flow meter

76. Identify the correct relationship between magnetic field intensity (H) and magnetic flux density (B), with standard notations of relative permeability (μ_r) and permeability in free space (μ_0).
(a) $H = \mu_r\mu_0 B$ (b) $H = (\mu_r/\mu_0)B$
(c) $B = (\mu_r/\mu_0)H$ (d) $B = \mu_r\mu_0 H$

77. The value of electric field at a distance of 1m from an infinite line with charge density 1 C/m is
(a) $2\pi\varepsilon_0$ (b) $1/2\pi\varepsilon_0$
(c) $\varepsilon_0/2\pi$ (d) $2\pi/\varepsilon_0$

78. A hollow sphere of charge does not produce an electric field at-
(a) Interior point (b) outer point
(c) Beyond 2 meters (d) none of the above

79. The direction of induced e.m.f. in a conductor (or coil) can be determined by-
(a) Work law
(b) Ampere's law
(c) Fleming's right hand rule
(d) Fleming's left hand rule

80. The composition of constantan is:
(a) Cu = 60% and Ni = 40%
(b) Cu = 43%, Ni = 17% and Mn = 40%
(c) Sn = 23.43%, Cu = 43.67% and Ni = 32.9%
(d) Mn = 65% and Zn = 35%

81. Which of the following options is a thermosetting polymer?
(a) PVC (b) Nylon
(c) Teflon (d) Bakelite

82. In an N-type semiconductor, there are
(a) No minority carrier
(b) Immobile negative ion
(c) Immobile positive ion
(d) Holes as majority carrier

83. The color of light emitted by a LED depends on
(a) Its forward bias voltage
(b) Its reverse bias voltage
(c) Value of series resistance in the circuit
(d) Type of semiconductor material

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84. Transistor biasing configuration works best at relatively_____.
(a) High power supply voltage
(b) Low power supply voltage
(c) High power supply current
(d) Low power supply current

85. Which of the following transistors can be used in enhancement mode
(a) UJT (b) MOSFET
(c) JFET (d) NPN transistor

86. A clipper circuit is also known as
(a) limiter circuit
(b) Clamper circuit
(c) Chopper circuit
(d) Charger circuit

87. In a single stage amplifier D.C and A.C load lines:
(a) are always parallel
(b) Are perpendicular to each other
(c) Cross each other at Q-point
(d) Are inclined but do not cross each other

88. The ac load line of a transistor circuit
(a) Is steeper than its dc load line
(b) Is same as its dc load line
(c) Never intersects the dc load line
(d) Is steeper than its dc load line but intersect at Q point

89. The most commonly used feedback arrangement in cascaded amplifier is:
(a) frequency series feedback
(b) voltage shunt feedback
(c) current shunt feedback
(d) voltage series feedback

90. An operational amplifier has a differential gain of 100 and a common mode gain of 0.01. Its CMRR will be:
(a) 20 dB (b) 40 dB
(c) 60 dB (d) 80 dB

91. Which type of SMPS is provided for output supply in inverted nature and either more or less than the input supply?
(a) Buck (b) Boost
(c) Buck-boost (d) High regulated

92. The current sensitivity of a meter is expressed in:
(a) Ampere/Division
(b) Ampere
(c) Ohm/Volt
(d) Ohm/Ampere

93. Electrodynamometer is a _____instrument where magnetic field in which coil moves, is provided by two ____.
(a) transfer-type, permanent magnets
(b) constant-type, permanent magnets
(c) transfer-type, fixed coils
(d) constant-type, fixed coils

94. Electrostatic-type instruments are primarily used as:
(a) Wattmeters
(b) Ohmmeters
(c) Voltmeters
(d) Ammeters

95. Two wattmeter method of power measurement is suitable for
(a) both balanced and unbalanced load
(b) balanced load only
(c) delta connected load
(d) unbalanced load

96. Gauge factor of a strain gauge is–
(a) (dR/dL) × (L/R)
(b) (dL/dR) × (R/L)
(c) (dL/dR) × (L/R)
(d) (dR/dL)

97. Express –39 in 8-bit 2's complement form.
(a) 10101001 (b) 01101010
(c) 01000101 (d) 11011001

98. The Boolean function F(A, B, C, D) = ∑ (0, 6, 8, 13, 14) with don't care conditions d(A, B, C, D) = ∑ (2, 4, 10) can be simplified to :
(a) $F = \bar{B}\bar{D} + C\bar{D} + AB\bar{C}$
(b) $F = \bar{B}\bar{D} + C\bar{D} + AB\bar{C}D$
(c) $F = A\bar{B}\bar{D} + C\bar{D} + AB\bar{C}$
(d) $F = \bar{B}\bar{D} + C\bar{D} + ABCD$

99. Read the following statements
i. Gate is a combinational logic.
ii. JK Flip-flop in toggle mode is not combinational logic.
iii. MSJK Flip-flop suffers from race-around.
iv. Counters are sequential circuits.
Which is correct?
(a) i, ii (b) i, ii ,iv
(c) ii, iii, iv (d) i, ii, iii

100. Duty cycle for repetitive waveform is defined as?
(a) Ratio of ON time to Total time
(b) Sum of ON time and OFF time
(c) Ratio of OFF time to ON time
(d) Ratio of Total time to ON time

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SOLUTION : PRACTICE SET- 4

ANSWER KEY

1. (a)	11. (c)	21. (a)	31. (d)	41. (a)	51. (a)	61. (b)	71. (b)	81. (d)	91. (c)
2. (d)	12. (d)	22. (a)	32. (b)	42. (b)	52. (d)	62. (c)	72. (c)	82. (c)	92. (c)
3. (c)	13. (c)	23. (a)	33. (b)	43. (c)	53. (a)	63. (b)	73. (d)	83. (d)	93. (c)
4. (d)	14. (d)	24. (c)	34. (b)	44. (c)	54. (b)	64. (b)	74. (c)	84. (b)	94. (c)
5. (a)	15. (b)	25. (c)	35. (c)	45. (a)	55. (c)	65. (d)	75. (a)	85. (b)	95. (a)
6. (a)	16. (a)	26. (c)	36. (a)	46. (d)	56. (a)	66. (b)	76. (d)	86. (a)	96. (a)
7. (c)	17. (d)	27.(a)	37. (d)	47. (d)	57. (d)	67. (d)	77. (b)	87. (c)	97. (d)
8. (c)	18. (d)	28. (c)	38. (a)	48. (a)	58. (c)	68. (d)	78. (a)	88. (d)	98. (b)
9. (b)	19. (b)	29. (d)	39. (d)	49. (c)	59. (a)	69. (b)	79. (c)	89. (d)	99. (b)
10. (a)	20. (b)	30. (c)	40. (d)	50. (c)	60. (b)	70. (b)	80. (a)	90. (d)	100. (a)

SOLUTION

1. (a)
Chandrayaan 2 was the second Lunar exploration mission which has been developed by the Indian Space Research Organization. It had three main components namely the Pragyan Rover, Vikram Lander, and orbiter. According to ISRO, the Pragyan Rover is capable of conducting in-situ payload experiments. It weighs a total of 27 kg and has an electric power generation capacity of 50w.

2. (d)
The term is traditionally believed to have originated with the former West Indies Spinner Ellis Achong. Back in 1933, England hosted West Indies in a Test match in Old Trafford. Achong bowled an unexpected delivery from his wrist which got a sharp turn after pitching outside off and got the English batsman Walter Robins stumped. From then, left-arm wrist spinners have been referred to as Chinaman bowlers.

3. (c)
The Sikkimese are known for their amazing mask dance called Cham or Lama dances. It is the most famous dance of Sikkim and performed by Buddhist lamas (monks) during special occasions like the Pang Lhabsol festival. During Pang Lhabsol festival, the Sikkimese remind mount Khangchendzonga of the promise made to the 8th century Saint Guru Padmasambhava to protect Sikkim forever.

4. (d)
Gertrude Ederle becomes first women (U.S.) to swim English Channel on August 6, 1926. She swim 21 miles from Dover, England to Cape Griz-Nez across the English Channel, which separates Great Britain from the north western tip of France.

5. (a)
In the year 1969, the Government of India did nationalization of banks. Nationalization of Banks was implemented under the Banking Companies (Acquisition and Transfer of undertakings) Act of 1970. The ordinance came into force on 19 July 1969. 14 banks were Nationalized in 1969 while 6 more Banks were Nationalized in 1980.

6. (a)
As per Indian Constitution, Article 75(1-A) states the limit on minister. According to this article the total number of ministers including Prime Minister, in the Council of Ministers shall not exceed fifteen percent, of the total number of members of the House of the People. This provision was added by the 91st Amendment Act, of 2003.

7. (c)
There are three main types of planetary winds - the trade winds, the westerlies and the easterlies. Planetary or permanent winds blow from high pressure belts to low pressure belts in the same direction throughout the year. They blow over vast area of continents and oceans.

8. (c)
Umiam lake is a reservoir located in Shillong, capital of India's north-eastern state of Meghalaya. It is also called Barapani lake. This artificial lake has been constructed by intercepting water of Umiam lake, coming from the southern Khari mountain.

9. (b)
After the death of Aurangzeb on 3 March, 1707 AD. When the Mughal ruler became weak, the Nizam of Hyderabad declared freedom of himself from Mughal Empire. He established the independent Hyderabad state in 1724 AD.

10. (a)
On 3rd June 1915, Nobel Laureate, Bangla writer and Poet Ravindranath Tagore was given the "Knighthood" title by the British government. But in agitation against the famous Jallianwala Bagh Massacre he returned the "Knighthood" title.

11. (c)
Just as, 11 : 132 Similarly, 8 : 72

11^2+11 8^2+8

Hence, option (c) is correct.

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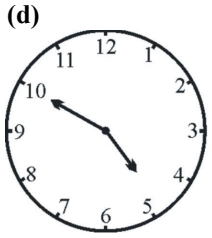
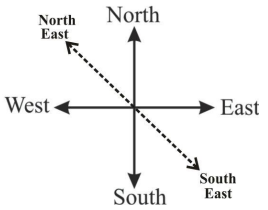
12. (d)





If the minute needle indicated North-West, then the hour needle will indicate South-East direction.

13. (c)

Given,

$$5 \times 15 \div 7 - 20 + 4 = 77$$

On interchanging the signs from option (c),

$$5 \times 15 + 7 - 20 \div 4 = 77$$
$$5 \times 15 + 7 - 5 = 77$$
$$75 + 7 - 5 = 77$$
$$77 = 77$$

Hence, option (c) is correct.

14. (d)

The government should prohibit smoking in public places because smoking causes serious and fatal disease. It is not only fatal for those who smoke but also for those who come in contact with smoke. Therefore the government should be aware of smoking in public places and its ill effects. So, the increase in smoking in public places can be stopped. Thus, here both conclusion (1) and conclusion (2) follow the statement.

15. (b)

Many farmers do organic farming, farmers doing organic farming will be given 10 thousand rupees per acre by the Government. Not only this, when the farmers crops are ready, the government will make separate arrangements to buy them in the mandis. So that organic farming is more beneficial for the farmers. Therefore only assumption II is implicit in the statement.

16. (a)

Let ₹100 be the money lent at simple interest, then

According to statement 1,

$$\text{Simple interest} = \frac{100 \times 16 \times 6}{100}$$

Simple interest = ₹96

Amount = 100 + 96 = ₹196

According to the statement 2,

$$\text{Simple interest} = \frac{100 \times 18 \times 5}{100}$$

Simple interest = ₹90

Amount = 100 + 90 = ₹190

Hence, it is clear that statement (1) and statement (2) both are wrong.

17. (d)

$$\frac{6}{5} = 1.2$$

On the given number line $\frac{6}{5} = 1.2$ represents by point by paint R.

18. (d)

Just as, a dog is related to protect in the same way a horse is related to ride.

19. (b)

Just as,

$M \xrightarrow{-1} L$
$I \xrightarrow{-1} H$
$S \xrightarrow{-1} R$
$T \xrightarrow{+1} U$
$A \xrightarrow{+1} B$
$K \xrightarrow{+1} L$
$E \xrightarrow{+1} F$

And,

$P \xrightarrow{-1} O$
$R \xrightarrow{-1} Q$
$O \xrightarrow{-1} N$
$B \xrightarrow{+1} C$
$L \xrightarrow{+1} M$
$E \xrightarrow{+1} F$
$M \xrightarrow{+1} N$

Same as,

$S \xrightarrow{-1} R$
$T \xrightarrow{-1} S$
$R \xrightarrow{-1} Q$
$A \xrightarrow{+1} B$
$N \xrightarrow{+1} O$
$G \xrightarrow{+1} H$
$E \xrightarrow{+1} F$

20. (b)

From options-

(a) $G \xrightarrow{-2} E \xrightarrow{+8} M$

(b) $J \xrightarrow{-2} H \xrightarrow{+9} Q$ (Different)

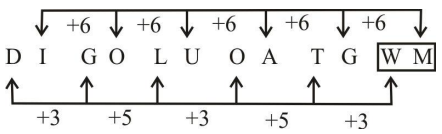
(c) $K \xrightarrow{-2} I \xrightarrow{+8} Q$

(d) $Y \xrightarrow{-2} W \xrightarrow{+8} E$

Hence, option (b) is odd one.

21. (a)

The given series is as follows-



22. (a)

Just as,

J = 10

And,

D, F
↓ ↓
4 + 6 = 10

And,

G A B
↓ ↓ ↓
7 + 1 + 2 = 10

Similarly,

D A ? B
↓ ↓ ↓ ↓
4 + 1 + ? + 2 = 10

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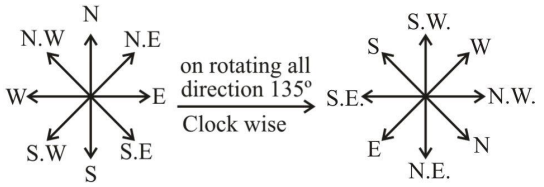
? = 10 – 7

? = 3

Hence, $\boxed{? = C}$

23. (a)

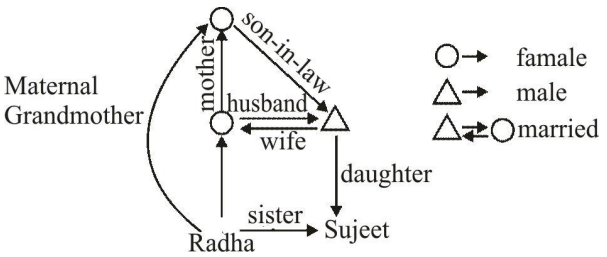
According to the question,



Hence, it is clear that North-east is facing in South direction now.

24. (c)

The blood relation diagram is a follows-



Hence, it is clear from the blood relation diagram that Sujeeta is the sister of Radha.

25. (c)

Given equation-

$$200 + 10 - 25 \times 60 \div 20 = X$$

+ means ⟶ ÷

÷ means ⟶ –

– means ⟶ ×

× means ⟶ +

On changing the sign as per question,

$= 200 \div 10 \times 25 + 60 - 20$

$= 20 \times 25 + 60 - 20$

$= 500 + 60 - 20$

$= 540$

Hence, X = 540

26. (c)

First Generation Computers were bulky, vacuum tube based and expensive. Magnetic drums were used for storage in the first generation computers. These computers were based on punched cards.

27.(a)

Joystick is an input device which works like a trackball. A stick is attached to the ball through, which it is rotated. It is used in video games, simulator training etc.

28. (c)

Both keyboard and mouse are input devices, which are used to give instructions to the computer.

29. (d)

Joystick is an input device consists of a stick which pivots on a base and reports its angles or direction of the CPU.

30. (c)

Dynamic Random Access Memory (DRAM) is a type of semiconductor memory that stores each bit of information in a capacitor. DRAM stores each bit of data in a separate passive electronic component, which is inside an integrated circuit board. A bit in every electronic component has two states (concepts) of value called 0 and 1.

31. (d)

RAM is a type of memory that temporarily stores data and instructions to perform the task currently being run by the CPU. It is of two types -

(i) DRAM (ii) SRAM.

The full form of DRAM is Dynamic Random Access Memory. This is volatile memory. It is used as main memory in computers because the data of DRAM is always changing so it needs to be refreshed.

32. (b)

Computer memory is a physical device which is used to temporarily and permanently store information, instructions and data in a computer. There are mainly two type of computer memory.

(i) Primary memory

(ii) Secondary memory.

Primary memory also two types - RAM and ROM.

RAM is a volatile memory, hence option (b) statement is incorrect and all other statement are correct.

33. (b)

GSM stands for Global System for Mobile communication. It is a digital cellular technology whose used to transmit mobile voice and data services. CDMA stands for Code Division Multiple Access. CDMA based devices do not require a SIM card, it uses an ESN (Electronic Serial Number). In CDMA mobile, the customer's information is stored in his/her headset or phone. Hence, both the given statement are correct.

34. (b)

Flow control in data communication is the process of managing the rate of data transmission between two nodes by preventing a faster sender from over whelming a slower receiver. Provides a mechanism for the receiver to control the transmission speed by which the sender is able to transmit data through the network. Cannot sent data faster than a limit. Congestion-control protocols have a problem that can occur at any time in a packet switched network. This can happen when there are too many packets in a subnet within the network. This a situation arising in the network layer where the message traffic is so high that it significantly slows down the response time of the network.

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35. (c)
The full form of SIM is subscriber Identity Module. It is used in mobile phone. Micro sim card is the smaller form of regular sim card and nano sim card has the smallest size hence statement (ii) is wrong.

36. (a)
SIM stands for Subscriber Identity Module.

37. (d)
File tabs has New, Open, Save, Save as, Print etc. options which is used for create a new file, open existing file and print file etc.

38. (a)
In MS Word 2007, click Watermark on the Page Layout tab, and then click on Printed Watermark. Click Picture Watermark or Text Watermark in the Printed Watermark dialog box.

39. (d)
In MS Word 2007, the Ctrl + S keyboard shortcut is used to save the contents of the currently open Word document.
Shortcut key-
Ctrl + Alt + S = Splits the current document.
Alt + Shift + C = Deletes the Document Windows partition.

40. (d)
To find emails after a specific date use YYYY/MM/DD . For ex. if you are trying to find emails before or after September 1, 2021 type before: 2021-09-01 or after: 2021-09-01 in the search bar and press enter. You can combine the two keywords to find emails between two dates.

41. (a)
To print the entire webpage in Google Chrome browser use the following procedure:
→ Open the web page
→ Use/press Ctrl + A shortcut key
→ Right click on the page and left click on print.

42. (b)
We can use quotation marks, choose specific keywords and change our search engine to search for content on the Internet but we can not use complex term in browser.

43. (c)
The Lynx browser was a text based browser invented in 1992. A text - based web browser is a web browser that renders only the text of web page and ignores most graphic content.

44. (c)
Google Chrome is a web browser developed by Google on December 11, 2008 through open source code. Microsoft Edge is a web browser developed by Microsoft that was released in July 2015. Microsoft Edge replaced Internet Explorer 11 as the default browser in Windows 10, and Edge was also released for Android and iOS in 2017 and for Mac OS in 2019. Safari is a graphical web browser developed by Apple. It is primarily open source software and primarily based on WebKit. It supports macOS, iOS and iPodOS and Safari has become the third most popular desktop browser.

45. (a)
A browser is a software program used to locate, retrieve, and display information available on the World Wide Web and provides an interface that allows clicking on hyperlinked resources on the World Wide Web.

46. (d)
Total number of numbers between 1 and 1000 which are divisible by 7

$$= \frac{1000}{7} = 142$$

Total number of numbers between 1 and 300 which are divisible by 7

$$= \frac{300}{7} = 42$$

Hence, Total number of numbers between 1 and 300 which are divisible by 7 between 300 and 1000

$$= 142 - 42 = 100$$

47. (d)

$$\frac{4}{11} \times \frac{121}{16} \times 24\left(75^2 - 55^2\right)\frac{1}{100}$$

From BODMAS,

$$= \frac{11}{4} \times 24\left[(75+55)(75-55)\right] \times \frac{1}{100}$$

We know that, $\left[\because a^2 - b^2 = (a+b)(a-b)\right]$

$$= 66 \times (130 \times 20) \times \frac{1}{100}$$

$$= 66 \times 2600 \times \frac{1}{100}$$

$= 1716$

48. (a)
From question,

$$\underset{0.67}{\frac{2}{3}}, \quad \underset{0.50}{\frac{4}{8}}, \quad \underset{0.55}{\frac{5}{9}} \text{ and } \underset{0.81}{\frac{9}{11}}$$

(Ascending order),

$$\frac{4}{8} < \frac{5}{9} < \frac{2}{3} < \frac{9}{11}$$

(0.50 < 0.55 < 0.67 < 0.81)

49. (c)

Let the fraction be $= \frac{x}{y}$

According to the question,

$$\sqrt{\frac{x}{y}} + 1 = 3\frac{1}{4}$$

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$$\sqrt{\frac{x}{y}} = \frac{13}{4} - 1$$

$$\sqrt{\frac{x}{y}} = \frac{9}{4}$$

$$\frac{x}{y} = \frac{81}{16}, \quad \frac{x}{y} = 5\frac{1}{16}$$

50. (c)

Finding the LCM by using common division method,

2	24,	96,	36
2	12,	48,	18
2	6,	24,	9
2	3,	12,	9
2	3,	6,	9
3	3,	3,	9
3	1,	1,	3
	1,	1,	1

The required LCM = 2 × 2 × 2 × 2 × 2 × 3 × 3 = 288

51. (a)

According to the question,

$$0.63 = \frac{63}{100}, 10.5 = \frac{105}{10}, 2.1 = \frac{21}{10}, 4.20 = \frac{420}{100} = \frac{42}{10}$$

So, the LCM of $\frac{63}{100}, \frac{105}{10}, \frac{21}{10}$ *and* $\frac{42}{10}$

$$= \frac{LCM\ of\ 63,105,21,42}{HCF\ of\ 100,10,10,10}$$

$$= \frac{21 \times 3 \times 5 \times 2}{10} = \frac{630}{10} = 63$$

52. (d)

$$\frac{3x + 2y}{3x - 2y} = \frac{5}{3}$$

$$9x + 6y = 15x - 10y$$

$$16y = 6x$$

$$\frac{x}{y} = \frac{16}{6} \text{ or } \frac{x}{y} = \frac{8}{3}$$

53. (a)

Let total marks be x.

According to the question,

x × 46% + 10 = x × 52% – 8

(x × 52%)– (x × 46%) = 10 + 8

$$\frac{x \times 52}{100} - \frac{x \times 46}{100} = 18$$

$$\frac{52x - 46x}{100} = 18$$

$$\frac{6x}{100} = 18$$

6x = 1800

x = 300

On putting the value of x

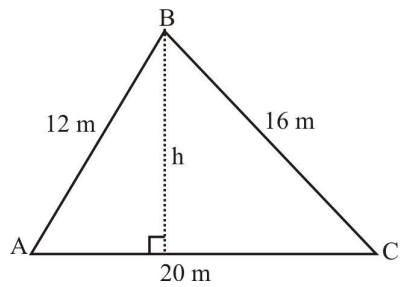
Minimum qualifying marks = (300 × 46%) + 10

$$= \left(\frac{300 \times 46}{100}\right) + 10$$

= 138 + 10

= 148 marks

54. (b)



Area of the triangle $= \sqrt{s(s-a)(s-b)(s-c)}$

Where $s = \frac{a+b+c}{2}$

$$s = \frac{16+12+20}{2} = 24$$

$\therefore$ Area $= \sqrt{24(24-16)(24-12)(24-20)}$

$$= \sqrt{24 \times 8 \times 12 \times 4}$$

$$= 96\,m^2$$

$\therefore$ The altitude $(h) = \frac{2 \times \text{area}}{\text{base}}$

$$= \frac{2 \times 96}{20}$$

$$= \frac{96}{10} = 9.6\,m$$

55. (c)

One day's work of (A + B) $= \frac{1}{18}$ part

One day's work of (B + C) $= \frac{1}{15}$ part

One day's work of (C + A) $= \frac{1}{12}$ part

One day's work of 2 (A + B + C) $= \frac{1}{18} + \frac{1}{15} + \frac{1}{12}$

One day's work of (A + B + C) $= \frac{37}{180} \times \frac{1}{2} = \frac{37}{360}$ part

Time taken by (A + B + C) to complete the work

$$= \frac{1}{37/360}$$

$$= 9\frac{27}{37} \text{ part}$$

56. (a)

Time taken by Nidhi to reach T one side on foot + another side by cycle = 3 hours 45 minutes

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$\Rightarrow 3+\frac{45}{60}=3+\frac{3}{4}=\frac{15}{4}$

Time taken by her to reach both sides

$\Rightarrow$ 4 hours 20 minutes $= 4+\frac{20}{60}=\frac{13}{3}$

Time taken to walk one side $=\frac{13}{3}\times\frac{1}{2}=\frac{13}{6}$

time taken to reach another side by cycle $=\frac{15}{4}-\frac{13}{6}$

$=\frac{45-26}{12}=\frac{19}{12}$ hour

time taken to travel both side by cycle $=\frac{19}{12}\times 2=\frac{19}{6}$

3 hours $\frac{1}{6}\times 60=3$ hours 10 minutes

57. (d)

Let simple interest (S.I) = ₹x

Time (T) = 1 Years

For P_1

$S.I=\frac{P_1\times R\times T}{100}$

$x=\frac{P_1\times 4\times 1}{100}$

$P_1 = 25x$

For P_2

$x=\frac{P_2\times 6\times 1}{100}$

$P_2=\frac{50x}{3}$

For P_3

$x=\frac{P_3\times 8\times 1}{100}$

$P_3=\frac{25x}{2}$

$P_1 + P_2 + P_3 = 2600$

$25x+\frac{50x}{3}+\frac{25x}{2}=2600$

$\frac{150x+100x+75x}{6}=2600$

$325x = 2600 \times 6$

x = ₹48

$P_1 = 25x = 25 \times 48 =$ ₹1200

$P_2=\frac{50x}{3}=\frac{50}{3}\times 48=$ ₹800

$P_3=\frac{25x}{2}=\frac{25}{2}\times 48=$ ₹600

58. (c)

Let Cost price of the article = ₹x

Selling price $=\frac{x\times 120}{100}$

$=$ ₹ $\frac{6x}{5}$

According to the question,

Cost price of the article if he bought 10% less $=\frac{90x}{100}$

$=$ ₹ $\frac{9x}{10}$

Selling price $=\frac{6x}{5}+18$

Again, Selling price = Cost price $\times\frac{100+\text{Profit}}{100}$

$\frac{6x}{5}+18=\frac{9x}{10}\times\frac{100+40}{100}$

$\frac{6x}{5}+18=\frac{9x}{10}\times\frac{140}{100}$

$\frac{90+6x}{5}=\frac{63x}{50}$

$900 + 60x = 63x$

$3x = 900$

x = ₹ 300

59. (a)

$x^4 - y^4 = (x^2 - y^2)(x^2 + y^2)$

$= (x - y)(x + y)(x^2 + y^2)$

$x^8 - y^8 = (x^4 - y^4)(x^4 + y^4)$

$= (x^2 - y^2)(x^2 + y^2)(x^4 + y^4)$

$= (x - y)(x + y)(x^2 + y^2)(x^4 + y^4)$

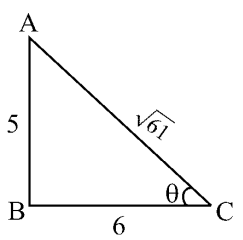
$x^2 - y^2 = (x - y)(x + y)$

HCF of $(x^4 - y^4)(x^8 - y^8)$ and $(x^2 - y^2) = (x - y)(x + y)$

60. (b)

Given,

$\tan\theta = \frac{5}{6}$ then $\frac{12\sin\theta-5\cos\theta}{12\sin\theta+5\cos\theta}=?$



From Pythagoras theorem,

$AC^2 = AB^2 + BC^2$

$AC^2 = 5^2 + 6^2$

$AC^2 = 61$

$AC = \sqrt{61}$

$\therefore \sin\theta = \frac{5}{\sqrt{61}}$, $\cos\theta = \frac{6}{\sqrt{61}}$

$=\frac{12\sin\theta-5\cos\theta}{12\sin\theta+5\cos\theta}$

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$$= \frac{12\times\frac{5}{\sqrt{61}} - 5\times\frac{6}{\sqrt{61}}}{12\times\frac{5}{\sqrt{61}} + 5\times\frac{6}{\sqrt{61}}}$$

$$= \frac{\frac{60-30}{\sqrt{61}}}{\frac{60+30}{\sqrt{61}}}$$

$$= \frac{\frac{30}{\sqrt{61}}}{\frac{90}{\sqrt{61}}}$$

$$= \frac{30}{\sqrt{61}}\times\frac{\sqrt{61}}{90} = \frac{1}{3}$$

61. (b)

$$\text{Mean} = \frac{\text{Sum of numbers}}{\text{number of terms}}$$

$$= \frac{1+\frac{1}{2}+\frac{1}{2}+\frac{3}{4}+\frac{1}{4}+2+\frac{1}{2}+\frac{1}{4}+\frac{3}{4}}{9}$$

$$= \frac{\frac{4+2+2+3+1+8+2+1+3}{4}}{9} = \frac{26}{36} = \frac{13}{18}$$

62. (c)

From given number,

$$\sqrt{0.00069169} = \sqrt{\frac{69169}{100000000}}$$

$$= \sqrt{\frac{69169}{100000000}} = \sqrt{\frac{263\times263}{10000\times10000}} = \frac{263}{10000} = 0.0263$$

63. (b)

Let the age of younger member = y years

And age of elder member = x years

First condition-

$x + 4 + y + 4 = 64$

$x + y = 56$ ----(i)

Second condition-

$$\frac{x-4}{y-4} = \frac{3}{1}$$

$x - 4 = 3y - 12$

$x - 3y = -8$ ----(ii)

From equation (i) and (ii),

$x + y = 56$

$x - 3y = -8$

$- \quad + \quad +$

$4y = 64$

$y = 16$

Hence, the age of younger member = y = 16 years

64. (b)

Suppose it takes t hours to fill the tank.

According to the question-

$$\frac{t}{\frac{7}{4}} - \frac{t}{\frac{21}{8}} = \frac{2}{3}$$

$$\frac{4t}{7} - \frac{8t}{21} = \frac{2}{3}$$

$$\Rightarrow \frac{12t-8t}{21} = \frac{2}{3}$$

$$\Rightarrow \frac{4t}{21} = \frac{2}{3}$$

$$\Rightarrow t = \frac{2\times21}{3\times4}$$

$$\Rightarrow t = \frac{7}{2}h$$

$$\Rightarrow t = 3\frac{1}{2}$$

$$\Rightarrow t = 3:\frac{1}{2}\times60$$

$$\Rightarrow t = 3h:30\,min$$

Hence it will take 3 hours 30 minutes to fill the tank.

65. (d)

Let the number of female and male employees in company = 2x and 3x

According to the question-

$3x = 90 \Rightarrow x = 30$

$\therefore$ Total number of employees in company = (3x + 2x)

= 5 × 30 = 150

66. (b)

Derived Unit :- The combination of two base units is called derived units.

- Density is derived unit because it is a combination of two basic units mass and volume and it is given by kg/m^3.

67. (d)

$\Rightarrow$ The quantity of motion of a body is best represented by 'its linear momentum'.

$$\boxed{P = m\times V}$$

Where,

P = Momentum

m = Mass

V = Velocity

68. (d)

Whenever light goes from one medium to another (from air to glass), the frequency of light and phase of light does not change. However, the velocity of light and wavelength of light change.

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69. (b)

Given mass to be lift M = 600kg

Depth of well (h) = 25 m

Speed (v) = 50 m/s

g = 10 m/s^2

Total energy required = kinetic energy + Potential energy

$$E = \frac{1}{2}Mv^2 + Mgh$$

$$= \frac{1}{2}\times 600\times(50)^2 + 600\times 25\times 10 = 900000 \text{ J}$$

$$\text{Power required} = \frac{\text{Work}}{\text{Time}} = \frac{\text{Energy}}{\text{time}} = \frac{900000}{60} = 15\text{kW}$$

70. (b)

Latent heat:- Latent heat is the heat required to change the state of unit mass of a substance at a constant temperature is called latent heat of the substance. It is denoted by L.

$$Q = mL$$

or $$L = \frac{Q}{M}$$

Given that m = 1.25 gm

$$Q = 250 \text{ J}$$

$$\text{Then, latent heat } (L) = \frac{Q}{M} = \frac{250}{1.25} = 200$$

71. (b)

Ohm's law states that the current through conductor between two points is directly proportional to the voltage across the two points.

According to ohm's law-

$$I \propto V$$

$$I = \frac{V}{R}, \qquad V = IR$$

72. (c)

$$\because F = \frac{1}{4\pi\varepsilon}\frac{Q\times Q}{r^2}$$

$$\text{So, } F = \frac{1}{4\pi\varepsilon}\frac{Q^2}{r^2}$$

$$\varepsilon = \frac{Q^2}{4\pi r^2 F}$$

$$\because C = \frac{Q}{V}$$

$$V = \frac{W}{Q}$$

$$\text{So, } C = \frac{Q^2}{W}$$

$$Q^2 = CW$$

$$\varepsilon = \frac{CW}{4\pi r^2 F} \qquad [W = \text{work}]$$

$$= \frac{F\times Nm}{m^2\times N}$$

$$\boxed{\varepsilon = \frac{F}{m}\text{Farad/meter}}$$

73. (d)

Given that

$$f = 100 \text{ kHz} = 100\times 10^3 \text{ Hz}$$

$$C = 0.01\ \mu F = 0.01\times 10^{-6} F$$

$$X_C = \frac{1}{2\pi fC}$$

$$= \frac{1}{2\times 3.14\times 100\times 10^3\times 0.01\times 10^{-6}}$$

$$\boxed{X_C = 159.23\Omega}$$

74. (c)

Given that,

Coefficient of coupling (k) = 0.5

Equivalent inductance on same polarity (L_{eq}) = 1.9 H

Equivalent inductance on opposite polarity (L_{eq}) = 0.7 H

On same polarity

$$L_{eq}(\text{same}) = L_1 + L_2 + 2M$$

$$L_1 + L_2 + 2M = 1.9 \text{ H} \qquad ...(i)$$

On opposite polarity

$$L_{eq}(\text{opposite}) = L_1 + L_2 - 2M$$

$$L_1 + L_2 - 2M = 0.7 \text{ H} \qquad ...(ii)$$

Adding equations (i) and (ii)

$$2L_1 + 2L_2 = 2.6 \text{ H}$$

$$L_1 + L_2 = 1.3 \text{ H}$$

$$\therefore \quad 0.9 + 0.4 = 1.3 \text{ H}$$

$$\therefore \quad L_1 = 0.9\text{H}, \qquad L_2 = 0.4\text{H}$$

75. (a)

Watt-hour meter is a measuring device which can evaluate and records the electrical power passing through a circuit in a certain time.

By implementing the watt - hour meter, we can know how much amount of electrical energy is used by a consumer or a residence or an electrically powered device or a business.

76. (d)

Relationship between magnetic field intensity (H) and magnetic flux density (B)–

$$\boxed{B = \mu_0\mu_r H} \text{ and } H = \frac{NI}{\ell}$$

Where- $B \rightarrow$ Magnetic flux density

$\mu_0 \rightarrow$ Permeability in free space

$\mu_r \rightarrow$ Relative permeability

$H \rightarrow$ Magnetic field intensity.

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77. (b)

Electric field intensity, $(E) = \frac{\lambda}{2\pi\varepsilon_0 . r}$

Where, λ = Charge density

r = Distance

ε_0 = Permittivity

Given,

$\lambda = 1$ C/m & r = 1 m.

$$E = \frac{1}{2\pi\varepsilon_0 \times 1}$$

$$E = \frac{1}{2\pi\varepsilon_0}$$

78. (a)

The electric field intensity at a point is the force experienced by unit of positive charge placed at that point. Electric field intensity is a vector quantity. A hollow sphere of charge does not produce an electric field at interior point because net charge density is zero in interior point.

79. (c)

The direction of induced emf in a conductor can be determined by Fleming's right hand rule. Fleming's right hand rule states, that if we arrange our thumb, forefinger and middle finger of the right-hand perpendicular to each other then the thumb point towards the direction of the motion of the conductor relative to the magnetic field, the fore finger point toward the magnetic field and the middle finger point toward the direction of the induced current

80. (a)

Constantan:- It is a copper and nickel alloy used in the production of thermocouples and thermocouple extension wire as well as precision resistor and two temperature resistance heating application.

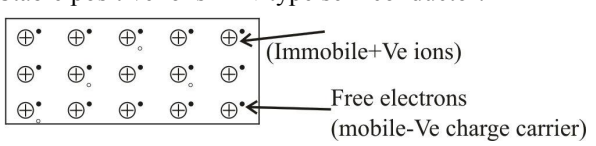
Constantan = Cu (60%) + Ni (40%)

81. (d)

Bakelite is an example of a thermosetting Polymer. A thermosetting plastic is a Polymer that hard irreversibly when heated. It is a rigid type of plastic that is highly resistant to heat after it has cured during the compression molding process. Thermosetting Plastic are generally strong than thermo plastic material.

82. (c)

Stable positive ions in N-type semiconductor.



In an N-type semiconductor, the number of free electrons is more than the number of holes for this reason in N-type semiconductor free electrons are called majority charge carriers and holes are called minority charge carriers.

83. (d)

LED are light emitting diodes which are semiconductors that convert electrical energy into the light energy. The colour of the emitted light depends on the type of semiconductor material depending on which LEDs can be classified into three wavelengths: ultraviolet, visible and infrared.

84. (b)

Transistor biasing configuration works best at relatively low power supply voltage.

When the transistor is biased, DC voltage is applied in it, DC current start flowing in it, whose value can be determined by drawing DC load line on the output characteristics of the transistor. Before using the transistor as an amplifier, its DC biasing is done. Hence transistor biasing configuration work best on DC voltage or low power voltage supply.

85. (b)

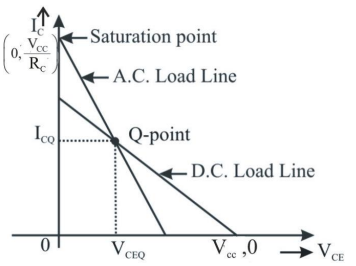
Enhancement mode MOSFET is generally a type of transistor. Enhancement can be operated only in enhancement mode (increase in V_{GS} leads to increase in I_d) or it gets enhanced. Therefore the MOSFET device can be classified as enhancement type is called MOSFET.

86. (a)

A clipper circuit is also known as limiter circuit. The clipper circuit is made using diodes which is used to remove the applied part of the signal without removing the remaining part from the signal.

87. (c)

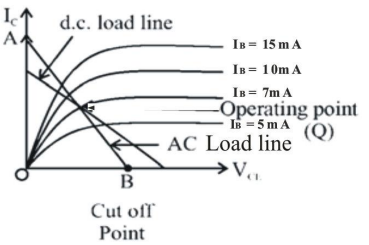
In a single stage amplifier D.C and A.C load lines intersect each other at the Q-point.



Q-point is also called quiescent point or operating point.

88. (d)

The ac load line of a transistor circuit is steeper than its dc load line but intersect each other at point Q. Slope of AC load line is greater than slope of DC load line.



$$\text{Slope} = \frac{-1}{R_{ac}}$$

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89. (d)

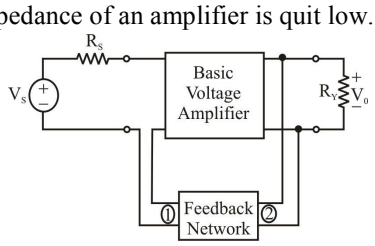
Most commonly used feedback arrangement in cascaded amplifier is voltage series feedback system.

Cascaded amplifier is also known as multistage amplifier.

Advantages of Voltage series feedback-

- High input impedance
- Low output impedance
- Less noise
- Less distortions

Output impedance of an amplifier is quit low.



90. (d)

Given,

$A_d = 100,\ A_c = 0.01$

$$\boxed{CMRR = \frac{A_{DM}}{A_{CM}}}$$

$$= \frac{100}{0.01}$$

$$CMRR = 10^4$$

$$CMRR(dB) = 20 \log_{10} (CMRR)$$

$$CMRR(dB) = 20 \log_{10}(10)^4$$

$$\boxed{CMRR(dB) = 80dB}$$

91. (c)

Buck-boost converter is a type of DC to DC converter, In which the magnitude of the output voltage can be greater or less than the magnitude of the input voltage.

92. (c)

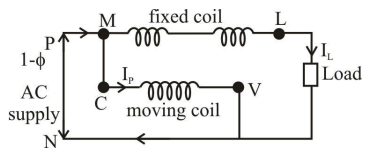
$$\text{Current sensitivity (S)} \propto \frac{1}{I_{fSD}}$$

$$\text{Sensitivity} = \frac{\text{Ohm}}{\text{Volt}} = \frac{1}{\text{Volt/ohm}}$$

$$\boxed{\text{Sensitivity} = \frac{1}{\text{ampere}}}$$

93. (c)

Electrodynamometer is a transfer type instrument where magnetic field in which coil move is provided by two fixed coils.



94. (c)

Electrostatic-type instruments are primarily used as voltmeters.

- These instruments are mainly used to measure high voltages.
- Deflecting torque, $T_d = \frac{1}{2}V^2\frac{dC}{d\theta}$

$$\boxed{\theta = \frac{1}{2K}V^2\frac{dC}{d\theta}}$$

- Scale is non-uniform due to square law response.
- These instruments are mounted vertically and uses fluid friction damping.
- It is used on both ac and dc voltage only.
- Power consumption is less.

95. (a)

Two wattmeter method of power measurement is suitable for both balanced and unbalanced load.

⇒ For n-phase, n-wire balanced or unbalanced system is required (n-1) wattmeter.

96. (a)

When a conductor is stretched or compressed due to the change in it's length and diameter it's resistance change the property of the conducting material is called "Piezo resistive effect".

$$G_f = \frac{\Delta R/R}{\Delta L/L}$$

consider a wire having a length of L and diameter D, when a tensile force acts on its length and diameter changes by ΔL and ΔD.

97. (d)

(39) = 00100111 in 8 bit binary

1's complement of (00100111) = 11011000

2' s complement of (11011000) = 11011001

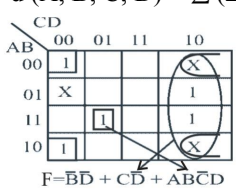
Hence, 2's complement of –39 is = 11011001

98. (b)

Function,

$$F(A, B, C, D) = \sum (0,6,8, 13, 14)$$

$$d(A, B, C, D) = \sum (2, 4, 10)$$



99. (b)

- Gate is a combinational circuit.
- JK- FF is a sequential circuit.
- Counter is a sequential circuit.
- MSJK Flip-flop does not suffer from race-around

100. (a)

The duty cycle for repetitive waveform is defined as the ratio of ON time to total time.

$$\boxed{\text{Duty cycle} = \frac{T_{ON}}{T_{ON} + T_{OFF}} = \frac{T_{ON}}{T_{Total}}}$$

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PRACTICE SET - 5

1. Name the centre in India which is used for launching satellites.
(a) North Eastern Space Applications Centre (NESAC)
(b) Barren Island
(c) ISTRAC ground station
(d) Wheeler Island

2. With which of following sports is Black Pearl associated?
(a) Soccer (b) Golf
(c) Snooker (d) Horse Racing

3. Kalbelia folk songs and dances belong to which Indian state?
(a) Madhya Pradesh (b) Rajasthan
(c) Maharashtra (d) Himachal Pradesh

4. Which physician came to India and served in the Bengal Medical service from 1794 to 1815 and also undertook pioneering survey explorations in several diverse regions of India.
(a) Francis Buchanan (b) Sir William Jones
(c) William Bentinck (d) Warren Hastings

5. Which of the following is depicted on the Indian 200-rupee note?
(a) Red Fort (b) Ellora Caves
(c) Mangalyaan (d) Sanchi Stupa

6. Who among the following has the power to grant pardons under Article 161 of the Constitution of India?
(a) Prime Minister (b) Chief Justice of India
(c) President (d) Governor

7. Of the given options, which is the saltiest sea in the world ?
(a) Celebes Sea (b) Black Sea
(c) Baltic Sea (d) Red Sea

8. Identify the world's second longest glacier located outside the polar region in Nubra Valley?
(a) Baltaro (b) Siachen
(c) Hispar (d) Batura

9. Who was also known as Rabia-ud-Daurani?
(a) Nur Jahan
(b) Dilras Banu Begum
(c) Jagat Gosain
(d) Asmat Begum

10. The Non-Cooperation Movement was adopted at the Congress session in December 1920 at:
(a) Nagpur (b) Surat
(c) Aurangabad (d) Nasik

11. Select the option that is related to the fifth term in the same way as the second term is related to the first term and fourth term related to the third term.
SUGAR : 11 :: PILOT : 12 :: HOTEL : ?
(a) 15 (b) 12
(c) 10 (d) 19

12. Starting from point S, Mahesh walked 25 meters towards South. He turned to his left and walked 50 meters. He again turned to his left and walked 25 meters. He again turned to his left and walked 60 meters and reached point T. How far and in which direction is Mahesh from point S?
(a) 10 m, East (b) 10 m, West
(c) 25 m, West (d) 25 m, North

13. By which of the following options, using the given symbols in the same order balance the given equation ?
65, 5, 25 = 190
(a) +, × (b) ×, –
(c) ×, + (d) ÷, ×

14. Statement:
It's better to pay cooks than paying doctors.
Conclusion:
I. Cook can expect better pay for making delicious food.
II. Those who visits hotels regularly do not need to go to the doctors.
III. It is better to keep healthy than going to the hospital.
IV. Chefs are paid less than doctors.
(a) Only conclusion II follows.
(b) Only conclusion I follows.
(c) Only conclusion IV follows.
(d) Only conclusion III follows.

15. Consider the given statement and decide which of the given assumptions is/are implicit in the statement.
Statement :
On his second visit, the doctor changed the prescription
Assumptions
I. The patient did not show improvement with the earlier prescription
II. The patient did not take the earlier prescription seriously
(a) Both assumptions I and II are implicit
(b) Only assumption I is implicit
(c) Only assumption II is implicit
(d) None of the assumptions is implicit

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16. Which of the following statements is correct?

1. The angle between two tangents to a circle may be 0°

2. If a transversal intersects two line such that a pair of alternate interior angles is equal, then the two lines are parallel.

3. The tangents at the end points of a diameter of a circle are perpendicular.

(a) Only 1
(b) Both 1 and 2, but not 3
(c) Only 3
(d) Only 2

17. Arrange the given words in alphabetical order

A. mild **B. moderate**
C. severe **D. profound**

(a) A, C, B, D (b) A, D, B, C
(c) A, B, C, D (d) A, B, D, C

18. Heart is related to 'Cardiology' in the same way as kidney is related to_____

(a) Nuclear Medicine (b) Nephrology
(c) Neurology (d) Rheumatology

19. In a certain code language, 'COUSIN' is written as 'UOISNC' and 'AUNTY' is written as 'UAYTN' How will 'UNCLE' be written in that language?

(a) CNELU (b) CNEUL
(c) UENLC (d) UNELC

20. Four letter-clusters have been given, out of which three are alike in some manner and one is different. Select the one that is different.

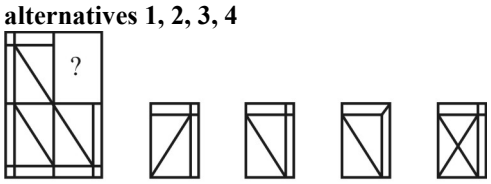
(a) DBI (b) HFM
(c) SQX (d) JGO

21. Select the letter-cluster from among the given options that can replace the question (?) in the following series.

GSI, ITD, KUY, MVT, OWO. ?

(a) JXM (b) JYM
(c) QXJ (d) QYK

22. Complete the Figure X from the given alternatives 1, 2, 3, 4



(X) (1) (2) (3) (4)

(a) 1 (b) 2
(c) 3 (d) 4

23. Facing South, X turns 225° clockwise and then 90° anti-clockwise. What direction is X facing now?

(a) South-West (b) North-East
(c) North-West (d) South-East

24. Pointing to a photograph, sumit said, "The man in the picture is the father-in-law of my mother-in law" How is the man in the picture related to sumit's wife.

(a) Father (b) Grand Father
(c) Husband's Father (d) Grand Father

25. If '+' means division,'÷' means subtraction, '–' means multiplication, and '×' means addition, then what is the value of the given expression?

175 –10 + 2 × 165 ÷ 25 + 5 = ?

(a) 1015 (b) 1025
(c) 1035 (d) 1045

26. Which of the following universities designed and built the first electronic computer (ENIAC)?

(a) University of Harvard
(b) University of Pennsylvania
(c) University of Standford
(d) University of Oxford

27. In the context of computer, trackball is a/an _____ device.

(a) Output (b) Storage
(c) Input (d) Processing

28. A mouse, trackball and joystick are examples of

(a) pointing devices
(b) pen input devices
(c) data collection devices
(d) multimedia devices

29. Example of Input device is

(a) Headphones (b) Projector
(c) Soundcard (d) Webcam

30. Static RAM (SRAM) is faster than Dynamic RAM (DRAM) because .....

(a) SRAM uses capacitors
(b) SRAM is costlier
(c) SRAM does not require refreshing
(d) SRAM is cheaper

31. Identify whether the given statements are true or false.

(i) Both, DRAM and cache memory have the same access speed.

(ii) Both, SRAM and DRAM can be used as main memory in a computer system.

(a) (i)-False (ii)-True
(b) (i)-True (ii)-True
(c) (i)-True (ii)-False
(d) (i)-False (ii)-False

32. Based on their data persistence property, identify the odd one out from the following options.

(a) SRAM (b) EEPROM
(c) EPROM (d) PROM

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33. Information Technology can be defined as–
(a) Computers + Connectivity
(b) Computers + Network
(c) Hardware + Software
(d) Connectivity + Hardware

34. Servers are computers that provide resources which are connected to a…
(a) Client (b) Network
(c) Super Computer (d) Mainframe

35. A device that provides functionality for other programs or devices that called client.
(a) Intranet (b) Dongle
(c) Thermostat (d) Server

36. Which of the following texts is an example of subscript in MS-Word?
(a) X = 12 (b) X = 10 + Y
(c) H_2O (d) $X^2 + Y^2$

37. Which of the following keyboard shortcuts is used to go to the File tab in MS-Word 2010?
(a) Alt + N (b) Alt + F
(c) Alt + H (d) Alt + G

38. Which of the following statement(s) is/are true about page setup in MS Word 2007?
(i) The value of margin is normally 2.54 cm in each direction.
(ii) The size of A4 paper is 21 cm × 29.7 cm.
(a) Only (i) (b) Only (ii)
(c) Neither (i) nor (ii) (d) Both (i) and (ii)

39. Which of the following is true with respect to Local Area Network?
(a) LAN can be operated only on client/ server technology
(b) It connects devices that are in a single limited area
(c) It is a combination of devices connected in different countries
(d) WAN cannot connect multiple LANs simultaneously

40. Which of the following layer is not available in five - layered internet architecture?
(a) Transport (b) Data Link
(c) Session (d) Application

41. In the context of Internet, what is the full form of ARPANET?
(a) Advanced Research Planning Agency Network
(b) Automatic Research Projects Agency Network
(c) Advanced Remedial Projects Agency Network
(d) Advanced Research Projects Agency Network

42. Which of the following is a type of browser window that opens without any user request while browsing the internet?
(a) Pop-up (b) Pull-up
(c) Plugins (d) Add-ons

43. Which of the following is not the main part of a search engine?
(a) Search algorithm (b) Search index
(c) Crawler (d) Kernel

44. Which of the following options is generally used to store the contact information of the people you contact frequently by web mail?
(a) Public profile
(b) Private profile
(c) Online calendar
(d) Online address book

45. Identify whether the following statements are true or false.
i) A microcontroller is a programmable digital processor.
ii) A microprocessor is defined as a multipurpose, programmable logic device that has the capability to read binary instructions from memory; that accepts binary data as input and then, processes that data.
iii) A microcontroller uses an internal controlling bus.
(a) i-False, ii-True, iii-False
(b) i-False, ii-True, iii-True
(c) i-True, ii-False, iii-True
(d) i-True, ii-True, iii-True

46. $3^{71}+3^{72}+3^{73}+3^{74}+3^{75}$ is divisible by:
(a) 8 (b) 5
(c) 11 (d) 7

47. Using BODMAS, simplify the following.
$\frac{7}{9}\times\frac{21}{5}\times 25(65^2-55^2)$
(a) 42000 (b) 86000
(c) 98000 (d) 84000

48. Arrange the following fractions in descending order.
5/6, 3/7, 8/9, 3/14
(a) 8/9, 5/6, 3/7, 3/14 (b) 8/9, 3/14, 3/7, 5/6
(c) 5/6, 8/9, 3/7, 3/14 (d) 3/7, 8/9, 5/6, 3/14

49. What is the fraction which, when subracted from $\frac{1}{2}$, gives $\frac{2}{3}$?
(a) $\frac{1}{3}$ (b) $-\frac{1}{3}$
(c) $-\frac{1}{6}$ (d) $\frac{1}{6}$

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50. Find the second term in a sequence of numbers that leaves that remainders 1, 2 and 7 when divided by 2, 3 and 8 respectively.
(a) 37 (b) 38
(c) 48 (d) 47

51. If the ratio of two numbers is 5 : 7, and their HCF is 8, then their LCM is :
(a) 480 (b) 580
(c) 380 (d) 280

52. If A : B = 3 : 4 and B : C = 6 : 5, then A : (A + C) = ?
(a) 9:11 (b) 9:10
(c) 9:19 (d) 6:7

53. The ratio of the number of boys to the girls in a school is 3 : 2. If 20% of the boys and 25% of the girls are scholarship holders, find the percentage of those who are NOT scholarship holders.
(a) 78% (b) 87%
(c) 68% (d) 86%

54. Three small triangles are so formed from the three corners of a large triangle in such a way that each side of the small triangle is equal to $\frac{2}{5}$ times of the corresponding side of the large triangle. What is the ratio between the total areas of the three small triangles and the remaining area of the large triangle?
(a) 12 : 13 (b) 1 : 5
(c) 12 : 25 (d) 4 : 25

55. Arjun alone can do a work in 12 days and Bheem alone can do the same work in 15 days with the help of Chetan, they together complete that work in 5 days. How many days will Chetan alone take to do that work ?
(a) 20 days (b) 24 days
(c) 15 days (d) 16 days

56. A man at 6:30 am starts walking and wants to travel 30 km. His initial speed is 6 km/h and after traveling 3/5 of distance he reduced his speed to 2 km/h. He will finish his journey:
(a) 11.00 am (b) 12.30 pm
(c) 11.30 pm (d) 12.00 pm

57. If a sum of ₹2,000 amounts to ₹2,360 in 3 years at a certain rate of simple interest per annum, then will the same sum amount to in 5 years, if the rate of simple interest per annum remains the same?
(a) ₹ 2,605 (b) ₹ 2,650
(c) ₹ 2,600 (d) ₹ 2,500

58. 40% of the goods are sold at 2% loss while the rest of the goods are sold at 4% profit. If there is a total profit of ₹ 250, then the cost price of goods sold is:
(a) ₹ 5,625 (b) ₹ 6,525
(c) ₹ 9,000 (d) ₹ 15,625

59. If x + y = 8 product of x and y is, 15 then find the value of $x^4 + y^4$:
(a) 606 (b) 806
(c) 906 (d) 706

60. Find the value of $2-\frac{\sin^2\alpha}{1-\cos\alpha}+\frac{1-\cos\alpha}{\sin\alpha}-\frac{\sin\alpha}{1+\cos\alpha}$
(a) 1 – sin α (b) 1 – cos α
(c) 1 + sin α (d) 1 + cos α

61. If an observation 70 is removed from the data 60, 68, 70, 72, 74, 76, 78, 80, then the median is increased by:
(a) 0.5 (b) 1.5
(c) 2 (d) 1

62. Find the value of $\sqrt{4.2436}$
(a) 2.14 (b) 2.16
(c) 2.04 (d) 2.06

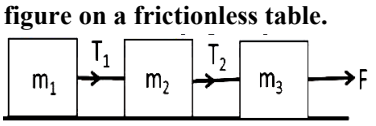
63. Rajan was married 8 years ago. Then he was 5/6 of his present age. At the time of his marriage, his sister was 10 years younger than him. What is the present age of sister?
(a) 38 (b) 32
(c) 26 (d) 40

64. Pipe A can fill a cistern in 6 hours and B can fill it in 30 hours. Both pipes were turned on but there was a leakage in the bottom of the cistern. So, the cistern took 30 minutes more to fill. The time that the leakage will take to empty the full cistern is :
(a) 54 hours (b) 65 hours
(c) 60 hours (d) 55 hours

65. If 10% of *x* = 15% of y, then what will be the value of x : y ?
(a) 2 : 3 (b) 2 : 1
(c) 3 : 2 (d) 1 : 2

66. S.I. Unit of universal gravitational constant is
(a) Nkg^2/m^2 (b) kg^2/Nm^2
(c) Nm^2/kg^2 (d) N^2m^2/kg^2

67. Three blocks of masses m_1 , m_2 and m_3 are connected by mass less strings as shown in figure on a frictionless table.



They are pulled with a force F = 40 N. If m_1 = 10 kg, m_2 = 6 kg and m_3 = 4 kg then tensions T_2 will be
(a) 20 N (b) 40 N
(c) 10 N (d) 32 N

68. A bullet travels 90 m in 0.2 seconds. Find its speed in km/hr.

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(a) 162 (b) 1620
(c) 125 (d) 1250

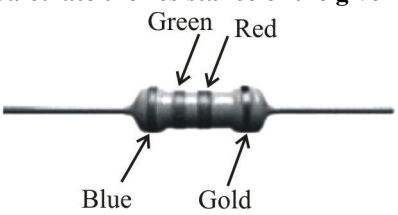
69. If 1,200 J of work is done in pushing a trolley by 20 m, what was the force (in N) employed?
(a) 30 (b) 90
(c) 120 (d) 60

70. _____° Celsius = 167°Fahrenheite
(a) 348 (b) 103
(c) 198 (d) 75

71. The terms 'ferrite beads' and 'toroidal cores' are related to _____.
(a) Decoupled capacitors
(b) Inductors
(c) Ganged capacitors
(d) Coupled capacitors

72. What is the SI unit of pressure :
(a) Dyne (b) Newton
(c) Pascal (d) Joule

73. Calculate the resistance of the given resistor.

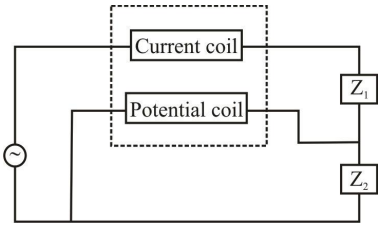


(a) 65×10^{-2} Ω– 5 percent
(b) 65×10^{2} Ω ± 5 percent
(c) 65×10^{-2} Ω
(d) 65×10^{-2} Ω + 5 percent

74. The given properties define which magnetic circuit measure?
1. Opposes the production of magnetic flux in a magnetic circuit
2. It is denoted by S.
3. Its unit is AT/Wb or 1/Henry of H^{-1}

(a) Conductance (b) Magnetic flux
(c) Permeance (d) Reluctance

75. With reference to the given figure, if a wattmeter current coil is connected to series impedance Z_1 and Z_2 potential coil connected across Z_2, then the wattmeter shows:



(a) Power consumed by Z_1 and Z_2
(b) Power consumed by Z_1
(c) Power consumed by Z_2
(d) wrong connection

76. Which type of electromagnetic wave has highest frequency?
(a) Gamma-rays (b) X-rays
(c) Ultraviolet (d) Microwaves

77. Electric field intensity at any point is equal to :
(a) Potential gradient at that point
(b) Potential at that point
(c) Potential difference at that point
(d) Work done at that point

78. Ampere's law relates
(a) Electric field and Charge
(b) Electric field and Current
(c) Magnetic field and Current
(d) Magnetic field and Charge

79. Electric field is a
(a) Scalar quantity
(b) Vector quantity
(c) Both scalar quantity & vector quantity
(d) None of these

80. Metal film resistors are made by depositing a very thin layer of metal on–
(a) Metal rod (b) Bakelite sheet
(c) Ceramic rod (d) Metal sheet

81. Materials in which large number of free electrons are available in outermost orbit are called :
(a) Semiconductors
(b) Conductors
(c) Insulators
(d) Magnetic materials

82. The following property of semiconductors cannot be determined from Hall effect:
(a) Semiconductor is n-type or p-type
(b) The carrier concentration
(c) The mobility of semiconductor
(d) The atomic concentration of semiconductor

83. Hot-carrier diode or surface-barrier diode are different names of the _____.
(a) Varactor diode
(b) Tunnel diode
(c) Schottky-barrier diode
(d) Gunn diode

84. Group-I lists four different semiconductor devices. Match each device in Group-I with corresponding properties in Group-II

Group-I		Group-II	
P	BJT	**1**	Population Inversion
Q	MOSFET	**2**	Pinch-off voltage
R	LASER	**3**	Early effect
S	JFET	**4**	Flat band voltage

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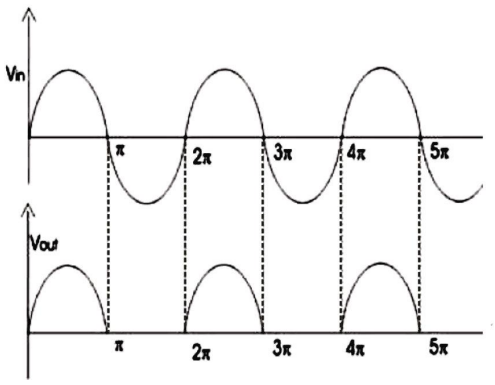
(a) P-3, Q-1, R-4 and S-2
(b) P-1, Q-4, R-3 and S-2
(c) P-3, Q-4, R-1 and S-2
(d) P-3, Q-2, R-1 and S-4

85. MOSFET is ..... controlled device-
(a) Voltage
(b) Current
(c) Voltage and current both
(d) Can not be controlled

86. Identify the given waveform.



(a) Negative half wave rectifier
(b) Positive half wave rectifier
(c) Dual wave rectifier
(d) Full wave rectifier

87. If biasing is not done in an amplifier circuit, it results in
(a) Decrease in the base current
(b) Excessive collector bias
(c) Unfaithful amplification
(d) High power loss

88. The bandwidth of an *RF* tuned amplifier is depend on
(a) Q-factor of the tuned output circuit
(b) Q-factor of the tuned input circuit
(c) Quiescent operating point
(d) Q-factors of output and input circuits as well as the quiescent operating point

89. Cascade control contains:
(a) One feedback and one feedforward
(b) Two feedforward
(c) Two feedback
(d) None of the above

90. In differentiator, feedback element is-
(a) Capacitor (b) Resistor
(c) Zener diode (d) Voltage divider

91. What voltage regulation does an ideal regulated power supply have?
(a) 0% (b) 100%
(c) 50% (d) 10%

92. The detector that minimizes the error probability is called as
(a) Minimum likelihood detector
(b) Maximum likelihood detector
(c) Mean likelihood detector
(d) Random likelihood detector

93. Identify the name of instrument shown in figure.

(a) Noise dosimeter (b) Flux meter
(c) FFT analyser (d) Sound enclosures

94. For the measurement of high resistances, following methods are used:
1. Loss of Charge Method
2. Direct Deflection Method
3. Substitution Method
Which of the following is/are correct?
(a) 1 and 2 (b) 2 and 3
(c) 1 and 3 (d) Only 1

95. The phenomenon of creeping occurs in
(a) Ammeter
(b) Voltmeter
(c) Energy meter
(d) None of the above

96. Seismic transducer is used for the measurement of-
(a) Linear velocity (b) Angular velocity
(c) Acceleration (d) Pressure

97. Parity bits are used for the purpose of _____in digital systems
(a) Power monitoring
(b) Error detection
(c) Symmetry Generation
(d) Time Stamping data

98. De Morgan's law states
(a) $\overline{X+Y}=\overline{X}.\overline{Y}$ (b) $\overline{X.Y}=\overline{X}+\overline{Y}$
(c) Both (d) None of these

99. Which of the following circuits can be used as a parallel to serial converter?
(a) Digital counter (b) Decoder
(c) Multiplexer (d) De-multiplexer

100. The fan out of a 7400 NAND gate is
(a) 2 TTL (b) 5 TTL
(c) 8 TTL (d) 10 TTL

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SOLUTION : PRACTICE SET- 5

ANSWER KEY

1. (d)	11. (c)	21. (c)	31. (a)	41. (d)	51. (d)	61. (d)	71. (b)	81. (b)	91. (a)
2. (a)	12. (b)	22. (b)	32. (a)	42. (a)	52. (c)	62. (d)	72. (c)	82. (d)	92. (b)
3. (b)	13. (a)	23. (c)	33. (d)	43. (d)	53. (a)	63. (a)	73. (b)	83. (c)	93. (a)
4. (a)	14. (d)	24. (d)	34. (b)	44. (d)	54. (a)	64. (d)	74. (d)	84. (c)	94. (a)
5. (d)	15. (b)	25. (c)	35.(d)	45. (d)	55. (a)	65. (c)	75. (c)	85. (a)	95. (c)
6. (d)	16. (b)	26. (b)	36. (c)	46. (c)	56. (b)	66. (c)	76. (a)	86. (b)	96. (c)
7. (d)	17. (d)	27. (c)	37. (b)	47. (c)	57. (c)	67. (d)	77. (a)	87. (c)	97. (b)
8.(b)	18. (b)	28. (c)	38. (d)	48. (a)	58. (d)	68. (b)	78. (c)	88. (a)	98. (c)
9. (b)	19. (c)	29. (d)	39. (b)	49. (c)	59. (d)	69. (d)	79. (b)	89. (c)	99. (c)
10. (a)	20. (d)	30. (c)	40. (c)	50. (d)	60. (b)	70. (d)	80. (b)	90. (b)	100. (d)

SOLUTION

1. (d)

The Integrated Test Range missile testing facility is located on Dr Abdul Kalam Island, formerly known as wheeler Island, an island off the coast of Odisha. Missiles like Agni, Prithvi, Brahmos, Astra, Nirbhay etc are tested here.

2. (a)

Brazilian Footballer Pele is also known as 'Black Pearl' he was part of the Brazillian national teams that won three World Cup Championships (1958, 1962, 1970).

3. (b)

Kalbelia folk dance and song belong to the state of Rajasthan.The costume of Kalbelia dance is Lehenga, Odhani, or Angarkha. This dance is performed by both men and women. Kalbelia folk songs and dances of Rajasthan are in the 'Representative List of the Intangible Cultural Heritage of Humanity'. Kalbelia folk songs and dances of Rajasthan" were recognized by UNESCO as an Intangible Cultural Heritage.

4. (a)

Francis Buchanan (also known as Hamilton) undertook pioneering survey explorations in several diverse regions of the Indian subcontinent during his 20 years career as a surgeon naturalist with the British East India Company.

5. (d)

Rupee Note	Depicted figure
200	Sanchi Stupa
500	Red Fort
2000	Mangalyaan
20	Ellora Caves
50	Stone chariot of Hampi
100	Rani ki Vav
10	Konark Sun temple

6. (d)

Article 161 grants power of Governor to "grant pardons, reprieves, respites or remissions of punishment or to suspend, remit or commute the sentence." any person convicted of any offence against any law relating to a matter to which the executive power of the state extends.

7. (d)

All the oceans and seas have salty water. However, the Dead Sea is considered to be the saltiest of all of them. In the given option the Red Sea is the saltiest water body.

Sea Salinity

Black Sea→ 1.3 – 2.3%

Baltic Sea→ 1.0%

Red Sea→ 3.6 – 4%

8.(b)

Siachen is the world's second longest glacier located outside the polar region in Nubra Valley.

Baltaro Glacier - One of the longest glaciers outside the polar regions located in Gilgit Baltistan region of Pakistan

Hisper Glacier - It is also located in Gilgit-Baltistan region of Pakistan

Batura Glacier - Gilgit-Baltistan, Pakistan

9. (b)

The original name of Rabia-ud-Daurani was Dilras Banu Begum. She was the first wife of Aurangzeb. Aurangzeb commissioned the tomb of Rabia-ud-Daurani in 1660 in Aurangabad, which is called as the second Taj Mahal. It is also known as 'Bibi Ka Maqbara'. It was actually built by his eldest son Prince Azam Shah in memory of his mother. It was built in 1678 AD.

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10. (a)

The Non-Cooperation Movement was adopted at Nagpur Session of the Congress in 1920. The Non-Cooperation Movement was launched in 1920 by M.K. Gandhi. The Congress passed a resolution in favour of Non-Cooperation Movement and defined Swaraj as its ultimate aim. Gandhi ji withdrew the Non-Cooperation Movement after the Chauri-Chaura incident.

11. (c)

Just as,

Note:- $\frac{(\text{Alphabetical order of letters})}{6}$

S U G A R : 11 $= \frac{19+21+7+1+18}{6} = 11$

19 21 7 1 18

and,

P I L O T : 12 $= \frac{16+9+12+15+20}{6} = 12$

16 9 12 15 20

Same as,

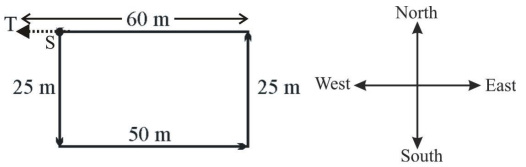
H O T E L : $\boxed{10}$

$\frac{(8+15+20+5+12)}{6}$

Hence, ? = 10

12. (b)

According to the question,



Distance b/w S and T = 60 – 50 = 10 m

Direction of S respect to T = West.

13. (a)

Given,

65, 5, 25 = 190

From option (a), (+, ×),

Putting the symbol in equation

65 + 5 ×25 = 190

65 + 125 = 190

190 = 190

L.H.S. = R.H.S.

14. (d)

The meaning of the sentences of the given statement, if we pay money to consume good food then it could be better than paying to the doctor. Hence, it is clear that conclusion III satisfies the statement.

15. (b)

The patient did not show improvement in the earlier prescription. So the doctor changed the prescription. Hence, only assumption I is implicit in the statement.

16. (b)

Hence, it is clear that statement 1 and 2 both are correct but statement 3 is not correct.

17. (d)

mild → moderate → profound → severe

A B D C

18. (b)

Just as, the heart is studied under cardiology, same as the kidney is studied under Nephrology.

19. (c)

Just as,

COUSIN = UOISNC

And,

AUNTY = UAYTN

Same as

UNCLE = UENLC

Note- In the given code first vowel then the consonant are coded in descending order on the basis of their place number.

20. (d)

From options-

(a) $D \xrightarrow{-2} B \xrightarrow{+7} I$

(b) $H \xrightarrow{-2} F \xrightarrow{+7} M$

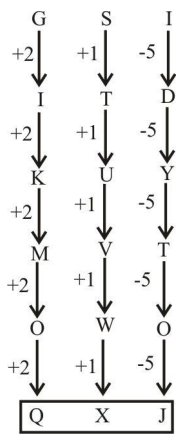
(c) $S \xrightarrow{-2} Q \xrightarrow{+7} X$

(d) $J \xrightarrow{-3} G \xrightarrow{+8} O$ (different)

Hence, option (d) is odd one.

21. (c)

The given series is as follows-



Hence, It is clear that option (c) is correct.

22. (b)

According to the question, answer figure (2) will complete the question figure.

Hence, option (b) is correct.

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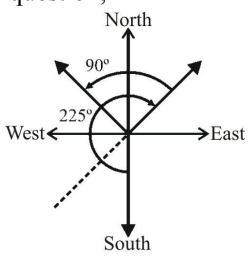
23. (c)

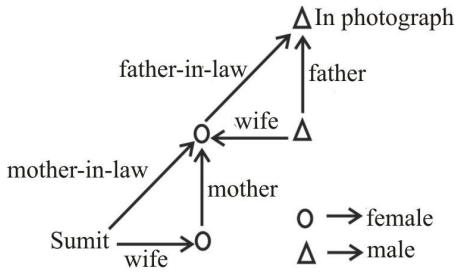
According to the question,



Hence, X is facing North-West.

24. (d)

According to the question blood relation diagram is follows as:



Hence, it is clear from blood relation diagram that the man in the picture is the grand father of Sumit's wife.

25. (c)

Given,

$$175 - 10 + 2 \times 165 \div 25 + 5 = ?$$

$+ \rightarrow \div$

$\div \rightarrow -$

$- \rightarrow \times$

$\times \rightarrow +$

On changing the sign,

$= 175 \times 10 \div 2 + 165 - 25 \div 5$

$= 175 \times 5 + 165 - 5$

$= 875 + 165 - 5$

$= 1040 - 5$

$= 1035$

26.(b)

ENIAC was built the first electronic computer formally dedicated at the University of Pennsylvania on February 15, 1946.

27. (c)

Devices through which we give instructions to the computer are called as input devices.

Example- Keyboard, Mouse, Touch pad, Joystick, Trackball etc.

28. (c)

Mouse is a small hand held pointing device that basically control the two-dimensional movement of the cursor of the display screen pointing devices are the input devices that are generally used for moving the cursor to a particular location to point an object on the screen.

Some of the commonly used pointing devices are: Mouse, trackball, Light pen, Joystick, Touch screen.

A pointing device is a human interface device that allows a user to input spatial data to a computer.

29. (d)

Input devices are electromechanical devices that are used to enter data to a computer or other devices for storing and further processing. Example of input devices are Mouse, Keyboard, Webcam, Scanner etc.

30. (c)

SRAM (Static-RAM) is faster than DRAM (Dynamic-RAM) and commonly used as cache memory in computers. Need to refresh it again and again. Hence it is much faster than DRAM.

31. (a)

(i) The access speed of both DRAM and cache memory is not same. The access speed of cache memory is faster than DRAM. Hence statement (i) is wrong.

(ii) In computer system SRAM and DRAM both can be used as main memory. Hence statement (ii) correct.

32. (a)

SRAM is type of RAM but EPROM, EEPROM and PROM are types of ROM. RAM is volatile memory but ROM is non-volatile memory.

33. (d)

Information technology can be defined in term of connectivity and hardware. Information technology on computer passed information system. Information technology has become an integral part of commerce and trade in the present times.

34. (b)

Server is a computer program or computer machine that provides various services to each computer connected to the network. The purpose of a server is to share data or hardware and software resources among its users.

35.(d)

A Server is a computer program or device that provides a service to another computer program and its user, also known as the client.

36. (c)

A superscript or subscript in Word is a number, shape, symbol, or indicator that is smaller than the normal line of type and is set it slightly above (superscript) or below (subscript).

Ex- $X^2 + Y^2$, H_2O

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37. (b)

In MS Word 2010, the Alt+F shortcut key is used to go to the File tab. The File menu has options to manage Microsoft Word files. Alt + F shortcut key is used to open the file menu. 'Key tips' are displayed on the file menu page options.

38. (d)

The default A4 paper size in MS Word 2007 page setup is 21 × 29.7 cm or 8.27 × 11.69 inches, and the typical margin value is 2.54 cm. Page Setup can change the structure and layout of the pages in the document.

39. (b)

LAN is the short form of Local Area Network. It connects devices which are available in a single or limited area with the help of LAN.

LAN can share data at speeds ranging from 10 Mbps to 1000 Mbps. Data transmission speed is higher in LAN network because the range of LAN network is limited to a fixed area.

40. (c)

TCP/IP has five different layers those are followings -

→ Application Layer

→ Transport Layer

→ Internet Layer

→ Data Link Layer

→ Physical Layer

Therefore, session layer does not come under five layer internet architecture.

41. (d)

In the context of internet full form of ARPANET is Advanced Research Projects Agency Network.

42. (a)

Pop - up is a type of browser window, which opens without any user request while browsing the Internet. It is also used to show advertisements on the Internet we can turn on or off pop-up windows in our browser as per our choice.

43. (d)

Search engine is a web based application that helps the user to find information on the World Wide Web. Its main parts are search algorithm, search index and crawler while kernel is a part of operating system.

44. (d)

Address book feature of a mail program allows the users to store information about the people when they communicate regularly by sending e-mails.

45. (d)

All statements are true because a microprocessor is defined as a programmable, multipurpose, logic device that has the reading capability of binary instructions from memory and I/O component externally in a microprocessor for processing. In this system, a microcontroller also known as a programmable digital processor, uses an internal controlling bus.

46. (c)

$$3^{71}+3^{72}+3^{73}+3^{74}+3^{75}$$
$$=3^{71}\left(3^0+3^1+3^2+3^3+3^4\right)$$
$$=3^{71}(1+3+9+27+81)$$
$$=3^{71}\times 121$$
$$=3^{71}\times 11^2$$

Hence, given series will be divisible by 11.

47. (c)

Given expression,

$$\frac{7}{9}\times\frac{21}{5}\times 25\left(65^2-55^2\right)$$
$$=\frac{49\times 5}{3}\left[(65+55)(65-55)\right]$$
$$=\frac{49\times 5}{3}\times 120\times 10$$
$$=49\times 5\times 40\times 10$$
$$=98000$$

48. (a)

$\frac{5}{6}=0.83,\ \frac{3}{7}=0.42,\ \frac{8}{9}=0.88,\ \frac{3}{14}=0.21$

Hence, the descending order of the fractions is $\frac{8}{9},\frac{5}{6},\frac{3}{7},\frac{3}{14}$.

49. (c)

Let the fraction be $\frac{x}{y}$.

According to the problem,

$$\frac{1}{2}-\frac{x}{y}=\frac{2}{3}\Rightarrow\frac{x}{y}=\frac{1}{2}-\frac{2}{3}$$
$$\frac{x}{y}=\frac{-1}{6}$$

50. (d)

LCM of number 2, 3 and 8 = 24

Required number = 24K–1

$(\because 2-1=1, 3-2=1, 8-7=1)$

(On putting K = 2)

$= 24\times 2-1 = 47$

51. (d)

Let the two numbers are 5x and 7x respectively.

Given-

HCF = 8

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Ist Number = 5 × 8 = 40

IInd Number = 7 × 8 = 56

By formula - Ist Number × IInd Number = HCF × LCM

40 × 56 = 8 × LCM

LCM = 40 × 7

= 280

52. (c)

A : B : C

3 4

6 5

18 : 24 : 20

9 : 12 : 10

Hence, $\frac{A}{A+C} = \frac{9}{9+10} = \frac{9}{19}$

53. (a)

Let the number of boys in school = 3x

And number of girls = 2x

Total number of students in school = 5x

Number of students who hold scholarship

$= 3x \times \frac{20}{100} + 2x \times \frac{25}{100}$

$= \frac{110x}{100} = \frac{11x}{10}$

Number of students who don't hold scholarship

$= 5x - \frac{11x}{10}$

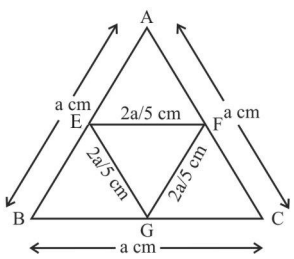
$= \frac{39x}{10}$

Required percentage $= \frac{\frac{39x}{10}}{5x} \times 100$

$= \frac{39x \times 100}{10 \times 5x}$

= 78%

54. (a)



Area of equilateral triangle ABC $= \frac{\sqrt{3}}{4}a^2$ cm

Area of small equilateral $\Delta AEF, \Delta BEG$ and ΔCFG

$= \frac{\sqrt{3}}{4}\left\{\left(\frac{2a}{5}\right)^2 + \left(\frac{2a}{5}\right)^2 + \left(\frac{2a}{5}\right)^2\right\}$

$= \frac{3\sqrt{3}}{4} \times \frac{4a^2}{25} = \frac{3\sqrt{3}}{25}a^2$ cm

$\frac{\text{Area of } \Delta ABC}{\text{Area of three small triangles}} = \frac{\sqrt{3}/4a^2}{3\sqrt{3}/25a^2}$

$\frac{\text{Area of } \Delta ABC}{\text{Area of three small triangles}} - 1 = \frac{25}{12} - 1$

$\frac{\text{Area of } \Delta ABC - \text{Area of three small triangles}}{\text{Area of three small triangles}}$

$= \frac{25-12}{12}$

$= \frac{\text{Area of remaining triangle}}{\text{Area of three small triangles}} = \frac{13}{12}$

$= \frac{\text{Area of three small triangles}}{\text{Area of remaining triangle}} = \frac{12}{13}$

55. (a)

According to the question,

One day work of Arjun $= \frac{1}{12}$ part

One day work of Bheem $= \frac{1}{15}$ part

Let, one day work of Chetan $= \frac{1}{x}$ part

One day work of all three $= \frac{1}{12} + \frac{1}{15} + \frac{1}{x}$

$\frac{1}{5} = \frac{5+4}{60} + \frac{1}{x}$

$\frac{1}{x} = \frac{1}{5} - \frac{9}{60}$

$\frac{12-9}{60} = \frac{1}{x}$

$\frac{1}{x} = \frac{3}{60} = \frac{1}{20}$

So time taken by Chetan to finish the work alone = 20 days

56. (b)

Total distance = 30 km.

Distance traveled at a speed of 6 Km./hr.

$= \frac{3}{5}$ of total distance

$= 30 \times \frac{3}{5}$

= 6 × 3

= 18 km

By 2 Km./hr. reduction in speed (6 – 2) = 4 Km./hr.

Hence the last 12 km distance will run at a speed of 4 Km./hr.

Hence time taken to cover the entire distance of 30 km

$= \frac{18}{6} + \frac{12}{4}$ = 3 + 3 = 6 hours

Total time taken by man to finish journey = 6 : 30 + 6 hours

= 12:30 pm

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57. (c)

A = ₹ 2360
P = ₹ 2000
t = 3 years

$$A = P\left(1+\frac{rt}{100}\right)$$

$$2360 = 2000\left(1+\frac{3r}{100}\right)$$

$$\Rightarrow \quad \frac{2360}{2000} - 1 = \frac{3r}{100}$$

$$\Rightarrow \quad \frac{360}{2000} = \frac{3r}{100}$$

$$\boxed{r = 6\%}$$

For 5 years

$$A = 2000\left(1+\frac{5\times 6}{100}\right)$$

$$= 2000 \times \frac{130}{100} = ₹2600$$

58. (d)

Let the cost price of total goods = 100x
According to the question,

$$\text{Total selling price} = \frac{40x\times(100-2)}{100} + \frac{60x(100+4)}{100}$$

$$\Rightarrow \quad \frac{40x\times 98 + 60x\times 104}{100} = \frac{3920x + 6240x}{100}$$

$$\Rightarrow \quad \frac{10160x}{100} = 101.6x$$

Profit = 101.6x – 100x = 1.6x

1.6x = 250

$$x = \frac{250}{1.6}$$

$$\text{Now the cost price of goods} = \frac{250}{1.6}\times 100 = ₹\ 15625$$

59. (d)

Given,

x + y = 8 .....(i)
xy = 15 .....(ii)

From the eq. (i)

$(x + y)^2 = 8^2$
$x^2 + y^2 + 2xy = 64$
$x^2 + y^2 + 2 \times 15 = 64 \qquad \{\because xy = 15\}$
$(x^2 + y^2) = 34$
$(x^2 + y^2)^2 = (34)^2$
$x^4 + y^4 + 2x^2y^2 = 1156$
$x^4 + y^4 = 1156 - 2 \times (15)^2$
$x^4 + y^4 = 706$

60. (b)

Given

$$2 - \frac{\sin^2\alpha}{1-\cos\alpha} + \frac{1-\cos\alpha}{\sin\alpha} - \frac{\sin\alpha}{1+\cos\alpha}$$

$$= 2 - \left[\frac{(1-\cos^2\alpha)}{1-\cos\alpha}\right] + \frac{(1-\cos\alpha)(1+\cos\alpha) - \sin^2\alpha}{\sin\alpha(1+\cos\alpha)}$$

$$= 2 - (1+\cos\alpha) + \frac{(1-\cos^2\alpha) - \sin^2\alpha}{\sin\alpha(1+\cos\alpha)}$$

$$= 2 - 1 - \cos\alpha + \frac{\sin^2\alpha - \sin^2\alpha}{\sin\alpha(1+\cos\alpha)}$$

$$= 1 - \cos\alpha + 0$$

$$= 1 - \cos\alpha$$

61. (d)

Given observations– 60, 68, 70, 72, 74, 76, 78, 80
Number of term = 8 (even)

$$\text{Median} = \frac{\left(\frac{n}{2}\right)^{th}\text{term} + \left(\frac{n}{2}+1\right)^{th}\text{term}}{2}$$

$$= \frac{\left(\frac{8}{2}\right)^{th}\text{term} + \left(\frac{8}{2}+1\right)^{th}\text{term}}{2}$$

$$= \frac{4^{th}\text{ term} + 5^{th}\text{ term}}{2}$$

$$= \frac{72+74}{2}$$

$$= \frac{146}{2}$$

Median = 73

Number of term on removing 70 = 7 (odd)

$$\therefore \quad \text{Median} = \frac{n+1}{2}\text{th term}$$

$$= \frac{7+1}{2} = 4^{th}\text{ term}$$

= 74

Then, Increased median = 74 – 73
= 1

62. (d)

$\sqrt{4.2436}$ = Square root of 4.2436

	206
2	42436
+2	4
406	×2436
6	2436
	××××

$$\sqrt{4.2436} = \sqrt{\frac{42436}{10000}} = \frac{206}{100} = 2.06$$

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63. (a)

Let the present age of Rajan = x years

Then present age of sister = (x – 10) years

According to the question,

$$x - 8 = \frac{5}{6}x$$

$$x - \frac{5}{6}x = 8$$

$$\frac{x}{6} = 8$$

x = 48 years

Therefore, present age of sister = 48 – 10 = 38 years

64. (d)

Part filled by pipe A in 1 hour $= \frac{1}{6}$

Part filled by pipe B in 1 hour

In intially stage, time taken by both pipe to fill the tank in 1 hour.

$$= \frac{1}{6} + \frac{1}{30} = \frac{5+1}{30} = \frac{6}{30} = \frac{1}{5}$$

Due to leakage let the time taken in x hours to empty the tank.

According to the question,

$$\frac{1}{6} + \frac{1}{30} - \frac{1}{x} = \frac{1}{5 + \left(\frac{30}{60}\right)}$$

$$\Rightarrow \quad \frac{5+1}{30} - \frac{1}{x} = \frac{1}{5 + \frac{1}{2}}$$

$$\Rightarrow \quad \frac{6}{30} - \frac{1}{x} = \frac{2}{11}$$

$$\Rightarrow \quad \frac{1}{x} = \frac{6}{30} - \frac{2}{11}$$

$$\Rightarrow \quad \frac{1}{x} = \frac{66-60}{30 \times 11}$$

$$\Rightarrow \quad \frac{1}{x} = \frac{6}{30 \times 11}$$

$$\Rightarrow \quad \frac{1}{x} = \frac{1}{5 \times 11}$$

$$\frac{1}{x} = \frac{1}{55}$$

So, x = 55 hours

65. (c)

$$x \times \frac{10}{100} = y \times \frac{15}{100}$$

10x = 15y

$$\frac{x}{y} = \frac{15}{10}$$

$$\frac{x}{y} = \frac{3}{2}$$

or x : y = 3 : 2

66. (c)

As per universal law of gravitations,

$$F = \frac{GMm}{d^2}$$

$$G = \frac{Fd^2}{Mm}$$

Where,

The SI units of Gravitational force = Newton (N)

The SI unit of Distance = Meter (m)

The SI units of Masses (M, m) = kg

Therefore, The SI unit of G = Nm^2kg^{-2} or $\frac{Nm^2}{Kg^2}$

67. (d)

Given,

F = 40N

m_1 = 10 kg, m_2 = 6 kg, m_3 = 4 kg

We know that,

F = ma

Total mass of the system

$m = m_1 + m_2 + m_3$

= 10 + 6 + 4

= 20 kg

Then,

Total acceleration of the system

$40 = 20 \times a \Rightarrow \boxed{a = 2m/s^2}$

Now,

Tension T_2 will be,

$T_2 = (m_1 + m_2)\, a = (10+6) \times 2$

$T_2 = 16 \times 2$

$\Rightarrow \quad \boxed{T_2 = 32N}$

68. (b)

Speed of bullet $= \frac{\text{distance}}{\text{time}}$

$$= \frac{90}{0.2} \times \frac{18}{5}$$

= 1620km/hr

69. (d)

Given,

Work (w) = 1200 J

Displacement (d) = 20 m

Force (F) = ?

Work = Force × displacement

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$\Rightarrow \quad 1200 = F \times 20$

$\Rightarrow \quad F = \frac{1200}{20}$

So, $\quad F = 60$ N

70. (d)

We know that, $\quad ^{o}C = \frac{5}{9}(F-32)$

$$C = \frac{5}{9}(167-32)$$

$$= \frac{5}{9} \times 135$$

$$C = 75^{o}$$

71. (b)

A ferrite beads is a type of choke that suppresses high-frequency electronic noise in electronic circuits. While toroidal cores are small MnZn based soft ferrite cores. Both (ferrite beads and toroidal cores) are related to inductors.

72. (c)

SI unit of pressure is Pascal

$$\text{Pressure} = \frac{\text{Force}}{\text{Area}} = \frac{N}{m^2} = \frac{Kg}{m.sec^2}$$

Dimension of pressure $\rightarrow [ML^{-1}T^{-2}]$

73. (b)

In resistor 4 colour strips

I^{st} strip –Blue , Value – 6

IInd strip – Green , Value – 5

IIIrd strip – Red, Multiplier -10^2

IVth strip – Gold, tolerance – ± 5%

Formula - $\boxed{R = AB \times 10^{C} \pm \text{Tolerance}}$

Resistance of resistor = $(65 \times 10^2 \pm 5\%)\ \Omega$

Colour	I^{st} band	IInd band	IIIrd band	IVth band Tolerance
Black	0	0	$10^0\Omega$	
Brown	1	1	$10^1\Omega$	±1%
Red	2	2	$10^2\Omega$	±2%
Orange	3	3	$10^3\Omega$	
Yellow	4	4	$10^4\Omega$	
Green	5	5	$10^5\Omega$	±0.5%
Blue	6	6	$10^6\Omega$	±0.25%
Violet	7	7	$10^7\Omega$	±0.10%
Grey	8	8	$10^8\Omega$	±0.05%
White	9	9	$10^9\Omega$	
Gold			$10^{-1}\Omega$	±5%
Silver			$10^{-2}\Omega$	±10%

74. (d)

We know that-

Magneto motive force or MMF = ϕ.S

Where,

$\phi \rightarrow$ Flux

S $\rightarrow$ Reluctance

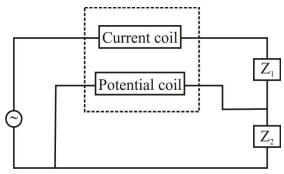
$$\therefore \quad S = \frac{MMF}{\phi} = \frac{AT}{wb}$$

The reluctance (S) opposes the flux production in a magnetic circuit.

$$S = \frac{\ell}{\mu a} = \frac{m}{H/m \times m^2} = \frac{1}{H} = H^{-1}$$

The unit of reluctance is H^{-1}

75. (c)



- The potential coil is connected across Z_2.
- It reads the voltage across Z_2 only.
- So, wattmeter reads only power consumed by Z_2.

76. (a)

Gamma-rays of electromagnetic wave has highest frequency.

The different wave present in the electromagnetic spectrum (in the order of increasing frequency) are as follows.

Increase frequency ↓ | Radio wave, Microwave, Infrared wave, Light wave, Ultraviolet wave, X-ray, Gamma-ray, Cosmic-ray | ↑ Increase wavelength

77. (a)

Electric field intensity at any point is equal to potential gradient at that point.

The potential gradient at a point in an electric field is the rate of change of potential with respect to distance, while the rate of change of this potential is considered at that point in the direction of the electric force.

78. (c)

Ampere's law relates to magnetic field and current.

$$\left[\oint \vec{H}.d\vec{\ell} = I_{enclosed}\right]$$

79. (b)

Electric field is a vector quantity because it has both magnitude and direction. The electric field is a ratio of electric force and charge. The charge is a scalar quantity but the electric force is a vector quantity and therefore the electric field has magnitude and direction both.

$$\left[\vec{E} = \frac{\vec{F}}{Q}\right]$$

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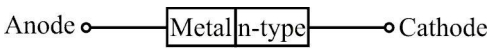
80. (b)
Metal film resistors are made by depositing a very thin layer of metal on Bakelite Sheet.

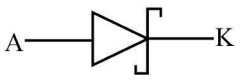
81. (b)
The large number of free electrons are available in outermost orbit are called conductor.

Example- Cu, Ag, Al etc.

82. (d)
The atomic concentration of semiconductor can not be determined by hall effect. While the type of semiconductors (P type or N-type) can be determined by hall effect and the carrier concentration and mobility of the semiconductor can also be determined. The information of a substance is also obtained from the hall effect. whether the substance is metal, semiconductor or an insulator.

83. (c)
The Schottky diode also known as Schottky barrier diode or hot-carrier diode, is a semiconductor diode formed by the junction of a semiconductor with a metal

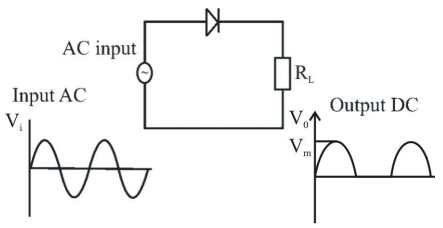




84. (c)
- BJT — Early effect
- Mosfet —Flat band voltage.
- Laser — Population inversion.
- JFET — Pinch-off voltage.

85. (a)
MOSFET is a voltage controlled current source device. The drain current (I_D) is controlled by the gate voltage. There are two types of MOSFET enhancement and depletion.

86. (b)
Positive Half wave Rectifier:- Half wave rectifies a positive half cycle of AC input. It remains turn off in the negative half cycle.



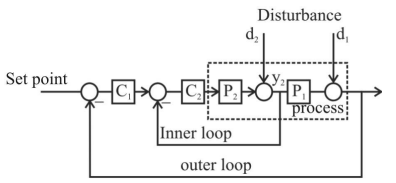
87. (c)
If biasing is not done in the amplifier circuit, it results in unfaithful amplification, because the Q-point will not be fixed, that is, the Q-point will be either in saturation or will go into cut-off.

88. (a)
The bandwidth of an RF tuned amplifier is depend on Q-factor of the tuned input circuit.

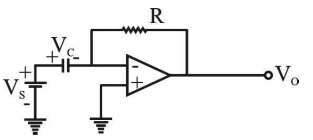
$$BW = \frac{f_r}{Q}$$

Where, f_r = Frequency of tuned amplifier
BW = Bandwidth
Q = Quality factor

89. (c)
The cascade control scheme consists of two nested loops. The inner loop contains the secondary controller and the outer loop contains the primary controller. Cascade controllers are used to reject a plant fault before it spreads.



90. (b)
In differentiator feedback element is resistor. A differentiator circuit produces an output proportional to the derivative of its input.



$$V_O = -RC\frac{dV_s}{dt}$$

- It is called the high pass filter.

91. (a)
Voltage regulation- The change in the value of the regulated output voltage when load current is changed from no load to full load (or in other words to change the load current from zero to maximum rated value) to the change in the value of regulated output voltage is called voltage regulation.

$$\% \text{ Voltage regulation} = \frac{V_{NL} - V_{FL}}{V_{FL}} \times 100$$

In ideal condition $V_{NL} = V_{FL}$

$$\% \text{ Voltage regulation} = \frac{V_{NL} - V_{NL}}{V_{FL}} \times 100 \quad = 0\%$$

- The ideal voltage regulation is 0%.

It should be as low as possible for proper operation of electrical equipment.

92. (b)
The detector that minimizes the error probability is called as maximum likelihood detector.

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93. (a)

Identified name of instrument shown in figure is noise dosimeter.

Noise dosimeter - Noise dosimeter is an instrument for measuring noise pollution. There is a microphone in it, which checks the noise pollution of any city and records the noise of the city. The level of noise pollution is displayed on the screen of the device.

94. (a)

For the measurement of high resistance -

- Loss of charge method.
- Megger
- Direct deflection method
- Mega ohm bridge

Classification of resistance -

1. Low resistance - $R \le 1\Omega$
2. Medium resistance - $1\ \Omega < R < 100\ k\Omega$
3. High resistance - $R > 100\ k\Omega$

- Low resistance standard are four terminal type.
- Medium resistance standard are two terminal type.
- High resistance standard are three terminal type.

Low resistance method -

- Kelvin's double bridge method
- Potentiometer method
- Voltmeter-Ammeter method

Medium resistance -

1. Substitution method
2. Wheatstone bridge method
3. Ammeter-Voltmeter method
4. Ohmmeter

95. (c)

The phenomenon of creeping occurs in energy meter. Creeping in energy meter is the phenomenon in which the aluminium disc rotates continuously when only the voltage is supplied to the pressure coil and no current flows through the current coil.

Prevention of creeping -

⇒ The creeping is avoided by drilling the hole in the disc. The holes should be diametrically opposite to each other.

96. (c)

Seismic transducer is used for the measurement of acceleration.

- Seismic transducer may be used is displacement mode.
- Seismic transducer used for measuring the vibration of ground. It is also called as accelerometer.

$$\boxed{\omega_n = \sqrt{\frac{k}{m}}}$$

97. (b)

Parity bits are used for the purpose of error detection in digital systems.

Parity bit is the simplest and frequently used method for detecting an error. In this method we have to join a parity bit to the end of the data structure.

There are two techniques used in parity bit are-

- Simple parity check.
- Two dimensional parity check.

98. (c)

There are two theorems of Demorgan -

Demorgan's first theorem-According to this theorem, the complement of a sum is equal to the product of the individual complements of the quantities used in it.

i.e.

$$\overline{A + B + C + ... + N} = \overline{A}.\overline{B}.\overline{C}.....\overline{N}$$

Demorgan's second theorem - According to this theorem, the complement of a product is equal to the sum of the separate complements of the quantities.

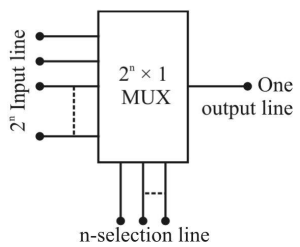
i.e.

$$\overline{A.B.C.....N} = \overline{A} + \overline{B} + \overline{C} + ... + \overline{N}$$

99. (c)

Multiplexer circuit can be used as a parallel to series converter.

- It is also called data selector Circuit.
- It is also called Many to One Circuit.
- Multiplexer is also called universal logic converter.



100. (d)

The fan-out of a 7400 NAND gate is 10 TTL. TTL logic family maximum fan-out = 10

7400 class ICs-

7400	–	quad 2 input NAND gate
7402	–	quad 2 input NOR gate
7404	–	hex inverter
7408	–	quad 2 input AND gate
7432	–	quad 2 input OR gate
7486	–	quad 2 input XOR gate

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PRACTICE SET - 6

1. At how much distance above the Earth's surface is the International Space Station located ?
(a) 200 km (b) 1000 km
(c) 400 km (d) 700 km

2. _____ has won the FIFA Men's Football World Cup the maximum number of times.
(a) Brazil (b) England
(c) France (d) Germany

3. Bon-geet (forest/nature song), is primarily a form of folk song of _____.
(a) Maghalaya (b) Manipur
(c) Assam (d) Himachal Pradesh

4. M.S. Swaminathan is .....
(a) An agricultural scientist
(b) An environmental scientist
(c) An ornithologist
(d) Journalist

5. Demonetisation was announced by Prime Minister Narendra Modi on :
(a) 8 October, 2016 (b) 8 November, 2016
(c) 8 September, 2016 (d) 8 December, 2016

6. Who can direct to transfer any civil or criminal case from one State High Court to another state High Court or from a Court subordinate to another State High Court in India?
(a) Chief Justice of High court
(b) Governor of state
(c) Law commission of India
(d) Supreme Court

7. Which of the following is NOT a hot water stream?
(a) Humboldt Current (b) Kuroshio Current
(c) Tsushima Current (d) Alaskan Current

8. 'Natural Levees' are :
(a) Depositional landforms of the river
(b) Depositional landforms of wind
(c) Erosional landforms of river
(d) Erosional landforms of wind

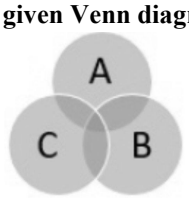
9. Ali Quli Salim and Abu Talib were important poets during the reign of ____.
(a) Aurangzeb (b) Jahangir
(c) Shah Jahan (d) Akbar

10. Who among the following remarked that "South Africa made the Mahatma"?
(a) Bipin Chandra Pal
(b) Chandran Devanesan
(c) Bal Gangadhar Tilak
(d) Jawaharlal Nehru

11. 'TABLE' is related to '726251522' and 'FORMS' is related to '21129148', in the same way as 'CHAIR' is related to '_____'.
(a) 241926189 (b) 241926198
(c) 241296189 (d) 214926189

12. X driving goes 30 km towards south, and after turning right, going 30 km, straight. Turn left and go straight 20 km and again turn left and go straight 30 km. How far is X from its starting point now?
(a) 20 km (b) 30 km
(c) 60 km (d) 50 km

13. Select the option that is best represented by the given Venn diagram.



(a) Doctor, Man, Student
(b) Gold, Silver, Ornaments
(c) Table, Chair, Furniture
(d) Family, Parents, Children

14. Statement:
U < P > S ≥ V
Conclusion:
I. S ≤ U
II. V = P
III. S > V
(a) No conclusion is correct
(b) Only conclusion II is correct
(c) Only conclusion III is correct
(d) Only conclusion I is correct

15. A statement is given followed by two Decide which of the arguments is/are strong with respect to the statement.
Statement:
Life expectancy of Indians is increasing
Arguments
I. Yes. People are getting better medical facilities.
II. Yes. People are doing more physical exercises now
(a) Both arguments I and II are strong
(b) Only argument I is strong
(c) Neither I nor II is strong
(d) Only argument II is strong

16. You are given a question and two statements. Find out which of the statements is/are necessary/sufficient to answer the question.
How much was discount is being provided by the store on soap.
Statements.
(i) Store is giving 1 soap free on purchase of 3
(ii) A discount of ₹10 is being given on the soap.

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(a) Only II is sufficient while I alone is not sufficient
(b) Either I or II is sufficient
(c) Only II is sufficient while II alone is not sufficient
(d) Neither I nor II is sufficient

17. Five students Radha, Sujit, Mihir, Anshul and Vikas have a total of five books on the subjects of Accountancy, Business Studies, Mathematics, Economics and English, written by authors Jain, Kohli, Das, Sharma and Edwin. Each student has only one book on one of the five subjects.

- **Jain is the author of the Accountancy book, which is not owned by Vikas or Radha.**
- **Anshul owns the book written by Edwin.**
- **Mihir owns the Mathematics book.**
- **Vikas has the English book, which is not written by Kohli.**
- **The Economics books is written by Sharma.**

Identify the author of the Business Studies book.
(a) Das (b) Sharma
(c) Jain (d) Edwin

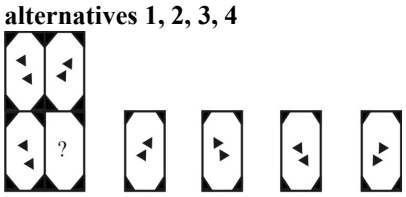
18. 'Gloves' is related to 'Hand' in the same way as 'Cap' is related to '.....'.
(a) Neck (b) Back
(c) Head (d) Foot

19. In a certain code language, 'STEM' is written as 'VXHQ' and 'ROOT' is written as 'USRX'. How will 'SEED' be written in that language?
(a) VIGH (b) VIHH
(c) UJHG (d) UKGG

20. Four letter clusters have been given, out of which three are alike in some manner and one is different. Select the odd one.
(a) ACBD (b) IKJL
(c) EGFH (d) MNPO

21. Select the combination of letters that when sequentially placed in the blanks of the given series will complete the series.
a_bca_ _ca_b_ _abc
(a) aabaca (b) abacaa
(c) bacaaa (d) aaacba

22. Complete the Figure X from the given alternatives 1, 2, 3, 4



(X) (1) (2) (3) (4)

(a) 1 (b) 2
(c) 3 (d) 4

23. Facing East, X turns 150° clockwise and 105° anti-clockwise. Which direction is X facing now?
(a) North-West (b) South-East
(c) North-East (d) South-West

24. D has a brother A. D is the son of C. B is C's father. In terms of relationship, what is A of B?
(a) Brother (b) Son
(c) Grandson (d) Grandfather

25. If × stands for addition, ÷ stands for subtraction, + stands for multiplication and – stands for division, then 10 × 4 ÷ 4 – 2 + 1 = ?
(a) 40 (b) 5
(c) 12 (d) 12.5

26. What was the first computer created by JW Mauchly and J Presper Eckert with NO mechanical parts?
(a) EDVAC (b) ENIAC
(c) Mark II (d) Mark I

27. Which one of the following is an output device?
(a) Printer (b) Mouse
(c) MICR (d) OCR

28. Which of the following looks like an upside-down mouse that requires the ball to be rotated manually with a finger for moving the cursor on the computer screen?
(a) Digitizer (b) Light pen
(c) Joystick (d) Trackball

29. Which of the following is an output device
(a) Monitor (b) Scanner
(c) Joystick (d) Keyboard

30. Which of the following statement is false?
(a) SRAM is faster than DRAM
(b) SRAM uses transistors and latches.
(c) SRAM does not require refresh electrical circuitry.
(d) SRAM is also called synchronous Random Excel memory.

31. In which of the following transistors and latches are used?
(a) ROM (b) Hard Disk
(c) DRAM (d) SRAM

32. Dynamic RAM (DRAM) is slower than Static RAM (SRAM) because …….
(a) DRAM uses flip–flops
(b) DRAM is costlier
(c) DRAM requires refreshing
(d) DRAM is cheaper

33. Which of these establishes communication between servers and work stations?
(a) Interspace (b) Backbone
(c) Terminal Access Point (d) Gateway

34. Which of the following extends a private network to a public network?
(a) Wide area network
(b) Virtual private network
(c) Enterprise private network
(d) Local area network

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35. Which of the following terms best describes the process of interconnecting two or more networks to form a single large network?
(a) Merging
(b) Intranet
(c) Virtualization
(d) Internetworking

36. Which of the following statements is correct about the alignment of paragraph text in MS-Word 2007?
(a) The keyboard shortcut 'Ctrl + L' can be used to align the text to the left.
(b) The keyboard shortcut 'Ctrl + D' can be used to align the text to the right.
(c) The keyboard shortcut 'Ctrl + C' can be used to center align the text.
(d) The keyboard shortcut 'Alt + L' can be used to left align the text.

37. Which of the following commands is not related to 'Page Setup' menu in MS Word 2007?
(a) Page Color (b) Margins
(c) Paper Size (d) Orientations

38. The keyboard shortcut to open a new blank document is which of the following?
(a) Ctrl + N (b) Ctrl + Alt + N
(c) Shift + N (d) Alt + N

39. Almost every search engine user programs or automated scripts called _____ to systematically browse the World Wide Web and index them in a local repository.
(a) Crawler (b) Adware
(c) Spooler (d) Spyware

40. Which of the following statements regarding the Internet is incorrect?
(a) It is a global network that connects billions of computers around the world.
(b) It uses TCP/IP protocol.
(c) It is different from the World Wide Web.
(d) It is a collection of web pages which are accessed through a browser.

41. Find out whether the given statements are true or false.
(i) WWW is a worldwide network of devices like computers, laptops, tablets etc.
(ii) The Internet is a collection of websites or web pages stored on web servers and connected to local computers.
(a) (i)- false, (i)- true
(b) (i)- true, (ii)- false
(c) (i)- false, (ii)- false
(d) (i)- true, (ii)- ture

42. Which of the following is a software program that serves the web pages requested by web users using a browser?
(a) Website (b) Web server
(c) URL (d) Web client

43. Which of the following inbox categories helps to focus on the emails that matter the most and separates the inbox into different tabs in MS-Outlook 365?
(a) Other (b) Unfocused
(c) Focused (d) Important

44. Who developed the Chromium web browser?
(a) Mozilla (b) Apple
(c) Google (d) Microsoft

45. Match points under the column 'Three V's of Big Data' with those under the column 'Description'.

Three V's of Big Data	Description
a) Volume	i) This refers to the many types of data that are available
b) Velocity	ii) This refers to the data of unknown value, such as Twitter data feeds, clickstreams on a web page or a mobile app or sensor-enabled equipment.
c) Variety	iii) This refers to the fast rate at which data is received and (perhaps) acted on.

(a) a-i, b-iii, c-ii (b) a-iii, b-ii, c-i
(c) a-ii, b-iii, c-i (d) a-ii, b-i, c-iii

46. A student divided a number by 12 instead of 21 and received 35. Find the correct answer.
(a) 20 (b) 15 (c) 26 (d) 25

47. The value of $15\times14 - 30 + (3^2 + 17)$ is:
(a) 154 (b) 266
(c) 124 (d) 206

48. Whose ascending order is correct from the given fractions?
(a) $\frac{5}{8}, \frac{19}{24}, \frac{11}{16}$ (b) $\frac{11}{16}, \frac{5}{8}, \frac{19}{24}$
(c) $\frac{5}{8}, \frac{11}{16}, \frac{19}{24}$ (d) $\frac{19}{24}, \frac{11}{16}, \frac{5}{8}$

49. Find the value of 0.1404 ÷ 0.06 = ?
(a) 0.234 (b) 2.34
(c) 234 (d) 23.4

50. Find the sum of the numbers between 400 and 600 such that when they are divided by 6, 12 and 16, there will be no remainder.
(a) 2610 (b) 2016
(c) 2620 (d) 2026

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51. Find the LCM and HCF of inverse of 18 and 24.
(a) 1/6., 1/4 (b) 72.6
(c) 1/72. 1/6 (d) 1/6.1/7

52. If a : b = 3 : 5 , c : b = 3 : 2 , c : d = 5 : 6 then find a : d = ?
(a) 12 : 36 (b) 12 : 15
(c) 1 : 3 (d) 11 : 36

53. Durba got 70% marks in an exam. He obtained 20 out of 25 marks in another exam. If his total score is 78% then what were the maximum marks of the first exam?
(a) 7.6 (b) 6.25
(c) 7.25 (d) 6

54. The length of a rectangular plot is 60% more than its breadth. If the difference between the length and the breadth of that rectangle is 30 cm, what is the perimeter of that rectangle ?
(a) 300 cm (b) 260 cm
(c) 330 cm (d) 270 cm

55. Ramu and Somu together can complete a task in 10 days. Somu and Dhamu together can complete it in 12 days. Dhamu and Ramu together can complete it in 15 days. If Ramu, Somu and Dhamu work together, in how many days will they complete the task?
(a) 8 (b) 6
(c) 9 (d) 7

56. Two cars cover a certain distance by moving at speeds of 45 km/h and 50 km/h respectively. Find the distance travelled when one car takes 32 minutes more than the other to cover the distance?
(a) 240 km (b) $\frac{240}{19}$ km
(c) $\frac{8}{3}$ km (d) $\frac{152}{3}$ km

57. At what rate of simple interest per annum will ₹ 7500 get ₹ 9250 in 7 years :
(a) $3\frac{1}{3}\%$ (b) $4\frac{1}{3}\%$
(c) $5\frac{1}{3}\%$ (d) $6\frac{1}{3}\%$

58. When the selling price of a TV is ₹18,700, the shopkeeper incurred a loss of 15%. What should be the selling price of that TV to gain 15% ?
(a) ₹ 25,300 (b) ₹ 34,200
(c) ₹ 43,200 (d) ₹ 19,800

59. Find the value of

$$\frac{(4x^2-9y^2)^3+(9y^2-49z^2)^3+(49z^2-4x^2)^3}{(2x-3y)^3+(3y-7z)^3+(7z-2x)^3}$$

(a) (2x–3y)(3y–7z)(7z–2x)
(b) 42xyz(2x+3y)(3y+7z)(7z+2x)
(c) 42xyz(2x–3y)(3y–7z)(7z–2x)
(d) (2x+3y)(3y+7z)(7z+2x)

60. Solve the following

$$1+\frac{1+\cos\theta}{\sin\theta}-\frac{\sin^2\theta}{1+\cos\theta}-\frac{\sin\theta}{1-\cos\theta}=?$$

(a) cosθ (b) − cosθ
(c) sinθ (d) −sinθ

61. The digits given below are arranged in ascending order. If their median is 10, then find the value of p.
3, 5, 6, 2p +3, 3p +2, 15, 25, 51
(a) 2 (b) 3
(c) 27.5 (d) 38

62. $\sqrt{0.015625}\times\sqrt{0.0256}=$ _____
(a) 0.004 (b) 0.002
(c) 0.04 (d) 0.02

63. 17 years later from Chetna's age will be twice as Mahim's age. Before 5 years from today Mahim's age was one year less than 1/3 part of Chetna's age. What is the present age of Chetna?
(a) 65 years (b) 63 years
(c) 67 years (d) 61 years

64. Two pipes X and Y can fill a gas tank in 60 and 75 minutes respectively. There is an outlet Z. If all the three pipes are used together, then the tank gets full in 50 minutes. How much time will be taken by Z to empty the tank completely?
(a) 100 minutes (b) 75 minutes
(c) 90 minutes (d) 50 minutes

65. If $\frac{3}{5}$ of a bottle is filled, what is the ratio of the filled part to the empty part of the bottle?
(a) 3:5 (b) 5:3
(c) 3:2 (d) 2:3

66. Light year is the unit of
(a) Length (b) Time
(c) Mass (d) Area

67. A man weighs 'W' on the surface of earth and his weight at a height '2R' from surface of earth is (R is the Radius of earth).
(a) $\frac{w}{9}$ (b) $\frac{w}{6}$
(c) w (d) $\frac{w}{3}$

68. A truck travels 450 km in two and a half hours. Find its speed in m/s.
(a) 60 (b) 90
(c) 50 (d) 75

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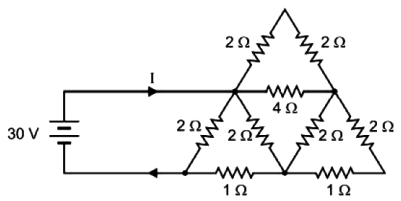
69. Work done will be maximum when the angle between the direction of force and the direction of displacement is.
(a) 45º (b) 0º
(c) 90º (d) 60º

70. Find the heat capacity of a pan of mass 180 g, if its temperature rises by 50 degree on receiving 2400 J of heat.
(a) 48 JK^{-1} (b) 16.67 $Jkg^{-1}K^{-1}$
(c) 13.33 $Jkg^{-1}K^{-1}$ (d) 36 JK^{-1}

71. An electrical circuit consists of two resistors of 300 Ω and 200 Ω in series with 100 V DC source. Find the current through 200 Ω and voltage drop across 300 Ω.
(a) 0.1 A; 60 V (b) 0.1 A; 40 V
(c) 0.2 A; 60 V (d) 0.2 A; 40 V

72. The units of absolute viscosity is–
(a) Pascal-Second (b) kg/m^3
(c) Pascal - kg (d) gm/cc

73.



Find current supplied by the source.
(a) 23. 5A (b) 22A
(c) 28.45A (d) 18A

74. In electromagnetic induction, the induced emf is independent of-
(a) Change of flux
(b) Time
(c) Number of line of force
(d) Resistance of the cells

75. Electrolytic type of energy meter can work in which of the following circuits?
(a) Magnetic circuit (b) AC only
(c) DC only (d) DC and AC both

76. A Magnetic material loses its ferromagnetic properties at a point called
(a) Curie temperature
(b) Inferred absolute temperature
(c) Room temperature
(d) Absolute temperature

77. Mark the incorrect relation :
(a) $D = \varepsilon E$ (b) $B = \mu H$ (c) $J = \sigma E$ (d) $B = \mu D$

78. Consider an interface between two dielectric materials, one with $\varepsilon_r = 2$ while the other has $\varepsilon_r = 5$. If the tangential component of electric field on one side of the interface has a magnitude of $10Vm^{-1}$. What is the magnitude of the tangential component of electric field on the other side is?
(a) 10 Vm^{-1} (b) 20 Vm^{-1}
(c) $2Vm^{-1}$ (d) 5 Vm^{-1}

79. Which of the following has no units?
(a) Thermal capacity
(b) Magnetic susceptibility
(c) Angular acceleration
(d) Moment of a magnet

80. In the superconducting state, the flux lines of a magnetic field are ejected out of the superconductor as per-
(a) Curie effect (b) Faraday's effect
(c) Maxwell's effect (d) Meissner effect

81. Which one of the following element has Forbidden energy band approximately equal to 6 eV?
(a) Metal (b) Insulator
(c) Conductor (d) Semiconductor

82. Temperature coefficient of resistance of an extrinsic semiconductor is
(a) Zero
(b) Positive
(c) Negative
(d) Dependent on size of specimen

83. Consider the following statements in connection with the biasing of semiconductor diodes–
1. LED's are used under forward bias condition
2. Photo diodes are used under forward bias condition
3. Zener diodes are used under reverse bias condition
4. Variable capacitance diodes are used under reverse bias condition
Which of the following are correct
(a) 1, 2 and 3 (b) 1, 2 and 4
(c) 2, 3 and 4 (d) 1, 3 and 4

84. What is the input voltage and output current in common base configuration of a transistor?
(a) V_{BE}, I_E respectively
(b) V_{CB}, I_C respectively
(c) V_{CB}, I_E respectively
(d) V_{EB}, I_C respectively

85. For a JFET, if the gate voltage V_{gs} is made more negative, then
(a) The channel conductivity increases
(b) Depletion region increases
(c) Channel conductivity decreases
(d) Channel current increases

86. The maximum rectification efficiency in case of a full wave rectifier is :
(a) 100% (b) 55.6%
(c) 81.2% (d) 40.64%

87. In CE configuration the output V-I characteristics are drawn by taking-
(a) V_{CE} versus I_C for constant value of I_E
(b) V_{CE} versus I_C for constant value of I_B
(c) V_{CE} versus I_E for constant value of V_{CB}
(d) None of the above

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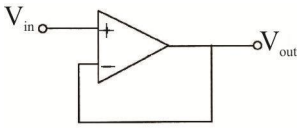
88. .....transistor is most suitable for high frequency circuits :
(a) Hermetically sealed
(b) Grown-diffusion
(c) Rate-grown
(d) Alloy

89. In an amplifier with negative feedback, the bandwidth is
(a) Increased by a factor of β
(b) Decreased by a factor of β
(c) Increased by a factor of (1+Aβ)
(d) Increased by a factor of (1−Aβ)
Where A= gain of basic amplifier and β= feedback factor

90. The following circuit is



(a) Differential amplifier
(b) Inverting amplifier
(c) Non-inverting amplifier
(d) voltage follower

91. In an unregulated power supply, if input a.c. voltage increases, the output voltage .....
(a) Increase
(b) Decreases
(c) Remains the same
(d) None of these

92. Which one of the following statement is not correct ?
(a) It is not possible to have precise measurements which are not accurate
(b) Correctness in measurement requires both accuracy and precision
(c) Reproducibility and consistency are expressions that best describe precision in measurements
(d) An instrument with 2% accuracy is better than another with 5% accuracy

93. The ohm scale of an analog multimeter-
(a) and current scale are equal
(b) is non-linear and is opposite of current scale
(c) is linear and is opposite of current
(d) is linear and is opposite of voltage scale

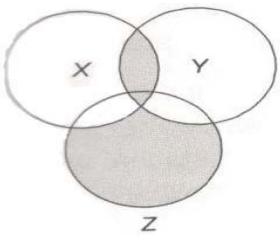
94. The purpose of a shunt in an ammeter is to-
(a) Increase the sensitivity of the ammeter
(b) Bypass the current
(c) Increase the sensitivity of the ammeter or by pass the current
(d) Increase the resistance of the ammeter

95. A wattmeter will read zero under the following condition
(a) The sinusoidal voltage frequency is half the frequency of the sinusoidal current
(b) The voltage and current are exactly in phase
(c) The current is dc and the voltage is sinusoidal.
(d) The voltage and current have the same time periods but the voltage is sinusoidal whereas the current is a square wave

96. Which mode of operation a piezo electric transducer can be subjected to :
(a) Face shear (b) Transverse Expansion
(c) Thickness shear (d) All of the above

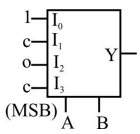
97. A code in which each decimal digit is represented by a group of 4 binary bits is
(a) BCD (Binary Coded Decimal)
(b) Gray code
(c) Excess 3 code
(d) ASCII code

98. The Boolean expression for the shaded area in the Venn diagram is :



(a) $\bar{X}+\bar{Y}+Z$ (b) $X\bar{Y}Z+\bar{X}YZ$
(c) $X+Y+Z$ (d) $\bar{X}\bar{Y}Z+XY$

99. Expression for Y(A, B, C) in figure, where A, B and C are Boolean variables is



(a) $\overline{AB}+\bar{A}BBC$ (b) A+BC
(c) $\bar{A}\bar{B}+BC$ (d) $(AB+A\bar{B})C$

100. Arrange the following logic families in the order of increasing speed : CMOS, low power Schottky TTL, ECL, Schottky TTL, low power TTL, TTL :
(a) Low power TTL, CMOS, TTL, Schottky TTL, low power Schottky TTL and ECL
(b) ECL, Schottky TTL, low power Schottky TTL, TTL, low power TTL and CMOS
(c) TTL, low power TTL, ECL, CMOS, low power Schottky TTL, Schottky TTL.
(d) CMOS , low power TTL, TTL, low power Schottky TTL, Schottky TTL and ECL

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SOLUTION : PRACTICE SET- 6

ANSWER KEY

1. (c)	11. (a)	21. (a)	31. (d)	41. (c)	51. (c)	61. (b)	71. (c)	81.(b)	91. (a)
2. (a)	12. (d)	22. (a)	32. (c)	42. (b)	52. (c)	62. (d)	72. (a)	82. (b)	92. (a)
3. (c)	13. (a)	23. (b)	33. (c)	43. (c)	53. (b)	63. (a)	73. (c)	83. (d)	93. (b)
4. (a)	14. (a)	24. (c)	34. (b)	44. (c)	54. (b)	64. (a)	74. (d)	84. (d)	94. (b)
5. (b)	15. (a)	25. (c)	35. (d)	45.(c)	55. (a)	65. (c)	75. (c)	85.(c)	95.(c)
6. (d)	16. (b)	26. (b)	36. (a)	46. (a)	56. (a)	66. (a)	76.(a)	86. (c)	96.(d)
7. (a)	17. (d)	27. (a)	37. (a)	47. (d)	57. (a)	67. (a)	77.(d)	87.(b)	97. (a)
8. (a)	18. (c)	28. (d)	38. (a)	48. (c)	58. (a)	68. (c)	78. (a)	88.(b)	98.(d)
9. (c)	19. (b)	29. (a)	39. (a)	49. (b)	59. (d)	69. (b)	79. (b)	89.(c)	99. (c)
10. (b)	20. (d)	30. (d)	40. (d)	50. (b)	60. (a)	70. (a)	80.(d)	90.(d)	100. (d)

SOLUTION

1. (c)

The International Space Station is located about 400 km distance above the earth surface.
The space station is situated in the lower orbit of the earth . The Salyut programme was the first space station programme, undertaken by the Soviet Union in 1971.

2. (a)

Brazil have won five times, and they are the only team to have played in every tournament. The other most successful teams are Germany and Italy, with four titles each.The first competition for the cup was organized in 1930 by the Fédération Internationale de Football Association (FIFA) and was won by Uruguay.

3. (c)

Bon-geet (forest/nature song), is primarily a form of folk song of Assam.

4. (a)

M.S. Swaminathan is an agricultural scientist of India. He was born in 1925, Tamil Nadu. He is renowned for his leading role in India's "Green Revolution". In recognition of his outstanding contributions, he was awarded the first World Food Prize, the Ramon Magsaysay Award and many other national and international honours. He was honoured with highest civilian award Bharat Ratna in Feb. 2024. He was died on Sep. 28, 2023.

5. (b)

Demonetisation was announced by Prime Minister Narendra Modi on 8 November, 2016. Government of India announced the demonetization of 500 and 1000 bank notes. Also announced the issuance of 500 and 2000 New bank notes. Urjit Patel was Governor of R.B.I. that time.

6. (d)

Supreme Court can direct to transfer any civil or criminal case from one State High Court to another State High Court or from a Subordinate Court to another State High Court in India.

7. (a)

Humboldt Ocean Current is also known as Peru Current as it runs parallel to Peru coasts. It runs in southern pacific ocean from south to north direction. It is a cold ocean current.

Ocean current	Ocean	Warm/Cold
Kuroshio	Pacific Ocean	Warm
Alaskan	Pacific Ocean	Warm
Gulf Stream	Atlantic Ocean	Warm

8. (a)

Levees are usually made of earth. The natural movement of the body of water pushes sediment to the side and creates a natural levee. Hence levees are depositional landforms of Rivers.

9. (c)

Ali Quli Salim and Abu Talib were important poets during the reign of Shah Jahan. During Akbar's period, Faizi, Abul Fazal, Tulsidas and Raskhan were famous poet. During Jahangir time, Bihari, Keshav das, Naqib khan and Mutamid Khan were famous poets.

10. (b)

In January 1915, Mohandas Karamchand Gandhi returned to his homeland after two decades of residence abroad. This two decades (approx 21 years) had been spent in the most part in South Africa, where he went as a lawyer, and in time became a leader of the Indian Community in that territory. As the historian Chandran Devanesan has remarked, South Africa was "the making of the Mahatma".

11. (a)

Just as,

	T	A	B	L	E
(Opposite alphabetical order)	↓	↓	↓	↓	↓
	G	Z	Y	O	V
	7	26	25	15	22

And,

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(Opposite alphabetical order)

F	O	R	M	S
↓	↓	↓	↓	↓
U	L	I	N	H
21	12	9	14	8

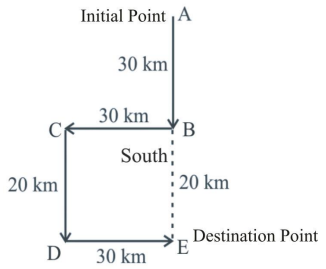
Same as,

(Opposite alphabetical order)

C	H	A	I	R
↓	↓	↓	↓	↓
X	S	Z	R	I
24	19	26	18	9

12. (d)

According to the question,

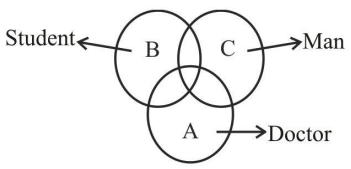


AE = AB + BE (∵ BE = CD = 20 km)

= 30 + 20 = 50 km

Hence, distance b/w A and E is 50 km.

13. (a)



Some doctors are men, some men are student, some are student as well as man. So, It is the best representation of the Venn diagram.

Hence, option (a) will be required answer.

14. (a)

Given, U < P > S ≥ V

I. S ≤ U (is false because U < P and P > S here no relation of U and S)

II. V = P (is false because P > S and S ≥ V)

III. S > V (is false because S ≥ V. Therefore, S can be equal to V or greater

Hence, all three statement are false.

15. (a)

Both arguments I and II are strong

16. (b)

Either I or II is sufficient to answer the question.

17. (d)

Student	Book	Author
Radha	Economics	Sharma
Sujeet	Accountancy	Jain
Mihir	Mathematics	Kohli
Anshul	Business Studies	Edwin
Vikas	English	Das

Hence, it is clear that Business Studies Book author is Edwin.

18. (c)

Just as, Gloves wears in Hands same as Cap wears on Head.

19. (b)

Just as,

S	T	E	M
↓+3	↓+4	↓+3	↓+4
V	X	H	Q

And,

R	O	O	T
↓+3	↓+4	↓+3	↓+4
U	S	R	X

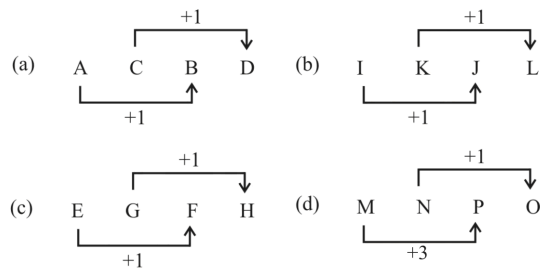
Same as,

S	E	E	D
↓+3	↓+4	↓+3	↓+4
V	I	H	H

Hence, option (b) is correct.

20. (d)

From the options –



Hence, it is clear that option 'd' is different among all.

21. (a)

The given series is as follows

aabc|aa bc|aabc|aabc

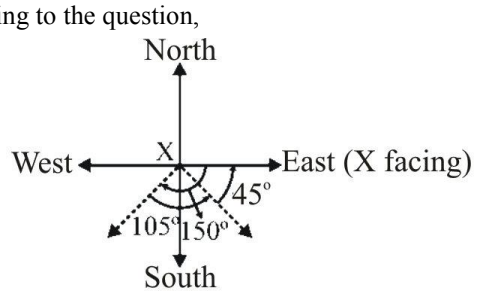
Hence option (a) will complete the series.

22. (a)

Just as on the left side, there is only one type of picture. Same as on the right side, there will be same type of picture.

23. (b)

According to the question,



Hence, X is facing South-East.

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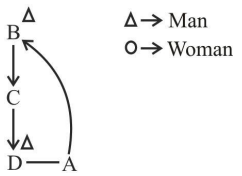
24. (c)

On drawing blood relation diagram according to the question,



It is clear form the figure that A is the grandson or gand-daughter of B.

25. (c)

Given,

$$10 \times 4 \div 4 - 2 + 1 = ?$$

On changing the signs,

$$10 + 4 - 4 \div 2 \times 1$$

$$14 - 2 \times 1 = 12$$

26. (b)

The first programmable, general purpose electronic digital computer was ENIAC (Electronic Numerical Integrator and Computer). ENIAC was invented by American Scientist J. Presper Eckert and John Mauchly. This computer was first used to calculate the hydrogen bomb.

27. (a)

Printer is an electronic output device, which is used to give printout of any document files present in the computer system, whereas Mouse, MICR and OCR are input devices.

28. (d)

Track ball is a pointing device that use as a mouse. It basically consists of a socket containing the ball, which can be rolled manually to move the cursor on the screen the socket also contains sensors which detect the movement of the ball. A trackball is an option for mouse. It resembles like an "upside down" mouse that requires the ball to be rotated manually with a finger for moving the cursor on the computer screen.

29. (a)

Devices which are used to get output from the computer system are called as output devices. Some examples of output devices are Printer, Monitor, Speaker etc. Scanner, Joystick and Keyboard are Input Devices.

30. (d)

SRAM is short form of Static Random Access Memory.

31. (d)

SRAM (Static Random Access Memory) is types of memory that uses latching circuitry (flip-flop) to store each bit.

32. (c)

SRAM is faster than DRAM because DRAM needs to be refreshed periodically when in use, while SRAM does not need to refreshed.

33. (c)

Terminal Access Point servers to establish connectivity between different server and work locations, so that data can be changed.

34. (b)

VPN is the short form of Virtual Private Network. It is an encrypted connection from a device to a network and the internet. VPN, are an extension of a private network to a public network. This technology is widely used in the corporate environment.

35. (d)

Internetworking is made up of two words. Inter and networking which means connection between completely different nodes or segments. This connection unit is established through interconnecting devices similar to routers or get ways. This interconnection is often between public, private, commercial, industrial or government networks. Internetworking refers to the business, products and process that are connected to intermediate networking devices that act as avast network. Which meets the challenge of creating and administering the internetwork.

36. (a)

Text alignment is a paragraph formatting attribute that determines the appearance of text throughout the paragraph and is used in MS Word 2007, the keyboard shortcut Ctrl + L is used to align text to the left.

37. (a)

In MS Word 2007, Margin, Paper Size, Orientation options are available in the Page Setup menu in the Page Layout tab, whereas the Page Color option is not present in the Page Setup menu. Page Color Options is available in Page Background menu.

38. (a)

In MS word, the shortcut key to open a new blank document is Ctrl + N. The Microsoft Word is a word processor developed by Microsoft.

39. (a)

A web crawler or web spider is a computer program that is used to search and automatically index website content and other information over the internet.

40. (d)

Internet is an international network of computers which is called a network of networks. The Internet is a global system of interconnected computer networks that uses the Internet Protocol Suite (TCP/IP) to communicate between networks and devices. It is a wide area network and is a collection of World Wide Web pages.

41. (c)

The World Wide Web is an interconnected system of public web pages accessible via the Internet. The World Wide Web follows the client-server model. The World Wide Web provides features such as hypertext information system, cross-platform, distributed, open standards, open-source, etc. British scientist Tim Berners-Lee invented the World Wide Web in 1989.

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The Internet is a global system of interconnected computer networks that uses the Internet Protocol Suite TCP/IP to communicate between devices and networks. Internet is a global network of computers. Hence, both the given statements are false.

42. (b)

A web browser is a program that your computer runs to communicate with web servers on the Internet which enables you to download and display the web pages that you request. A web server is software and hardware that uses HTTP and other protocols to respond.

43. (c)

Focused inbox separates your inbox separates your inbox into two tabs focused and other your most important e-mail messages are on the focused tab while the rest remain easily accessible but out of the way on the other tab.

44. (c)

Chromium is a free and open - source web browser project, mainly, developed and maintained by Google. This cachebase provides the vast majority of code for the Google chrome browser, which is proprietary software and has some additional features.

45.(c)

The 3V's (Volume, Velocity and Variety) are three defining properties or dimensions of big data, where volume refers to the amount of data, velocity refers to the speed of data processing and variety refers to the number of types of data.

46. (a)

Let the number be x.

According to the question,

On dividing by 12,

$\frac{x}{12} = 35$

x = 35 × 12

x = 420

The number is 420

Dividing 420 by 21-

$\frac{420}{21} = 20$

Hence, the correct answer = 20

47. (d)

Given expression,

$15 \times 14 - 30 + (3^2 + 17) = ?$

= 210 – 30 + 26

= 210 – 4 = 206

48. (c)

$\frac{5}{8} = 0.625 \quad \frac{19}{24} = 0.791 \quad \frac{11}{16} = 0.687$

Hence, the required ascending order is 0.625 < 0.687 < 0.791

$\Rightarrow \quad \frac{5}{8} < \frac{11}{16} < \frac{19}{24}$

49. (b)

Given,

$0.1404 \div 0.06$

$= \frac{0.1404 \times 10000}{0.06 \times 10000} = \frac{1404}{600} = 2.34$

50. (b)

LCM of Number 6, 12, and 16 = 48

Required numbers = 48 × 9 = 432

= 48 × 10 = 480

= 48 × 11 = 528

= 48 × 12 = 576

Total Required number = 2016

51. (c)

Inverse of $18 = \frac{1}{18}$

Inverse of $24 = \frac{1}{24}$

LCM of $\frac{1}{18}, \frac{1}{24} = \frac{\text{LCM of } 1,1}{\text{HCF of } 18,24} = \boxed{\frac{1}{6}}$

HCF of $\frac{1}{18}, \frac{1}{24} = \frac{\text{HCF of } 1,1}{\text{LCM of } 18,24} = \boxed{\frac{1}{72}}$

52. (c)

a : b = 3 : 5, c : b = 3 : 2, c : d = 5 : 6

b : c = 2 : 3

$\therefore a : d = \frac{a}{b} \times \frac{b}{c} \times \frac{c}{d}$

$= \frac{3}{5} \times \frac{2}{3} \times \frac{5}{6} = \frac{1}{3}$

53. (b)

Let the maximum marks of the first exam be x.

And the obtained marks = y

According to the first condition,

$\frac{y}{x} = \frac{70}{100}, \quad y = \frac{7x}{10}$

According to the second condition,

$\frac{y+20}{x+25} = \frac{78}{100}$

$\frac{7x+200}{x+25} = \frac{78}{10}$

70x + 2000 = 78x + 1950

8x = 50

x = 6.25

Therefore, maximum marks = 6.25

54. (b)

Let the breadth of rectangle = x cm

then the length of rectangle = $x \times \frac{160}{100} = 1.6x$ cm

According to the question,

length breadth = 30

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$1.6x - x = 30$

$0.6x = 30$

$\boxed{x = 50cm}$

Breadth $= 50cm$

Length $= 50 \times \frac{160}{100} = 80cm$

Hence the perimeter of the rectangle

$= 2(\text{length} + \text{breadth})$

$= 2(80 + 50)$

$= 2 \times 130$

$= 260cm$

55. (a)

One day work of (Ramu+Somu) = $\frac{1}{10}$

One day work of (Somu+Dhamu) = $\frac{1}{12}$

One day work of (Dhamu+Ramu) = $\frac{1}{15}$

One day work of 2 (Ramu+Somu+Dhamu)

$$= \left(\frac{1}{10} + \frac{1}{12} + \frac{1}{15}\right)$$

$$= \frac{6+5+4}{60}$$

$$= \frac{15}{60} = \frac{1}{4}$$

One day work of (Ramu+Somu+Dhamu)

$$= \frac{1}{4 \times 2} = \frac{1}{8}$$

$\because \frac{1}{8}$ of the work done by (Ramu+Somu+Dhamu) in one day.

Hence, total time taken by (Ramu+Somu+Dhamu) to complete the work in 8 days.

56. (a)

Let distance covered = d km

According to the question,

$$\frac{d}{45} - \frac{d}{50} = \frac{32}{60}$$

$$\frac{d}{9} - \frac{d}{10} = \frac{32}{12}$$

$$\frac{10d - 9d}{90} = \frac{32}{12}$$

$$\frac{d}{90} = \frac{32}{12}$$

$$d = \frac{90 \times 32}{12} = 240\,km$$

57. (a)

$$\text{Amount} = P\left(1 + \frac{rt}{100}\right)$$

$$9250 = 7500\left(1 + \frac{7r}{100}\right)$$

$$\frac{925}{750} - 1 = \frac{7r}{100}$$

$$\frac{7r}{100} = \frac{175}{750}$$

$$r = \frac{7}{30} \times \frac{100}{7}$$

$$r = \frac{10}{3}$$

$$r = 3\frac{1}{3}\%$$

58. (a)

According to the question,

Let the CP of TV = 100 unit

SP of TV = 18,700

Loss = 15%

$\therefore$ SP of TV $\Rightarrow 85\% \rightarrow 18700$

$1\% \rightarrow \frac{18700}{85}$

CP of TV $\Rightarrow 100\% = \frac{1870000}{85}$

To gain 15%,

$$\text{SP of TV} = \frac{1870000}{85} \times \frac{115}{100}$$

$$= \frac{18700 \times 115}{85}$$

$$= \frac{18700 \times 23}{17} = 1100 \times 23$$

$= ₹25300$

59. (d)

From the question,

$$\frac{(4x^2 - 9y^2)^3 + (9y^2 - 49z^2)^3 + (49z^2 - 4x^2)^3}{(2x - 3y)^3 + (3y - 7z)^3 + (7z - 2x)^3}$$

If a + b + c = 0 then $a^3 + b^3 + c^3 = 3abc$

$4x^2 - 9y^2 + 9y^2 - 49z^2 + 49z^2 - 4x^2 = 0$

$2x - 3y + 3y - 7z + 7z - 2x = 0$

Hence,

$$= \frac{3(4x^2 - 9y^2)(9y^2 - 49z^2)(49z^2 - 4x^2)}{3(2x - 3y)(3y - 7z)(7z - 2x)}$$

$$= \frac{(2x + 3y)(2x - 3y)(3y - 7z)(3y + 7z)(7z + 2x)(7z - 2x)}{(2x - 3y)(3y - 7z)(7z - 2x)}$$

$= (2x + 3y)(3y + 7z)(7z + 2x)$

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60. (a)

$$1+\frac{1+\cos\theta}{\sin\theta}-\frac{\sin^2\theta}{1+\cos\theta}-\frac{\sin\theta}{1-\cos\theta}=?$$

$$=1+\frac{1+\cos\theta}{\sin\theta}-\frac{(1-\cos\theta)(1+\cos\theta)}{1+\cos\theta}-\frac{\sin\theta}{1-\cos\theta}$$

$$=1-(1-\cos\theta)+\frac{1+\cos\theta}{\sin\theta}-\frac{\sin\theta}{1-\cos\theta}$$

$$=1-1+\cos\theta+\frac{\sin^2\theta-\sin^2\theta}{\sin\theta(1-\cos\theta)}$$

$= \cos\theta + 0$

$= \cos\theta$

61. (b)

When the number of terms is even then

$$\text{Median}=\frac{\left(\frac{n}{2}\right)^{th}\text{term}+\left(\frac{n}{2}+1\right)^{th}\text{term}}{2}$$

Where n = number of term.

here n = 8 and median = 10 (Given)

$$10=\frac{\left(\frac{8}{2}\right)^{th}\text{term}+\left(\frac{8}{2}+1\right)^{th}\text{term}}{2}$$

$$10=\frac{4^{th}\text{ term}+5^{th}\text{ term}}{2}$$

$$10=\frac{2p+3+3p+2}{2}$$

$5p = 20 - 5 = 15$

$p=\frac{15}{5}=3$

62. (d)

$\sqrt{0.015625}\times\sqrt{0.0256}$

$=\sqrt{0.125\times0.125}\times\sqrt{0.16\times0.16}$

$= 0.125 \times 0.16$

$= 0.02$

63. (a)

Before 5 years,

Age of Chetna = x years

Age of Mahim $=\frac{x}{3}-1=\left(\frac{x-3}{3}\right)$ years

After 17 years,

$$x+5+17=\left(\frac{x-3}{3}+5+17\right)\times2$$

$$x+22=\left(\frac{x-3}{3}+22\right)\times2$$

$$x+22=\frac{2x-6}{3}+44$$

$$x-\frac{2x-6}{3}=22$$

$3x - 2x - 6 = 66$

$x = 60$

Hence, the present age of Chetna = 60 + 5 = 65 years

64. (a)

Suppose time taken by 'Z' is x minute

Filled part of tank by 'X' in 1 minute $=\frac{1}{60}$

Filled part of tank by 'Y' in 1 minute $=\frac{1}{75}$

Emptied part of tank by 'Z' in 1 minute $=\frac{1}{x}$

As per the question-

$$\frac{1}{60}+\frac{1}{75}-\frac{1}{x}=\frac{1}{50}$$

$$\Rightarrow-\frac{1}{x}=\frac{1}{50}-\left(\frac{1}{60}+\frac{1}{75}\right)$$

$$\Rightarrow-\frac{1}{x}=\frac{1}{50}-\left(\frac{5+4}{300}\right)$$

$$\Rightarrow-\frac{1}{x}=\frac{1}{50}-\frac{9}{300}$$

$$\Rightarrow-\frac{1}{x}=\frac{6-9}{300}=-\frac{3}{300}$$

$$\Rightarrow-\frac{1}{x}=-\frac{1}{100}$$

$\Rightarrow x = 100$ minute

Hence, time taken by 'Z' to empty the whole tank = 100 minute

65. (c)

Filled part of the bottle $=\frac{3}{5}$

Empty part of the bottle $=1-\frac{3}{5}=\frac{2}{5}$

Ratio of the filled part to the empty part of the bottle.

$$\frac{\frac{3}{5}}{\frac{2}{5}}=\frac{3\times5}{2\times5}=\frac{3}{2}=3:2$$

66. (a)

The light year is a unit of length. It is used to express Astronomical distances.

- It is equal to about 9.46 trillion kilometers (9.46×10^{12}km) or 5.88 trillion miles (5.88×10^{12}miles).

67. (a)

$g=\frac{GM}{R^2}$ [given h = 2R]

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$$g' = \frac{GM}{(R+h)^2}$$

$$g' = \frac{GM}{(R+2R)^2} = \frac{GM}{(3R)^2} = \frac{GM}{9R^2} = \frac{g}{9}$$

$$w = mg$$

$$w' = mg'$$

$$w' = \frac{mg}{9}$$

$$\boxed{w' = \frac{w}{9}}$$

68. (c)

Given,

$$t = 2\frac{1}{2} \text{ hour}$$

$$= \frac{5}{2} \text{ hour}$$

s = 450km.

$$\text{speed} = \frac{s}{t}$$

$$= \frac{450}{\frac{5}{2}} = 180 \text{km/h}$$

$$= 180 \times \frac{5}{18}$$

= 50m/s

69. (b)

Work = force acting in the direction of displacement

$$W = F.S \cos\theta$$

When, θ = 0, work will be maximum because cos0 =1

When the work done is maximum, then the direction of the force and the angle between direction of the displacement will be 0º or force acting in the direction of displacement.

70. (a)

mass (m) · 180 gram = 0.18 kg

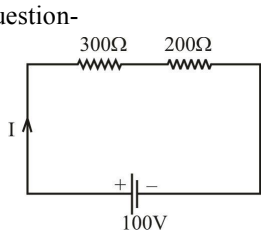
Q = 2400 Joule C = ?

Temperature (ΔT) = 50 Kelvin

$$\text{Heat capacity (C)} = \frac{Q}{\Delta T} = \frac{2400}{50} = 48 \text{ J K}^{-1}$$

71. (c)

According to question-



$$I = \frac{100}{500} = \frac{1}{5} = 0.2A$$

Both resistance connected in series therefore current in 200 ohm resistor is 0.2.

Voltage drop across 300Ω resistor-

$$V = 100 \times \frac{300}{500} \text{ (by voltage divider rule)}$$

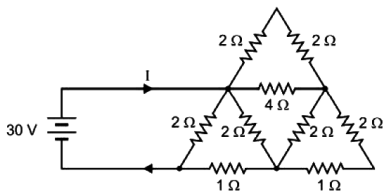
V = 60V

72. (a)

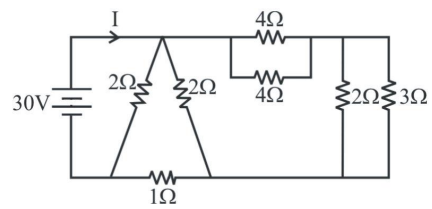
The units of absolute viscosity is Pascal-Second or $\frac{N.sec}{m^2}$

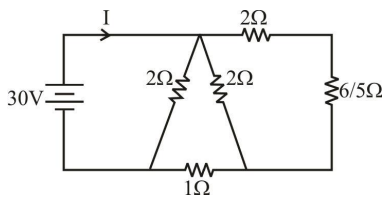
73. (c)

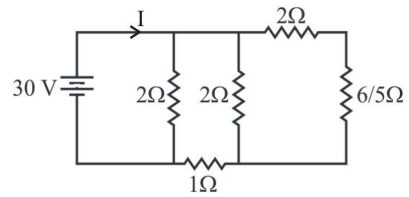
According to question -

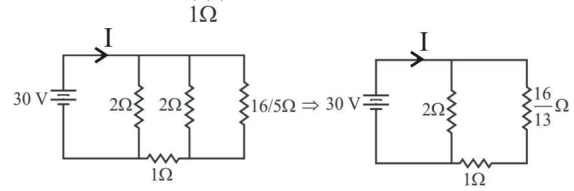


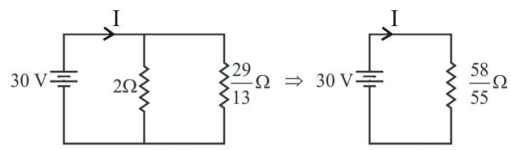
When break the circuit











$$I = \frac{V}{R_{eq}} = \frac{30 \times 55}{58} = 28.45A$$

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74. (d)

In electromagnetic induction the induced emf can be given by-

$$E = -N\frac{d\phi}{dt}$$

Where, N = No of turns

ϕ= Flux

t = Time

Thus in electromagnetic induction the induced emf is independent of resistance of the cells.

75. (c)

Electrolytic type of energy meter can work in DC circuit only.

(Instruments)	Types of supply
PMMC Type	Only D.C.
Moving iron type	A.C. and D.C.
Electrodynamometer type	A.C. and D.C.
Hot wire type	A.C. and D.C.
Electrolytic type	Only D.C.
Induction type	Only A.C.
Electrostatic type	A.C. and D.C. (Voltage only)

76.(a)

A magnetic material loses its ferromagnetic properties at a point called curie temperature.

Curie temperature- The temperature at which ferromagnetic material transforms into paramagnetic material is known as curie temperature.

77.(d)

The ratio of magnetic flux density (B) and magnetic field intensity (H) are called permeability of the magnetic material.

$$\mu = \frac{B}{H} \Rightarrow B = \mu H$$

The ratio of the electric flux (D) and the intensity of the electric field (E) are called the permittivity.

$$\varepsilon = \frac{D}{E} \Rightarrow D = \varepsilon E$$

Point form of ohm's law- $J = \sigma E$

78. (a)

Given that-

$$\varepsilon_{r_1} = 2 \;,\; \varepsilon_{r_2} = 5 \;,\; E_{t_1} = 10V/m$$

The tangential component of $\vec{E}$ is continuous at dielectric- dielectric boundary condition.

$$E_{t_1} = E_{t_2}$$

$$E_{t_2} = 10V/m$$

79. (b)

Magnetic susceptibility has no unit.

Magnetic Susceptibility (χ_m) = $\left(\frac{\mu}{\mu_0}\right) - 1$

$$\chi_m = \mu_r - 1$$

Magnetic susceptibility is the ratio of magnetization to applied magnetizing field intensity.

$$\chi_m = \frac{M}{H}$$

Where,

χ_m = Magnetic susceptibility.

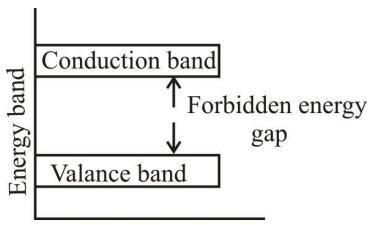
M = Magnetization

H = Magnetic field intensity.

80.(d)

In the superconducting state the flux lines of a magnetic field are ejected out of the super conductor as per Meissner effect. The Meissner effect is a property of all superconductor was discovered by the German Physicists W. Meissner and R. Ochsenfeld in 1933.

81.(b)



Energy band in insulator

Forbidden energy gap-The energy difference between the top of valance band and the bottom of the conduction band is known as forbidden energy gap. The current flowing through the materials is due to the electron transfer from the valence band to conduction band.

Insulator do not conduct electricity because a large amount of energy is needed for the electron to cross the forbidden energy gap. Hence for an insulator the forbidden gap is approximately equal to 6 eV.

82. (b)

When a tri or pentavalent impurity is added to a pure semiconductor material. It becomes an extrinsic semiconductor material and on increasing its temperature, conductivity decreases and resistivity increases. Therefore the temperature coefficient of resistance of an extrinsic semiconductor is positive.

$$R_t = R_0(1 + \alpha\Delta t)$$

$$R_t = R_0 + R_0\alpha\Delta t$$

$$\alpha = \frac{R_t - R_0}{R_0\Delta t}$$

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R_t = Resistance at t°C
R_0 = Resistance at 0°C
Δt = Temperature difference
α = Temperature coefficient

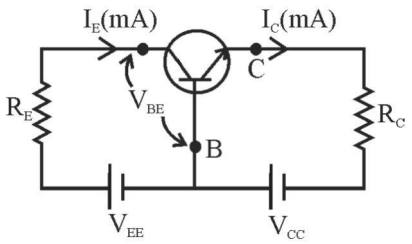
83. (d)

- LED is used under forward bias condition.
- Zener diode, variable capacitance diode and photodiode is used under reverse bias condition

Statement (2) given in the question is false, rest of the statements are correct.

84. (d)

The input voltage (V_{EB}) and output current (I_C) in common base configuration of a transistor.



$\boxed{I_E = I_B + I_C + I_{CBO}}$ or $\boxed{I_E = I_B + I_C}$

$\boxed{I_B = 2\% \text{ of } I_E}$, $\boxed{I_C = 98\% \text{ of } I_E}$

85.(c)

For JFET, V_{gs} is made more negative by applying more negative voltage between gate and source, the depletion region will increase, which reduces the value of ID and the resistance of the channel becomes high and the conductivity of the channel decreases.

86. (c)

$$\%\eta = \frac{\text{Average DC output power}}{\text{AC Input power}} \times 100\%$$

$$\%\eta = \frac{P_{dc}}{P_{ac}} \times 100\% = \frac{I_{dc}^2 R_L}{I_{rms}^2 (R_f + R_L)} \times 100\%$$

$$= \frac{\frac{4I_m^2}{\pi^2} \times R_L}{\frac{I_m^2}{2}(R_f + R_L)} \times 100\% = \frac{800}{\pi^2} \times \frac{R_L}{R_f + R_L}\%$$

$$\boxed{\%\eta = 81.2 \frac{R_L}{R_f + R_L}\%}$$

($R_f = 0$)

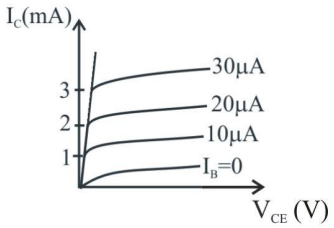
$\boxed{\% \ \eta = 81.2\%}$

87.(b)

In CE-configuration the graph is drawn between V_{CE} and I_C for the constant value of I_B.

Output Characteristics :–

- I_C Versus $V_{CE}\Big|_{I_B \to \text{Constant}}$



- Slope $= -\frac{1}{R_C}$

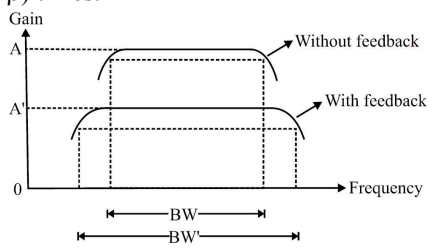
- β can be determined by the output characteristics of the CE-configuration.

88.(b)

Grown-diffusion transistor is most suitable for high frequency circuits. The grown junction transistor was the first type of bipolar junction transistor.

89.(c)

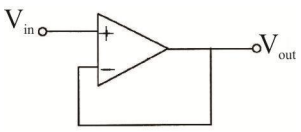
In negative feedback amplifier, its bandwidth increases by (1+Aβ) times.



BW' = BW (1+Aβ)

Negative feedback amplifier the bandwidth increased by a factor of (1+Aβ).

90.(d)



- It is called voltage follower.
- Voltage follower is a unity voltage gain non-inverting amplifier.
- Input resistance is very high and output resistance is less.
- Between input and output phase shift is zero.
- Application –
  - (i) Buffer Amplifier
  - (ii) Sample & hold circuit design
  - (iii) Butter-worth filter design
  - (iv) Instrumentation amplifier design

91. (a)

In an unregulated power supply, if input a.c voltage increases, the output voltage increases. Because unregulated power supply depends on output voltage (d.c voltage), input voltage (a.c voltage) and d.c. terminal voltage of unregulated power supply depends on the value of load connected to it and dc voltage (output voltage) on temperature also depends.

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92. (a)

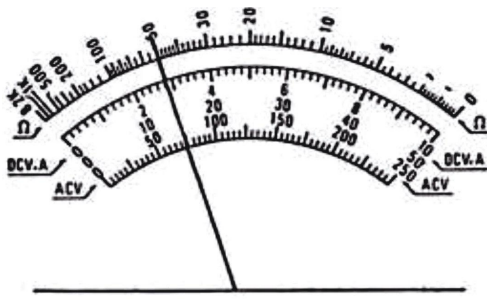
Correctness in measurement requires both accuracy and precision.

- Reproducibility and consistency are expressions that best describe precision in measurements.
- An Instrument with 2% accuracy is better than another with 5% accuracy.

But it is possible to have precise instrument which are not accurate.

93. (b)

The ohm scale of an analog multimeter is non-linear and opposite of current scale. An analog multimeter is used to measure voltage, current and resistance.



94. (b)

The purpose of a shunt in an ammeter is to bypass the current.

- When high current is to be measured most of the current is bypassed through a low resistance called a shunt.

$$R_{sh} = \frac{R_m}{M-1}$$

- Shunt resistance after addition of swamp resistance.

$$R_{sh} = \frac{R_m + R_{swamp}}{M-1}$$

- Shunt should have small and constant temperature coefficient.
- The material used for shunt in PMMC is manganin.

95.(c)

A wattmeter will read zero under the condition when the current is dc and the voltage is sinusoidal.

A electrodynamometer wattmeter can be used for the measurement of dc as well as ac power.

Pressure coil of a dynamometer type wattmeter is made to have very high resistance.

A wattmeter measures average power,

$$P = VI\cos\phi$$

96.(d)

When a varying potential applied to the proper axis of a crystal, there is a change in dimension of the crystal which is known as "Piezoelectric effect.

- The elements which exhibit Piezoelectric qualities are called as "Electro-resistive elements".
- Piezoelectric transducer can be operation subjected to face shear, transverse expansion, thickness shear.

97. (a)

BCD (binary coded decimal)- Here each of the decimal digit is represented by 4-bit binary. BCD code is a weighted code.

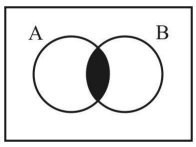
Note - Any code can be BCD only if its decimal number lies between 0-9. (eg - 8421)

98.(d)

According to Set theory in logic theorem-

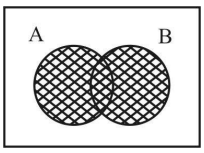
AND Circuit,

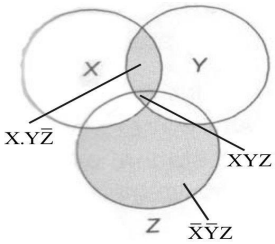
$$\Rightarrow Y = A.B = A \cap B$$



OR Circuit,

$$\Rightarrow Y = A + B = A \cup B$$



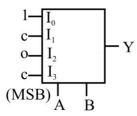


$$= XY\bar{Z} + XYZ + \bar{X}\bar{Y}Z \qquad (\because Z + \bar{Z} = 1)$$

$$= XY(\bar{Z} + Z) + \bar{X}\bar{Y}Z$$

So, $\boxed{XY + \bar{X}\bar{Y}Z}$

99. (c)



$$Y = \bar{A}\bar{B}.1 + \bar{A}B.C + A\bar{B}.0 + AB.C$$

$$Y = \bar{A}\bar{B} + \bar{A}BC + ABC$$

$$= \bar{A}\bar{B} + BC(\bar{A} + A)$$

$$Y = \bar{A}\bar{B} + BC$$

100. (d)

Order of increasing speed at the given logic family -

CMOS<Low power TTL<TTL<Low power schottky TTL<Schottky TTL<ECL.

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PRACTICE SET - 7

1. India's space programme was started by:
(a) Vikram Sarabhai (b) Vijay Sarabhai
(c) Rahul Kumar (d) Vivek Sarabhai

2. Who among the following sportsmen has the nickname 'CR7'?
(a) Chris Paul (b) Cristiano Ronaldo
(c) Chris Gayle (d) Chris Rea

3. Khamba-Thoibi is an important form of performing arts of _____ .
(a) Lakshadweep (b) Puducherry
(c) Nagaland (d) Manipur

4. Who is known as the 'Missile Man of India'?
(a) Bhisham Sahni
(b) K Sivan
(c) CV Raman
(d) Dr. APJ Abdul Kalam

5. In Banking field, SLR means:
(a) Statutory Liquidity Ratio
(b) State liquidity Ratio
(c) Statutory Lending Rate
(d) Simple Lending Rate

6. The article in the Part-V of the Indian Constitution ..... describes the independence power of Jurisdiction and procedures of the Supreme Court?
(a) Article 124 to 147
(b) Article 126 to 147
(c) Article 122 to 147
(d) Article 128 to 147

7. Which strait lies between Russia and a state of the United States of America?
(a) Palk Strait (b) Strait of Magellan
(c) Strait of Dover (d) Bering Strait

8. Lokapavani and Bhavani are tributaries of the River _____.
(a) Cauvery (b) Godavari
(c) Krishna (d) Mahanadi

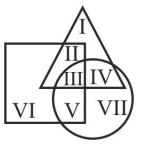
9. Who is the author of the book Geet Govindam written during medieval India?
(a) Meerabai (b) Tulsidas
(c) Kabir (d) Jayadev

10. In which year was the Azad Hind Radio Service as part of Germany's radio service started?
(a) 1942 (b) 1938
(c) 1940 (d) 1939

11. BYTEW is related to YWTEB following a certain logic. Following the same logic, AMFQC is related to QMFCA. Which of the following is TILDW related to following the same logic?
(a) LTIWD (b) WILDT
(c) WLITD (d) WTLID

12. Facing North, X turns 205° clockwise and then 160° anticlockwise. Which direction is X facing now?
(a) North-East (b) South - East
(c) South-West (d) North-West

13.



In the given diagram, the triangle represents the set of people who have a car; the square represents the set of people who have a house; and the circle represents the set of people who have gold. The total number of people who have only one among the three, that is, house, car or gold, is:
(a) II + IV + V (b) I + VI + VII
(c) V + VII (d) IV + I

14. Statement:
H ≤ I < L ≥ A > Q
Conclusion:
I. H < L
II. H ≥ L
III. Q < H
(a) Only conclusion I is appropriate
(b) Only conclusion II and III are appropriate
(c) Only conclusion II is appropriate
(d) Only conclusion III is appropriate

15. Argument:
A father advised his son that the shortest route between Chennai and Mangalore is via Bengaluru.
Assumptions:
1. Son wishes to go to Mangalore.
2. Father gives advice to everyone.
(a) Neither 1 nor 2 is implicit
(b) Only assumption 2 is implicit
(c) Only assumption 1 is implicit
(d) Both 1 and 2 are implicit

16. Question:
What is the color of Jasmine?
Statement:
I. Blue is called white, white is called red and red is called yellow
II. Yellow is called purple, purple is called black, white is called brown and brown is called orange.

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(a) Either I or II is sufficient
(b) Both I and II together are not sufficient
(c) Only I is sufficient
(d) Only II is sufficient

17. In which of the given letter-clusters is the letters skipped between adjacent letters in the order 2^1, 2^2, 2^3.
(a) BEJS (b) AEJS
(c) CFIS (d) EIRZ

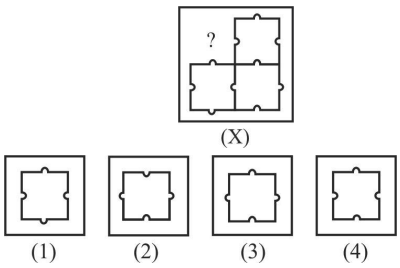
18. Select the option that is related to the sixth letter-cluster in the same way as the first letter-cluster is related to the second letter-cluster and the third letter-cluster is related to the fourth letter-cluster.
GCN : LHS :: OQU : TVZ :: ? : KRY
(a) GNT (b) ENS
(c) DMQ (d) FMT

19. If in a certain code, 'BRACKET' is written as 'DPCAMCV' then how will 'BLOCK' be written as in the same code?
(a) DJQAN (b) DJQAM
(c) DIQAM (d) DJPAM

20. In each of the number-pairs, the second number is obtained by performing a certain mathematical operation on the first number. Three of the following pairs follow the same pattern and thus form a group. Select the number-pair that does NOT belong to that group.
(a) 14 : 198 (b) 18 : 325
(c) 22 : 485 (d) 20 : 401

21. Select the alphanumeric clusters from among the given option that can replace the question mark (?) in the following series.
z1, x4, v9, t16, ?
(a) s24 (b) v25
(c) r25 (d) t26

22. Complete the Figure X from the given alternatives 1, 2, 3, 4



(a) 1 (b) 2
(c) 3 (d) 4

23. Moving towards North, a person turns 135° left ward and then turns 180° Southwards. What direction is he facing now?
(a) North-West (b) North-East
(c) South-East (d) West

24. A is the paternal grandfather of B, D is the brother of A and E is the son of D. How is E related to B?
(a) Brother (b) Paternal Uncle
(c) Grandfather (d) Cousin

25. Select the correct combination of mathematical signs that can sequentially replace the * signs and balance the given equation.
19* 5*4*2*4*13
(a) +, ×, –, =, ÷ (b) ÷, +, (–), –, =,
(c) –, ×, ÷, +, = (d) ÷, ×, +, –, =,

26. The second generation of computers was based on:
(a) Integrated circuits (b) Transistor
(c) VLSI Chips (d) Vacuum tubes

27. Touchpad is a good alternative to the mouse, it is an example of .....
(a) Software device (b) Printing device
(c) Pointing device (d) Temporary device

28. Which of the following statements is wrong?
(i) The cordless mouse is not physically connected to the computer.
(ii) The cordless mouse relies on infrared or radio waves to communicate with the computer.
(a) Only (ii) (b) Both (i) and (ii)
(c) Neither (i) nor (ii) (d) Only (i)

29. Touchpad responds to _____.
(a) Light
(b) Pressure
(c) Clicking
(d) Feeling of heat from the tips of the fingers
(e) None of these

30. Which of the following is/are true with respect to EEPROM?
(i) It is block-wise erasable
(ii) It is byte-wise erasable
(a) Both (i) and (ii) (b) Only (ii)
(c) Only (i) (d) Neither (i) nor (ii)

31. Which of the following is comparatively the fastest memory?
(a) ROM (b) DRAM
(c) Hard disk (d) SRAM

32. Which of the following memory is assessed per second should items be renewed?
(a) EPROM (b) ROM
(c) Static RAM (d) Dynamic RAM

33. What is use of ping command in computer?
(a) To test the power supply
(b) To test the ability of the source computer to reach of specified destination computer.
(c) To test for any fault in the computer hardware.
(d) To check for network related problems.

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34. Which of the following refers to a set of rules for routing and addressing packets of data so that they can travel across a network and reach the correct destination?
(a) Model (b) Topology
(c) Protocol (d) Architecture

35. In the abbreviation HTTPS, what is the full form of the second 'T'?
(a) Truncation (b) Termination
(c) Transition (d) Transfer

36. Which of the following menus enables you to switch between single page and two page views in MS-Word 2016?
(a) View (b) Home
(c) Review (d) Design

37. Mention the keyboard shortcut used to access 'Insert Hyperlink' window in MS - Word 2016.
(a) Alt + L (b) Ctrl + H
(c) Alt + K (d) Ctrl + K

38. Which of the following is not a valid tab in the Table Properties window in MS - Word 2016?
(a) Row (b) Column
(c) Table (d) Sheet

39. DNS (Domain Name System) comes under which of the following services of the Internet?
(a) Communication
(b) Directory
(c) WWW
(d) Information retrieval

40. Which of the following types of computing is used in the defense industry?
(a) Farmacy Management Software
(b) Library manager
(c) GPS tracking
(d) e-banking

41. Which of the following is not proper internet etiquette?
(a) You can forward unwanted messages
(b) You should include your name at the bottom of the mail
(c) You should use abbreviations wisely
(d) Attachments should be small

42. If we want to download all the assets like images, videos etc. along with the web page, then in which of the following formats should we save the downloaded web page?
(a) Webpage (complete)
(b) Webpage (HTML only)
(c) webpage
(d) Webpage (pdf)

43. Identify whether the given statements are true or false.
(i) Web browser is an application used to access and view websites.
(ii) A website helps you search other web pages like Google.
(a) (i) True (ii) True
(b) (i) True (ii) False
(c) (i) False (ii) True
(d) (i) False (ii) False

44. Which of the following privacy and security setting of the Google Chrome browser uses cookies to remember preferences, even if we do not visit those pages?
(a) Manage certificates
(b) Clear browsing data
(c) Preload pages for faster browsing and searching
(d) Sync and Google services

45. Which of the following statement is wrong?
(a) PDF is a type of portable file format
(b) ZIP files are compressed files
(c) Each file has a primary name and an extension name
(d) A file name cannot contain any special character

46. If 3 is added to each odd digit and 2 is subtracted from each even digit in the number 6452851, what will be difference between the largest and smallest digits thus formed?
(a) 8 (b) 6
(c) 4 (d) 2

47. Solve the following
$(4+2-16\div4+3)+\{(1+8\times7)\div19\}\times[(3+5-4)+(17-9\times4)]=?$
(a) –40 (b) 40
(c) –225 (d) 335

48. Which of the following vulgar fractions, when written as a decimal, its value will not be found in a terminating decimal?
(a) $\frac{27}{480}$ (b) $\frac{21}{640}$
(c) $\frac{81}{450}$ (d) $\frac{240}{450}$

49. If $\frac{0.7}{1-6c}=-0.2$, then c = ?
(a) 0.8 (b) 0.5
(c) 0.75 (d) 0.075

50. Find the least number, which when divided by 16, 24, 36 and 54, leaves remainder 12, 20, 32 and 50 respectively?
(a) 432 (b) 444
(c) 428 (d) 452

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51. Two natural number are in the ratio of 6:5 and the product of their LCM and HCF is 6750. What is the sum of the numbers ?
(a) 180 (b) 165
(c) 160 (d) 145

52. A sum of ₹4,800 is divided between A, B and C such that the ratio of the share of A to the combined share of B and C is 3 : 5 and C receives 5/7 of what A and B together receive. The difference (in ₹) of A's share and B's share is :
(a) 900 (b) 800
(c) 1,000 (d) 850

53. From the salary of Hari, 15% is deducted as house rent, 20% of the remaining amount is spent on children's education and 10% of the remaining balance is his medical expenses, Finally, he is left with ₹42,840. Find his total salary.
(a) ₹ 65,000 (b) ₹ 75,000
(c) ₹ 72,000 (d) ₹ 70,000

54. The ratio of the perimeter to the length of a rectangle is 5 : 1. If the area of the rectangle is 216 cm^2, then the length of the rectangle (in cm) is:
(a) 12 cm (b) 18 cm
(c) 14 cm (d) 16 cm

55. A and B can complete a task in 40 days, B and C can complete in 30 days while C and A can complete the same task together in 24 days. How many days will each of A, B and C take to complete the task individually?
(a) 48, 96 and 32 (b) 32, 48 and 96
(c) 60, 120 and 40 (d) 40, 120 and 60

56. A person reaches his office 1 minute before at a speed of 42 km/h, while that person traveling at a speed of 36 km/h reaches the office with a delay of 3 minutes. How much distance does a person travel (in km)?
(a) 12.9 (b) 16.8
(c) 15.4 (d) 18.2

57. Simple interest on a fixed amount is 1/36 of the principal. If the rate of interest and number of years are equal, then what is the rate of interest?
(a) $\frac{6}{19}\%$ (b) $\frac{5}{3}\%$
(c) $\frac{10}{3}\%$ (d) $\frac{10}{12}\%$

58. Pavan sold an item at a loss of 12.5%. If he could have sold it for ₹ 56 more, he would have made a profit of 22.5%. What should be the selling price of the item to make a profit of 25%?
(a) ₹ 182 (b) ₹ 190
(c) ₹ 185 (d) ₹ 200

59. If $x^4 + x^{-4} = 1154$, then the value of $x + x^{-1}$ is:
(a) 12 (b) 6
(c) 8 (d) 5

60. Given that $\tan(A+B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$, then what is the value of $\tan 75^0$?
(a) $2+2\sqrt{3}$ (b) $2-\sqrt{3}$
(c) $2+\sqrt{3}$ (d) $2-2\sqrt{3}$

61. Calculate the standard deviation for the following data.
3, 4, 5, 6, 7
(a) $\sqrt{2}$ (b) $\sqrt{6}$
(c) 2 (d) $\sqrt{3}$

62. Simplify the following expression.
$\sqrt{12.5 \times 8 \times 1.44}$
(a) 13 (b) 12
(c) 15 (d) 10

63. Five years ago, the son's age was one third of his mother's age. If the sum of their present age is 70, find the present age of the mother.
(a) 45 (b) 55
(c) 50 (d) 60

64. Two pipes working together can fill a tank in 3.9 hours and 5.2 hours respectively, while a third pipe, can empty the full tank in 10.4 hours. When the tank is 1/12 filled, all three pipes are opened together. How much time will be taken to fill the tank completely?
(a) 2 hours 45 minutes (b) 2 hours 10 minutes
(c) 2 hours 11 minutes (d) 2 hours 36 minutes

65. If 25% of the first number is three times of 50% of the second number then what will be the ratio of the first number and the second number?
(a) 3 : 1 (b) 6 : 1
(c) 2 : 3 (d) 1 : 6

66. Light year is the unit of a quantity whose unit can also be
(a) Second (b) Kg
(c) Square metre (d) Angstrom

67. Find the mass (in kg) of a tank completely filled with kerosene of dimensions 5m × 2m × 1m (Density of kerosene is 800 kg/m^3)
(a) 8000 (b) 1250
(c) 800 (d) 12500

68. A body starts moving form rest. Its displacement is propational to ____ when its acceleration is constant.
(a) Velocity (b) Work
(c) Time squared (d) Time

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69. How much work is done in moving a charge of 10 C across two points having a potential difference 20 V?
(a) 200J (b) 0.5J
(c) 10J (d) 2J

70. In an electrical circuit, two resistors of 20Ω and 30Ω are connected in parallel across 60 V DC supply. Compute the current through 20Ω resistor.
(a) 1 A (b) 5 A
(c) 2 A (d) 3 A

71. In the ground state, an element has 18 electrons in its M-shell. The element is
(a) Copper (b) Chromium
(c) Nickel (d) Iron

72. Calculate the value of an unknown resistance when it is connected in parallel to a 250 V supply with a 100 Watt, 250 V lamp (assuming that the resistance of the lamp remains unchanged); The total dissipated power in the circuit is 1100 watts.
(a) 62.5 Ω (b) 24 Ω
(c) 38 Ω (d) 20 Ω

73. The e.m.f. induced in a conductor of length 1 meter moving at right angled to a uniform magnetic field of flux density 1.5 wb/m^2 with velocity 50 m/s is
(a) 0 V (b) 1.5 V
(c) 75 V (d) 150 V

74. The constant of a given energy meter is 500 revolution/ kWh. At the test 4.4 kW full load, meter completes 50 revolutions in 86 seconds. The percentage error of the meter is:
(a) –4.86% (b) 4.86%
(c) 2% (d) 3%

75. _____ in signal transmission is susceptible to radio frequencies and electromagnetic induction noise pick-up.
(a) Soft wiring (b) Hard wiring
(c) Leakage (d) Error

76. The Maxwell's equation $\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$ is obtained from :
(a) Ampere's Law (b) Faraday's Law
(c) Lenz's Law (d) Both b and c

77. The electric flux and field intensity inside a conducting sphere is
(a) Minimum (b) Maximum
(c) Uniform (d) Zero

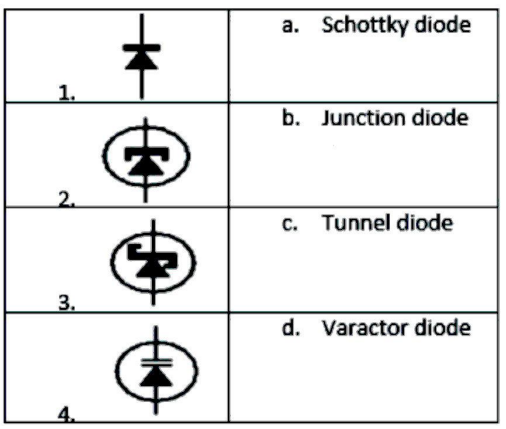
78. Which of the following is not a factor on which the capacitance of a parallel plate capacitor depends?
(a) Area of plates
(b) Medium between plates
(c) Distance between plates
(d) Materials of plates

79. The best definition of a superconductor is:
(a) It is a material showing perfect conductivity and Meissner effect below a critical temperature
(b) It is conductor having zero resistance
(c) It is a perfect conductor with highest diamagnetic susceptibility
(d) It is a perfect conductor but becomes resistive when the current density through it exceeds a critical value

80. Bakelite is a
(a) Insulator
(b) Semiconductor
(c) High resistivity conductor
(d) Low resistive conductor

81. Select the correct statement about a semiconductor
(a) Electron mobility is less than hole mobility
(b) Electron mobility is more than hole mobility
(c) Electron and hole mobilities are equal
(d) Electrons accelerate in the direction of applied electric field

82. Match the columns.



(a) 1-c, 2-b, 3-a, 4-d (b) 1-b, 2-c, 3-d, 4-a
(c) 1-c, 2-a, 3-b, 4-d (d) 1-b, 2-c, 3-a, 4-d

83. The relation between α and β in a transistor.
(a) $\alpha = \frac{1-\beta}{\beta}$ (b) $\alpha = \frac{\beta}{1-\beta}$
(c) $\alpha = \frac{\beta}{1+\beta}$ (d) $\alpha = \frac{1+\beta}{\beta}$

84. The CMOS devices are prone to failure due to electrostatic potential Why?
(a) CMOS is unipolar
(b) Voltage controlled device
(c) Very thin gate insulator
(d) None of these

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85. In a full wave rectifier, the current in each diode flows for?
(a) Whole cycle of the input signal
(b) Half cycle of the input signal
(c) More than half cycle of the input signal
(d) none of these

86. How many cascaded stages of CE amplifiers will result in polarity inversion of the input signal?
(a) Two (b) Three
(c) Four (d) None

87. The h-parameter equivalent circuit of a BJT is valid for :
(a) Large signal operation at high frequencies
(b) Small signal operation at low frequencies
(c) Large signal operation at low frequencies
(d) Small signal operation at high frequencies

88. Feedback is said to be positive if
(a) the feedback signal gets subtracted from the input signal
(b) the feedback signal gets added to the input signal
(c) any increase in the output signal results in a feedback signal which on being mixed with the input signal causes further increase in magnitude of the output signal
(d) none of these

89. When a step-input is given to an Op-amp integrator, the output will be
(a) A ramp.
(b) A sinusoidal wave
(c) A rectangular wave
(d) A triangular wave with dc bias

90. Which of the following multivibrator (s) is referred as free running multivibrator ?
(a) Astable multivibrator
(b) Stable multivibrator
(c) Bistable multivibrator
(d) Stable and Bistable multivibrators both

91. Identify the material which has high coefficient of volume expansion.
(a) Alcohol (b) Glass
(c) Brass (d) Water

92. Calculate the precision of 3rd measurement from the data given below:

Measurement no.	Value
1	48
2	50
3	51
4	49
5	48

(a) 95.46% (b) 96.40%
(c) 96.34% (d) 95.34%

93. Electrostatic type instruments are primarily used as–
(a) Ammeters (b) Wattmeters
(c) Voltmeters (d) Ohmmeters

94. A moving coil instrument having 50 Ω resistance shows full-scale deflection with 2 mA. If a resistance of 0.2 Ω is added in parallel to extend its range, then its range is extended to:
(a) 202 mA (b) 251 mA
(c) 1002 mA (d) 502 mA

95. The pressure coil of a wattmeter should be connected on the supply side of the current coil when.....
(a) supply voltage is low
(b) supply voltage is high
(c) load impedance is low
(d) load impedance is high

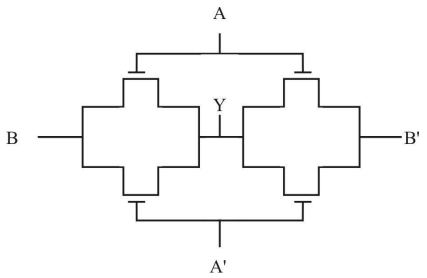
96. LVDT is a Transducer.
(a) Eddy current
(b) Resistance
(c) Magnetostriction
(d) Inductive

97. Which of the following is not a binary code?
(a) Morse (b) ARQ
(c) Baudot (d) CCITT-2

98. What is the number of 1's in the truth table's output for the SOP expression $\bar{A}BC + A\bar{B}\bar{C} + \bar{A}B\bar{C}$?
(a) 1 (b) 2
(c) 3 (d) 4

99. The fast carry or look-ahead carry circuits found in most 4-bit parallel-adder circuits–
(a) Increase ripple delay
(b) Add a 1 to complemented inputs
(c) Reduce propagation delay
(d) Determine sign and magnitude

100. The Boolean equation for Y in the following circuit is:



(a) Y=XNOR(A, B)
(b) Y=OR(A,B)
(c) Y=AND (A,B)
(d) Y=XOR(A,B)

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SOLUTION : PRACTICE SET- 7

ANSWER KEY

1. (a)	11. (d)	21. (c)	31. (d)	41. (a)	51. (b)	61. (a)	71.(c)	81. (b)	91. (a)
2. (b)	12. (a)	22. (b)	32. (d)	42. (a)	52. (b)	62. (b)	72. (a)	82. (d)	92. (c)
3. (d)	13. (b)	23. (b)	33. (b)	43. (b)	53. (d)	63. (c)	73. (c)	83. (c)	93. (c)
4. (d)	14. (a)	24. (b)	34. (c)	44. (c)	54. (a)	64. (d)	74. (a)	84. (c)	94. (d)
5. (a)	15. (c)	25. (c)	35. (d)	45.(d)	55. (c)	65. (b)	75. (b)	85. (b)	95. (d)
6. (a)	16. (a)	26. (b)	36. (a)	46. (a)	56. (b)	66. (d)	76. (d)	86. (b)	96 .(d)
7. (d)	17. (a)	27. (c)	37. (d)	47. (a)	57. (b)	67. (a)	77. (d)	87. (b)	97. (a)
8. (a)	18. (d)	28. (c)	38. (d)	48. (d)	58. (d)	68. (c)	78. (d)	88. (c)	98. (c)
9. (d)	19. (b)	29. (b)	39. (b)	49. (c)	59. (b)	69.(a)	79. (a)	89.(a)	99. (c)
10. (a)	20. (a)	30. (b)	40. (c)	50. (c)	60. (c)	70.(d)	80. (a)	90. (a)	100. (d)

SOLUTION

1. (a)

Vikram Sarabhai who initiated India's space research and helped in developing nuclear power in the country. He is known for the establishment of the Indian Space Research Organisation (ISRO). Sarabhai is known as the father of Indian Space Program. The first Chairman of ISRO was Dr. Vikram Sarabhai. Indian Space Research Organization (ISRO) was formed on 15 August, 1969.

2. (b)

Cristiano Ronaldo dos Santos Aveiro was born on 5 February, 1985 also known as Cristiano Ronaldo, or by his nickname 'CR7'. He is a Portuguese professional footballer who plays as a forward. He plays for Premier League Club Manchester United and is the captain of the Portuguese national team.

3. (d)

Khamba-Thoibi is an important form of performing arts of Manipur. This dance is performed in duet of male and female partners dedicated to the Sylvan deity, Thangjing of Moirang.

4. (d)

The Formar president of India Dr. APJ Abdul Kalam is known as the 'Missile Man of India' for his contribution to the development of India's missile projects. India became Nuclear power country in his supervision. He was the chief scientific adviser to the Prime Minister between 1992 to 1999. He was the head of several nuclear test at Pokharan, Rajasthan. Dr. Kalam was awarded with India's highest civilian honour Bharat Ratna in 1997.

5. (a)

Statutory Liquidity Ratio popularly called SLR is the minimum percentage of deposits that the commercial bank maintains through gold, cash and other securities. However, these deposits are maintained by the banks themselves and not with the RBI or Reserve Bank of India. Every bank must have a particular portion of their Net Demand and Time Liabilities (NDTL) in the form of cash, gold, or other liquid assets by the end of the day. The ratio of these liquid assets to the demand and time liabilities is called the Statutory Liquidity Ratio (SLR). The Reserve Bank of India (RBI) has the authority to increase this ratio by up to 40%.

6. (a)

In the Part-V Article 124 to 147 of the Indian Constitution explain the formation of Supreme Court and describes the independent power, jurisdiction and procedures of judiciary According to Article 124 India will have a Supreme Court. Currently the Supreme Court has a total of 34 Judges including the Chief Justice.

7. (d)

Some major straits of the world-

Strait	Connects	Location
Dover Strait	English Channel and North Sea	England-France
Bering Strait	Bering Sea and Chuksi sea	Alaska (US) - Russia
Palk Strait	Palk Bay and Bay of Bengal	India-Sri Lanka
Magellan Strait	Pacific Ocean and South Atlantic Ocean	Chile
North Channel	Irish Sea and Atlantic Ocean	Ireland-England
Florida Strait	Gulf of Mexico and Atlantic Ocean	USA-Cuba

8. (a)

Tributaries of Cauvery → Harangi, Hemavati, Lokapavani, Bharani.

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Tributaries of Godavari →Purna, Pravara, Manjira, Maner, Pranhita, Wainganga, Penganga etc.

Tributaries of Krishna →Ghatprabha, Malaprabha Bhima, Tungabhadra, Musi,

Tributaries of Mahanadi →Hasdeo, Sheonath, Ong, Tel, Jonk.

9. (d)

The book Geet Govindam was written in Sanskrit by Jayadev, who was attached to the Bengali court of king Laksmana Sena (12 century) during medieval India.

Writers – Compositions

Jayadeva– Geet Govinda, Ratimanjari

Tulsidas – Ramcharit Manas, Dohavali, Geetavali, Vinay patrika

Kabirdas – Bijak (Sakhi, Sabad, Ramaini)

Meerabai – Geet Govind Teeka, Rag Govind

10. (a)

Azad Hind Radio service was started under the leadership of Subhas Chandra Bose and Adolf Hitler in Germany in 1942 with the aim to encourage Indians to fight for the Axis power. Initially it was headquarterd in Germany, later shifted to Singapore.

11. (d)

Just as,

BYTEW → YWTEB

And,

AMFQC → QMFCA

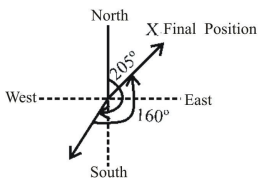
Similarly,

TILDW → WTLID

Note:- Alphabets are arranged in descending order.

12. (a)

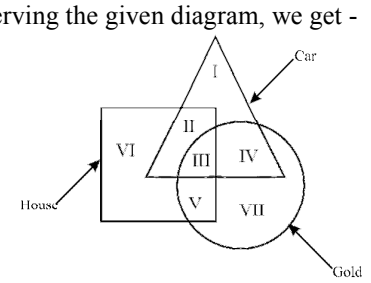
According to the question,



Hence, the direction of X is North-East.

13. (b)

After observing the given diagram, we get -



Number of people who have only cars = I

Number of people who have only gold = VII

Number of people who have only house = VI

So the total number of people (I + VII + VI) who have only one thing out of the three (car, house, gold) . Hence, the total number of people is (I + VI + VIII)

14. (a)

Statement:

H ≤ I < L ≥ A> Q

Conclusion:

I. H < L (✓)

II. H ≥ L (×)

II. Q < H (×)

Hence, only conclusion I is appropriate.

15. (c)

In the given statement only assumption I is implicit

16. (a)

Jasmine flower is white in color but according to statement I, white is called red and statement II white is called brown.

Hence, either I or II is sufficient.

17. (a)

From option (a)

B $\boxed{\text{C D}}$ E $\boxed{\text{F G H I}}$ J $\boxed{\text{K L M N O P Q R}}$ S

Hence, the given letter cluster in option (a) is the letters skipped between adjacent letters in the order 2^1, 2^2, 2^3.

18. (d)

Just as,

$G \xrightarrow{+5} L$

$C \xrightarrow{+5} H$

$N \xrightarrow{+5} S$

and,

$O \xrightarrow{+5} T$

$Q \xrightarrow{+5} V$

$U \xrightarrow{+5} Z$

Same as,

$\boxed{\begin{matrix} F \\ M \\ T \end{matrix}} \begin{matrix} \xrightarrow{+5} K \\ \xrightarrow{+5} R \\ \xrightarrow{+5} Y \end{matrix}$

19. (b)

Just as,

B R A C K E T
+2 -2 +2 -2 +2 -2 +2
D P C A M C V

Similarly,

B L O C K
+2 -2 +2 -2 +2
D J Q A M

20. (a)

From the given options,

(a) $(14)^2 + 1 = 197 \neq 198$

(b) $(18)^2 + 1 = 325$

(c) $(22)^2 + 1 = 485$

(d) $(20)^2 + 1 = 401$

Hence, option (a) is odd one.

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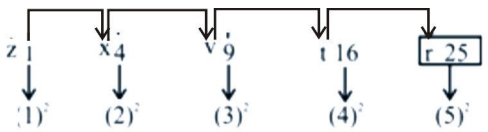
21. (c)

The given series is as follows–



Therefore, $\boxed{? = r25}$

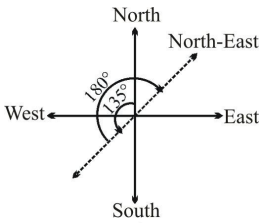
22. (b)

Answer figure (2) will complete the pattern of the question figure.

Hence, option (b) is correct.

23. (b)

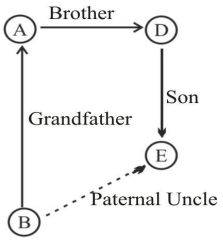
According to the question,



Given figure shows that person facing North-East in his final position.

24. (b)

According to the question the given blood relation diagram is–



Hence, E is paternal uncle of B.

25. (c)

On putting the signs from option (c),

$19 - 5 \times 4 \div 2 + 4 = 13$

$19 - 10 + 4 = 13$

$13 = 13$

Hence option (c) is correct.

26. (b)

The period of the second generation was from about 1956-1964. Second generation computers were used the technology of transistors rather than bulky vacuum tubes. It was cheaper, consumed less electricity and more reliable faster than vacuum tubes.

27. (c)

Touchpad is an input device, with the help of which we give instructions to our system just by touching the screen.

28. (c)

Cordless mouse is an input device used in computer. It is very modern mouse which does not require cable to connect. In this, infrared or radio waves are needed for transmission.

29. (b)

Touchpad is a pointing device, which senses pressure by sensor and translates the movement and position of the user's fingers in a relative position on the operating system, which can be viewed on the screen.

30. (b)

EEPROM stands for Electrically Erasable PROM. It is byte wise erasable memory. But flash memory is block-wise erasable. EEPROM can be erased and reprogrammed repeatedly by applying and electrical voltage that is higher than normal.

31. (d)

SRAM is short form of Static Random Access Memory. It is the fastest memory among the above options and it stores less data than DRAM. Static RAM is mostly used as cached memory for the processor (CPU).

32. (d)

Dynamic RAM memory should update many item per second.

33. (b)

Ping is a CMD command in a computer network to find out whether the network device is accessible or not. For this the host sends a message and sees after how much time the message is being received again.

34. (c)

The Internet Protocol is a protocol or set of rules, for routing and addressing packets of data so that they can travel across networks and arrive at the correct destination.

35. (d)

The full form of HTTPs is Hyper Text Transfer Protocol secure. This is an extended secure version of HTTP. It is used for secure communication on computer network.

36. (a)

View menu enables you to switch between single page and two page views in MS - Word 2016.

37. (d)

Ctrl + K → Opens the hyperlink window.

Ctrl + H → Opens find and Replace window.

38. (d)

Valid tabs in table properties window in MS - Word 2016 are table, row, column cell in which table is default tab and sheet is not a valid tab.

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39. (b)

DNS (Domain Name System) comes under the service of Internet Directory. The Domain Name System (DNS) is a naming database in which Internet domain names are located and translated into Internet Protocol (IP) addresses. The Domain Name System has been an essential component of the functionality of the Internet since 1985.

40. (c)

GPS tracking monitors location through the use of the Global Positioning System (GPS) to remotely track the location of an entity or object. GPS technology is used for a wide variety of military missions, including precision-guided, munitions strikes, force tracking, search and rescue, and remote piloting of unmanned aerial vehicles.

41. (a)

Internet etiquette, often referred to as "netiquette", refers to a set of guidelines and social norms for polite and respectful behavior when using the internet, especially in online communications. Here are some proper internet etiquette -

→ You should include your name at the bottom of the mail.

→ You should use abbreviations wisely.

→ Attachments should be small.

→ Think before you post.

42. (a)

The options for saving the webpage vary depending on the browser. If choose webpage (complete), then you want to save the whole webpage along with all the assets like images, videos and files included. This keeps the visual look intact, but it may not keeps the HTML link structure of the original page or any server - side elements in order.

43. (b)

A web browser is a software application that allows users to access and view content on the World Wide Web. A website is a collection of web pages or digital documents that are accessible on the internet. A website does not help you search other web pages. So, statement (i) is True and statement (ii) is False.

44. (c)

Preloading pages in Google Chrome is a feature that aims to speed up browsing and searching by loading web pages in the background before you actually click on them. This can make the browsing experience feel faster because when you do click a link, the page may already be partially loaded or cached, reducing the perceived loading time. It uses cookies to remember preferences, even if we do not visit those pages.

45.(d)

Statement (d) is false because a file name can contain special character.

46. (a)

The number obtained by adding 3 to the odd digit and substracting 2 from the even digit of the number is

$$\begin{array}{ccccccc} 6 & 4 & 5 & 2 & 8 & 5 & 1 \\ -2 & -2 & +3 & -2 & -2 & +3 & +3 \\ \hline 4 & 2 & 8 & 0 & 6 & 8 & 4 \end{array}$$

Hence the difference of largest and smallest digits

$= 8 - 0$

$= 8$

47. (a)

$(4 + 2 - 16 \div 4 + 3) + \{(1 + 8 \times 7) \div 19\} \times [(3 + 5 - 4) + (17 - 9 \times 4)]$

$= (6 - 4 + 3) + \{57 \div 19\} \times [4 + (-19)]$

$= 5 + 3 \times (-15)$

$= 5 - 45$

$= -40$

48. (d)

(a) $\frac{27}{480} = 0.05625$

(b) $\frac{21}{640} = 0.0328125$

(c) $\frac{81}{450} = 0.18$

(d) $\frac{240}{450} = 0.5333 = 0.5\overline{3}$

Hence, it is clear that option (d) $\frac{240}{450} = 0.5333 = 0.5\overline{3}$ is not giving a value in terminating decimal.

49. (c)

Given,

$$\frac{0.7}{1-6c} = -0.2$$

$$-0.2 + 1.2c = 0.7$$

$$1.2c = 0.9$$

$$c = \frac{0.9}{1.2}$$

$$c = 0.75$$

50. (c)

According to the question,

$16 - 12 = 4, 24 - 20 = 4$

$36 - 32 = 4, 54 - 50 = 4$

2	16, 24, 36, 54
2	8, 12, 18, 27
2	4, 6, 9, 27
2	2, 3, 9, 27
3	1, 3, 9, 27
3	1, 1, 3, 9
3	1, 1, 1, 3
	1, 1, 1, 1

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So, the required number = (LCM of 16,24,36 and 54)–4
$= 2\times2\times2\times2\times3\times3\times3 = 432 - 4 = 428$

51. (b)

Let the two numbers be 6 x and 5x.

and product of LCM and HCF = 6,750

$\because$ 1st number × 2nd number = LCM × HCF

$$6x \times 5x = 6{,}750$$
$$30x^2 = 6{,}750$$
$$x^2 = \frac{6{,}750}{30}$$
$$x^2 = 225$$

$\boxed{x = 15}$

1st number = 6x = 6 × 15 = 90, 2nd number = 5x = 5 × 15 = 75

Hence Sum of both numbers = 90 + 75 = 165

52. (b)

A : (B+C) = 3 : 5

$$A = \frac{4800\times3}{8} = ₹1800$$
$$B + C = \frac{4800\times5}{8} = ₹3000$$
$$B + C = 3000 \text{ ..... (i)}$$
$$C = (A+B)\times\frac{5}{7}$$
$$7C = 5\,(A+B)$$
$$7C - 5B = 5A$$
$$7C - 5B = 5\times1800$$
$$7C - 5B = 9000 \text{ ..... (ii)}$$

Multiplying equation (i) by 7 and substracting equation (ii)

$$7C + 7B = 21000$$
$$7C - 5B = 9000$$
$$\underline{-\quad +\quad -}$$
$$12B = 12000$$
$$B = 1000$$

The difference of A's share and B's share
$= ₹1800 - ₹1000$
$= ₹800$

53. (d)

Let the salary of Hari = ₹ x

$$\text{House rent} = \frac{x\times15}{100} = ₹\ 0.15x$$
$$\text{Children's education} = (x - 0.15x)\times\frac{20}{100}$$
$$= ₹\ 0.17x$$
$$\text{Medical expenses} = (x - 0.15x - 0.17x)\times\frac{10}{100}$$
$$= ₹\ 0.068x$$

According to the question,

$$x - (0.15x + 0.17x + 0.068x) = 42840$$
$$x - 0.388x = 42840$$
$$0.612x = 42840$$
$$x = \frac{42840}{0.612}$$
$$\boxed{x = ₹\ 70{,}000}$$

Hence the total salary of Hari will be ₹ 70,000

54. (a)

Let the length of rectangle is x cm and perimeter is 5x cm.

$$2 \times \text{Width} = \text{Perimeter} - 2\ell$$
$$= 5x - 2x$$
$$\text{Width} = \frac{3x}{2}$$
$$\text{Area} = \text{Length} \times \text{Width} = 216\ \text{cm}^2$$
$$x \times \frac{3x}{2} = 216$$
$$3x^2 = 216\times2$$
$$x^2 = 72\times2$$
$$x = 12\ \text{cm}$$

Hence, length of rectangle (x) = 12 cm.

55. (c)

$$\text{One day work of } (A+B) = \frac{1}{40} \text{ part}$$
$$\text{One day work of } (B+C) = \frac{1}{30} \text{ part}$$
$$\text{One day work of } (C+A) = \frac{1}{24} \text{ part}$$
$$\text{One day work of } 2(A+B+C) = \frac{1}{40} + \frac{1}{30} + \frac{1}{24}$$

One day work of (A + B + C)

$$= \left(\frac{3+4+5}{120}\right)\frac{1}{2} = \frac{1}{10}\times\frac{1}{2} = \frac{1}{20} \text{ part}$$
$$\text{One day work of A} = \frac{1}{20} - \frac{1}{30} = \frac{3-2}{60} = \frac{1}{60} \text{ part}$$

So, A will complete the work in 60 days

$$\text{One day work of B} = \frac{1}{20} - \frac{1}{24} = \frac{6-5}{120} = \frac{1}{120} \text{ part}$$

So, B will complete the work in 120 days

$$\text{One day work of C} = \frac{1}{20} - \frac{1}{40} = \frac{2-1}{40} = \frac{1}{40} \text{ part}$$

So, C will complete the work in 40 days

Hence, A, B and C can complete the work in 60 days, 120 days and 40 days respectively.

56. (b)

Let the time taken by man to reach the office = t hours

According to the question,-

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$$42 \times \left(t - \frac{1}{60}\right) = 36 \times \left(t + \frac{3}{60}\right)$$

$$\Rightarrow 42t - \frac{42}{60} = 36t + \frac{108}{60}$$

$$42t - 36t = \frac{108}{60} + \frac{42}{60}$$

$$6t = \frac{15}{6}$$

$$t = \frac{5}{12}$$

Distance = Speed × Time

$$= 36 \times \left(\frac{5}{12} + \frac{3}{60}\right)$$

$$= 36 \times \frac{28}{60} = \frac{6 \times 28}{10} = \frac{168}{10}$$

$\boxed{\text{Distance} = 16.8 \text{ km}}$

57. (b)

Let Principal = ₹ P

$\therefore$ Simple interest $= \frac{P}{36}$

Let Time = n Years

$\therefore$ Rate = n %

Simple interest $= \frac{P \times R \times T}{100}$

$$\frac{P}{36} = \frac{P \times n \times n}{100}$$

$$n^2 = \frac{100}{36} = \frac{25}{9}$$

$$n = \frac{5}{3} \text{ Years}$$

$$\therefore \text{Rate} = \frac{5}{3}\%$$

58. (d)

Let the cost price of the item is x and the selling price is y then,

$$12.5 = \frac{(x-y) \times 100}{x}$$

$$22.5 = \frac{(y + 56 - x) \times 100}{x}$$

or, $22.5 = \frac{(y + 56 - x) \times 100 \times 12.5}{(x-y) \times 100}$

$$\Rightarrow \quad 22.5(x-y) = (y - x + 56) \times 12.5$$

$$\Rightarrow \quad 9(x-y) = (y - x + 56) \times 5$$

$$\Rightarrow \quad 9x - 9y = 5y - 5x + 280$$

$$\Rightarrow \quad 14x - 14y = 280$$

$$\Rightarrow \quad x - y = 20$$

Now, $12.5 = \frac{20 \times 100}{x}$ or $x = \frac{2000}{12.5}$ = ₹160

So, the cost price of the item = ₹ 160

Then, the selling price of the item for 25% profit

$$= \frac{25 \times 160}{100} + 160 = 5 \times 8 + 160 = 40 + 160 = ₹200$$

59. (b)

$x^4 + x^{-4} = 1154$

or $\quad x^4 + \frac{1}{x^4} = 1154$

On adding 2 both sides,

$$\left(x^2\right)^2 + \frac{1}{\left(x^2\right)^2} + 2 = 1156$$

$$\left(x^2 + \frac{1}{x^2}\right)^2 = 1156$$

$$x^2 + \frac{1}{x^2} = 34$$

On adding 2 both sides,

$$x^2 + \frac{1}{x^2} + 2 = 36$$

$$\left(x + \frac{1}{x}\right)^2 = 36$$

$$x + \frac{1}{x} = 6$$

or $\quad x + x^{-1} = 6$

60. (c)

On putting,

$A = 45°$ and $B = 30°$,

$$\Rightarrow \frac{\tan 45° + \tan 30°}{1 - \tan 45° \tan 30°} = \tan(45° + 30°)$$

$$\Rightarrow \frac{\tan 45° + \tan 30°}{1 - \tan 45° \tan 30°} = \tan 75°$$

$$\Rightarrow \frac{1 + \frac{1}{\sqrt{3}}}{1 - 1 \times \frac{1}{\sqrt{3}}} = \tan 75°$$

$$\Rightarrow \frac{1 + \frac{1}{\sqrt{3}}}{1 - \frac{1}{\sqrt{3}}} = \frac{\sqrt{3}+1}{\sqrt{3}-1} = \tan 75°$$

On multiplying the numerator and denominator by $(\sqrt{3}+1)$

$$\Rightarrow \frac{\sqrt{3}+1}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1}$$

$$\Rightarrow \frac{\left(\sqrt{3}+1\right)^2}{\left(\sqrt{3}-1\right)\left(\sqrt{3}+1\right)}$$

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$$\Rightarrow \frac{\left(\sqrt{3}+1\right)^2}{\left(\sqrt{3}-1\right)\left(\sqrt{3}+1\right)} = \frac{\left(\sqrt{3}\right)^2+(1)^2+2\times\sqrt{3}\times 1}{\left(\sqrt{3}\right)^2-(1)^2}$$

$$= \frac{3+1+2\sqrt{3}}{3-1} = \frac{4+2\sqrt{3}}{2} = \tan 75°$$

$$= \frac{2\left(2+\sqrt{3}\right)}{2} = \tan 75° = 2+\sqrt{3} = \tan 75°$$

61. (a)

Standard deviation $= \sqrt{\frac{\sum\left|x-\bar{x}\right|^2}{n}}$

where $x \rightarrow$ term

$\bar{x} \rightarrow$ mean

$n \rightarrow$ number of terms

mean $(\bar{x}) = \frac{\text{Sum of total terms}}{\text{Total number of terms}}$

$$\bar{x} = \frac{3+4+5+6+7}{5} = \frac{25}{5} = 5$$

$$= \sqrt{\frac{\sum\left|x-\bar{x}\right|^2}{n}}$$

$$= \sqrt{\frac{(3-5)^2+(4-5)^2+(5-5)^2+(6-5)^2+(7-5)^2}{5}}$$

$$= \sqrt{\frac{4+1+0+1+4}{5}}$$

$$= \sqrt{\frac{10}{5}} = \sqrt{2}$$

62. (b)

$\sqrt{12.5\times 8\times 1.44}$

$$= \sqrt{\frac{125}{10}\times\frac{144}{100}\times 8}$$

$$= \sqrt{\frac{5\times5\times5\times12\times12\times2\times2\times2}{10\times100}}$$

$$= \frac{5\times12\times2}{10}$$

$= 12$

63. (c)

Let the age of mother before 5 years $= x$ years

$\therefore$ Present age of mother $= (x + 5)$ years

And age of son before 5 years $= \frac{x}{3}$ years

$\therefore$ Present age of son $= \left(\frac{x}{3}+5\right)$ years

According to the question,

$$x+5+\frac{x}{3}+5 = 70$$

$$\frac{4x}{3}+10 = 70$$

$4x + 30 = 210$

$4x = 180$

$x = 45$

Present age of mother $= x + 5$ years

$= 45 + 5 = 50$ years

Therefore, present age of mother is 50 years.

64. (d)

Suppose required time is t to fill the remaining part of tank $= 1-\frac{1}{12} = \frac{11}{12}$ part

According to the question-

$$\frac{t}{3.9}+\frac{t}{5.2}-\frac{t}{10.4} = \frac{11}{12}$$

$$\frac{10t}{39}+\frac{10t}{52}-\frac{5t}{52} = \frac{11}{12}$$

$$\frac{40t+30t-15t}{156} = \frac{11}{12}$$

$$\frac{55t}{156} = \frac{11}{12}$$

$t = \frac{13}{5} = 2$ hours 36 minute

65. (b)

Let the first number A and the second number B -

According to the question,

$$\frac{A\times25}{100} = \frac{B\times50}{100}\times3$$

$$\frac{A}{B} = \frac{6}{1}$$

$A : B = 6 : 1$

66. (d)

Light year is the unit of a quantity whose unit can also be Angstrom.

The distance travelled by light in one year is called one light - year. It is the unit of astronomical distance.

The unit of length which is equal to 10^{-10} meters is called 1 Angstrom. It is denoted by Aº.

67. (a)

density $= \frac{\text{Mass}}{\text{Volume}}$

$\therefore$ mass = density × volume

mass of kerosene = 800 × 5 × 2 ×1

= 8000 kg

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68. (c) Let, constant acceleration is a initial velocity u = 0 ,

$s = ut + ½at^2$

$s = 0\times t + ½at^2$

$s = ½at^2$

$\boxed{s \propto t^2}$

Therefore, displacement of object is directly proportional to the square of time.

69.(a)

Q = 10 C

V = 20 V

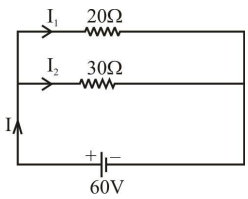
W = ?

$\Rightarrow \quad V = \dfrac{\text{Work done(W)}}{\text{Charge(Q)}}$

$\Rightarrow \quad W = V \times Q = 20\times10 = 200$ J

70.(d)

According to question



$$R_{eq} = \frac{20\times30}{20+30} = \frac{600}{50} = 12\Omega$$

$$I = \frac{V}{R_{eq}} = \frac{60}{12} = 5A$$

Therefore the current through 20Ω resistor-

Applying current dividing rule-

$$I_1 = \frac{I\times30}{20+30} = \frac{5\times30}{50} = 3A$$

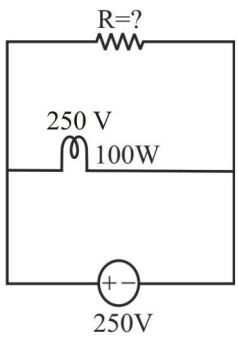
71.(c)

In the ground state, an element has 18 electrons in its M-shell. The element is Nickel.

	K	L	M
Atomic number of Nickel $(Ni) \rightarrow$	2	8	18

72. (a)

According to question -



Total dissipated power in the circuit = 1100W

Power dissipated by R + Power of lamp = 1100W

$$\frac{V^2}{R} + 100 = 1100$$

$$\frac{62500}{R} = 1000$$

$$\boxed{\therefore \; R = \frac{62500}{1000} = 62.5\Omega}$$

73. (c)

Given,

l = 1m, B = 1.5 wb/m^2

v = 50m/sec, θ = 90º

Emf = Blv sinθ

= 1.5 ×1×50×sin90º

$\boxed{E = 75V}$

74. (a)

Given that,

Meter constant K_1 = 500 revolution/kWh

Power (P) = 4.4 kW

Number of revolution = 50

Time (t) = 86 second

We know that,

$$K = \frac{N}{P\times t} \text{ revolution/kWh}$$

$$K_2 = \frac{50}{4.4\times\frac{86}{3600}} \text{ revolution/kWh}$$

K_2 = 475.68 revolution/kWh

$$\text{Percentage error} = \frac{\text{Measure valued} - \text{True value}}{\text{True value}}\times100$$

$$= \frac{475.68-500}{500}\times100 = \frac{-24.32}{5}$$

$= -4.86\%$

75. (b)

Hard wiring in signal transmission is susceptible to radio frequencies and electromagnetic induction noise pick-up.

76. (d)

According to faraday's law-

$$V = \frac{-\partial\phi}{\partial t} = \frac{-\partial}{\partial t}\int_S \vec{B}.d\vec{s} = \int_S \frac{-\partial B}{\partial t}.d\vec{s}$$

From Stroke's theorem-

$$\oint_L \vec{E}.d\vec{\ell} = \int_S (\nabla\times\vec{E}).ds = -\int_S \frac{\partial\vec{B}}{\partial t}d\vec{s}$$

So, $\quad (\nabla\times\vec{E}) = \dfrac{-\partial\vec{B}}{\partial t}$

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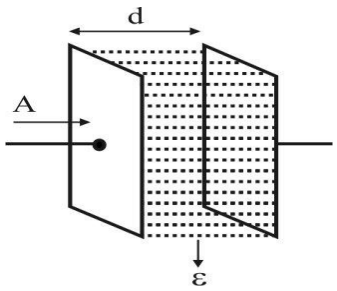
77. (d)

The electric flux and field intensity inside a conducting sphere is zero. According to Gauss law, the electric field inside a conducting sphere is always zero irrespective of how much charge resides on its surface. Due to zero electric field inside a sphere the electric flux inside a sphere is zero.

78. (d)

$$C = \frac{\varepsilon A}{d}$$

$$C = \frac{\varepsilon_0 \varepsilon_r A}{d}$$



Where, C = Capacitance of capacitor

ε = Permittivity

A = Area of plate

d = Distance between plate

Thus the capacitance of parallel plate capacitor does not depend on material of plate.

79. (a)

A superconductor is a material that achieve superconductivity which is a state of matter that has no electrical resistance and does not allow magnetic field to penetrate.

Superconductor is a material showing perfect conductivity and Meissner effect below a critical temperature.

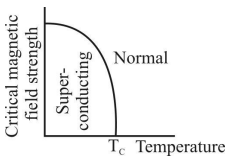
Effect of magnetic field on superconductivity -

$$H_c = H_{c(0)}\left[1 - \left(\frac{T^2}{T_c^2}\right)\right]$$

H_c = critical value of magnetic field

$H_{c(0)}$ = critical magnetic field at 0K

T_c = critical temperature

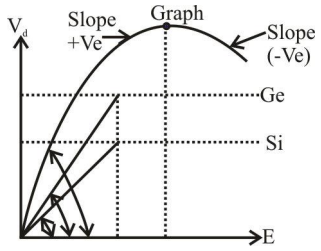


80. (a)

Bakelite is a insulator. Bakelite is an example of a thermosetting polymer and also a type of phenol-formaldehyde polymer. These are obtained by the condensation reaction of phenol with formaldehyde in the presence of either an acid or a base catalyst.

81. (b)

For mobility



$$\mu = \frac{dv_d}{dE}$$

$$\mu = \frac{v_d}{E} \qquad \boxed{v_d = \mu E}$$

Where, V_d = drift velocity

E = Electric field Intensity

$$\boxed{\mu_{Ge} > \mu_{Si}}$$

As compared to holes, the mobility of electrons is more.

$$\boxed{\mu_n > \mu_p}$$

	Germanium (Ge)	Silicon (Si)
Electron mobility	3800 cm^2/Vsec	1300 cm^2/Vsec
Hole mobility	1800 cm^2/Vsec	500 cm^2/Vsec

82. (d)

	Symbol	Diode
1.		b-junction diode
2.		c- tunnel diode
3.		a- schottky diode
4.		d-varactor diode

83. (c)

$$I_E = I_B + I_C \qquad .....(i)$$

In equation (i), both side divide by I_C,

$$\frac{I_E}{I_C} = \frac{I_B}{I_C} + \frac{I_C}{I_C}$$

$$\frac{I_E}{I_C} = \frac{I_B}{I_C} + 1 \qquad \left(\because \alpha = \frac{I_C}{I_E}\right)$$

$$\frac{1}{\alpha} = \frac{1}{\beta} + 1 \qquad \beta = \frac{I_C}{I_B}$$

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$$\alpha = \frac{\beta}{1+\beta}$$

$$\beta = \frac{\alpha}{1-\alpha}, \quad \gamma = 1+\beta$$

84. (c)

CMOS device fails due to electrostatic potential because its gate insulator is very thin.

CMOS is a combination of N-MOS and P-MOS

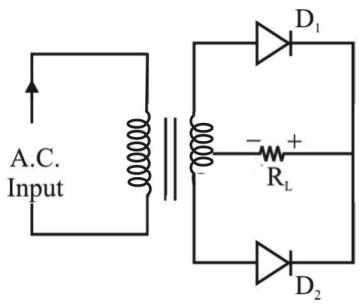
It is used as an inverter.

Power dissipation is less.

85. (b)

In a full - wave rectifier, the current in each diode flows for the half cycle of the input signal.

Centre Tapped Full wave Rectifier:–



- For input signal of positive half cycle D_1 is a short circuit and D_2 is a open circuit.
- For input signal of negative half cycle D_1 is a open circuit D_2 is short circuit
- $I_{avg} = \frac{2I_m}{\pi}$
- $I_{rms} = \frac{I_m}{\sqrt{2}}$
- $PIV = 2V_m$

86. (b)

Output signal form 3-cascaded stage of CE-Amplifiers will be of opposite polarity to the input signal, because phase shift of 180º is available in on-stage of CE-Amplifier.

In a CE-Amplifier-

- Input resistance (R_{in}) moderated
- Output resistance (R_0) moderated
- Current gain (A_C) moderated
- Voltage gain (A_V) moderated
- High power gain

87. (b)

The 'h' parameter equivalent circuit of a BJT is valid for low frequency, small signal operation only so h-parameter are used for characterizing bipolar transistors.

88. (c)

Feedback is said to be positive if any increase in the output signal result in a feedback signal which on being mixed with the input signal cause further increase in magnitude of the output signal.

$$\frac{V_o}{V_{in}} = \frac{A}{1-A\beta}$$

$$\uparrow V_o = \left(\frac{A}{1-A\beta}\right)V_{in}$$

If output signal is increase with the input signal further increase.

89.(a)

When a step-input is given to an op-amp integrator, the output will be a ramp.

$$\int \text{step signal} = \text{Ramp signal}$$

90. (a)

Astable multivibrator is referred as free running multivibrator.

Astable multivibrator: An astable multivibrator is a switching circuit with no stable output state. This means that the output switches continuously back and forth between two DC levels as long as they have DC supply voltage input. Astable multivibrator is called free running oscillator. It maintains two quasi stable states.

91. (a)

Coefficient of volume expansion:- It is the measure of the fractional change of size per unit change in the temperature with the surrounding pressure being constant. This coefficient is most applicable to fluids.

Material	**Volume coefficient expansion (/ºC)**
Alcohol	– 1490
Glass	– 27.6
Brass	– 57
Water	– 210

out of given option, alcohol has higher coefficient of volume expansion.

92. (c)

Measurement no.	**Value**
1	48
2	50
3	51
4	49
5	48

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$$\text{Average Value} = \frac{48+50+51+49+48}{5}$$

$$= \frac{246}{5} = 49.2$$

$$\%\ \text{Error in } 3^{rd} \text{ measurement} = \frac{51-49.2}{49.2} \times 100 = 3.66\%$$

Precision of 3rd measurement = (100 – 3.66)%
= 96.34%

93. (c)

Electrostatic types instruments are primarily used as voltmeters.

These instruments are mainly used to measure high voltage. Its principle is the force of attraction between static charges.

$$\boxed{T_d = \frac{1}{2} V^2 \frac{dC}{d\theta}}$$

Controlling torque,

$$\boxed{T_C = K\theta}$$

$$\boxed{\theta = \frac{1}{2K} . V^2 \frac{dC}{d\theta}}$$

- Scale is non-uniform due to square law response.
- These instruments are mounted vertically and uses fluid friction damping.

$$\boxed{M = \frac{V}{V_m} = \left(1 + \frac{C_m}{C_s}\right)}$$

94. (d)

Given, $R_m = 50\Omega$, $I_m = 2mA$

Shunt resistance, $R_{Sh} = 0.2\ \Omega$

∵ Shunt resistance,

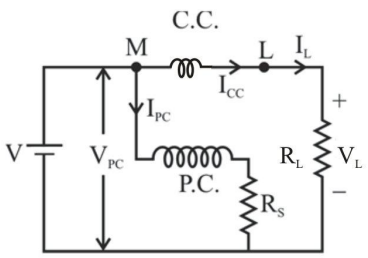
$$\boxed{R_{sh} = \frac{R_m}{\frac{I}{I_m} - 1}}$$

$$I = \frac{R_{sh} + R_m}{R_{sh}} \times I_m$$

$$I = \frac{(0.2+50)}{0.2} \times 2mA$$

I = 502 mA

95. (d)

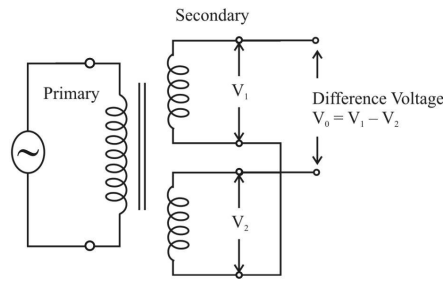


The pressure coil of a wattmeter should be connected on the supply side of the current coil when load impedance is high.

$$\boxed{\%\text{Error} \downarrow = \frac{\Delta R}{R_L \uparrow} \times 100}$$

⇒ Therefore this connection is suitable for the measurement of power for low value of load current, i.e. for high impedance

96 .(d)



- LVDT (Linear Variable Differential Transformer) is a inductive transducer.
- The LVDT works under the principle of mutual inductance effect.
- LVDT is the most widely used inductive transducer for converting the linear motion into proportional output electrical voltages.

97. (a)

Morse code is not a binary code. While ARQ, Baudot and CCITT-2 is a binary code.

- Morse code is a method of sending messages. It was created by Samuel Morse in the early 1840s. To sent messages through electrical telegraph. After this, Morse code was also used in the early days of radio communication in the 1980s.

98. (c)

$\bar{A}BC + A\bar{B}\bar{C} + \bar{A}B\bar{C}$

A \ BC	$\bar{B}\bar{C}$	$\bar{B}C$	BC	$B\bar{C}$
$\bar{A}$			1	1
A	1			

There are three 1's in above K-map

99. (c)

The fast carry or look-ahead carry circuits found in most 4-bit parallel-adder circuits reduce propagation delay.

100. (d)

Given circuit Boolean equation -

$$Y = A\bar{B} + B\bar{A}$$

Y=XOR(A,B)

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PRACTICE SET - 8

1. Mission Shakti is related to which of the following ?
(a) India's Anti-satellite missile test
(b) India's mission for nuclear self-dependence
(c) India's missile development program
(d) India's anti-nuclear defence system

2. Which country has played every FIFA Football World Cup since it began ?
(a) Germany (b) Brazil
(c) England (d) Spain

3. Ustad Amjad Ali khan plays which of the following instruments?
(a) Bansuri (b) Sarod
(c) Shehnai (d) Santoor

4. Who is called the father of Hindi theatre of India?
(a) Raja Harish Chandra
(b) Dada Saheb Phalke
(c) Bhartendu Harish Chandra
(d) Prithvi raj Kapoor

5. Which system has been adopted by the Reserve Bank of India for note issue?
(a) Gold Reserve System
(b) Proportional Reserve System
(c) Fixed Fiduciary System
(d) Minimum Reserve System

6. Under Article 243 E of the Constitution of India, every Panchayat, unless sooner dissolved under any law for the time being in force, shall continue for ..... years from the date appointed for its first meeting and no longer.
(a) six (b) four
(c) three (d) five

7. On which river is Victoria Falls located in Africa?
(a) Zambezi (b) Niger
(c) Nile (d) Congo

8. Which river of Rajasthan had dried up but revived with efforts of the villagers assisted by Tarun Bharat Sangh, an NGO?
(a) Bhagirathi River
(b) Saraswati River
(c) Luni River
(d) Arvari River

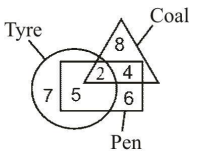
9. Which of the following was NOT built by Shah Jahan?
(a) Shalimar Gardens
(b) Red Fort (Delhi)
(c) Buland Darwaza
(d) Jama Masjid (Delhi)

10. Indian National Army recaptured Andaman and Nicobar island from British Government and named them-
(a) Swaraj Island
(b) Shaheed and Swaraj Island
(c) Free Island
(d) Independent and Swaraj Island

11. In a certain code language, 'cip civ cin' is written as 'life is good', 'cip cin er' is written as 'love is life' How will 'love' be written as in that language?
(a) cip (b) oob
(c) er (d) cin

12. Two workers K and L, Start walking from the same point. K walks 5 Km North, then takes a right turn and walk 2 Km. Mean while, L walks 3 Km west, a left turns south and walks 4 Km. Finally L takes a left turn and walks 5 Km. Where is K with respect to L?
(a) K is 1 km South of L
(b) K is 9 km North of L
(c) K is 9 km South of L
(d) K is 1 km North of L

13. How many pens are coal?



(a) 9 (b) 8
(c) 7 (d) 6

14. Statement:
$L \le R < M < N < K$
Conclusion:
I. $L < N$
II. $K > M$
III. $R < N$
(a) Only conclusion I is appropriate
(b) All conclusion are appropriate
(c) Only conclusion II is appropriate
(d) Only conclusion III is appropriate

15. Argument: The BEST bus travels company has decided to increase its fare by 10%.
Inference :
1. Passengers may opt for other buses costing less than the BEST bus travels company.
2. The demand for the buses by passengers may remain unchanged even after the fare hike.
(a) Both 1 and 2 are implicit
(b) Only assumption 2 is implicit
(c) Only assumption 1 is implicit
(d) Neither 1 nor 2 is implicit

16. Question:
Which word represents 'give' in code language?

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Statement:
I. 'Give me some tea' is written as 'De min to te'
II. 'Please give' is written as 'Plea de'
(a) Only statement I is sufficient
(b) Both statements I and II are insufficient
(c) Only statement II is sufficient
(d) Both statements I and II are sufficient

17. If $9 \div 5 + 3 \times 7 = 22$ and $4 \div 7 + 2 \times 15 = 29$, then find the value of 14÷5+35×9.
(a) 36 (b) 15
(c) 11 (d) 7

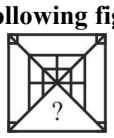
18. Select the option that is related to the fifth letter-cluster in the same way as the fourth letter-cluster related to the third letter-cluster and second letter-cluster is related to the first letter-cluster.
FTPY : JVTA :: NVZG: RXDI :: MPRE: ?
(a) QSVH (b) QRVG
(c) PSUH (d) PRUG

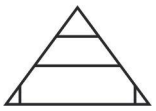
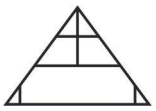
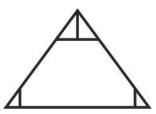
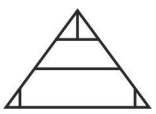
19. In a certain code language.
'living inside houses' is coded as 'ca de mo'.
'snow houses built' is coded as ' ni tp ca'.
'living with snow man' is coded as 'vr hs ni mo'
If 'built with brick' is coded as 'vr aj tp'.
(Note: All codes are two letter codes only)
What is the probable code for 'brick man' in the given code language?
(a) aj vr (b) mo to
(c) vr ni (d) hs aj

20. In each of the number-pair, the second number is obtained by performing a certain mathematical operation on the first number. Three of the following pairs follow the same pattern and thus form a group. Select the number-pair that does NOT belong to that group.
(a) 22 : 133 (b) 14 : 85
(c) 16 : 97 (d) 18 : 107

21. Select the alphanumeric-clusters from among the given options that can replace the question mark (?) in the following series.
2D, 3I, 4P, ?
(a) 5Z (b) 5Y
(c) 5X (d) 5W

22. Select the option that can replace the (?) symbol in the following figure.



(a) 
(b) 
(c) 
(d) 

23. Gautam start moving towards South, then he turns 135° to his left. What direction is he facing now?
(a) North-East (b) North-West
(c) South-East (d) South-East

24. If X is Y's sister, Z is Y's mother, A is Z's father and B is A's mother, then how is X related to A?
(a) Mother's sister
(b) Daughter
(c) Father's mother
(d) Daughter's Daughter

25. If '×' means '−', '#' means '+', '@' means '=', '$' means '÷' and '&' means '×', then which of the following equation is true?
(a) (81×4)&3@8$15&7
(b) (81×4)&3@4#16×3
(c) (6#2)$2@(2&8)×1
(d) (15×4)&3@(60$2)#3

26. Which of the following was used in second generation computers.
(a) Integrated Circuit (b) Transistor
(c) Microprocessor (d) Vacuum Tube

27. Which of the following does not connect to the input unit?
(a) It accepts data from outside world.
(b) It converts the data into binary code, which the computer can understand.
(c) It converts the binary data into a human readable from which can be understood by the users.
(d) It sends the data in binary form to the computer for further processing.
(e) None of these

28. Which of the following is used to correct the objective answer sheet?
(a) CD-ROM (b) MICR
(c) Bar code (d) OCR

29. Optical input devices allow computers to use light as a source of input. Which of the following is/ are example(s) of optical input devices?
(i) Scanner
(ii) MICR
(a) Only (i) (b) Neither (i) nor (ii)
(c) Only (ii) (d) Both (i) and (ii)

30. Extend ASCII used the ____ bit and provides the code for the ____ character.
(a) 8,256 (b) 7,128
(c) 8,257 (d) 7,256

31. What is the difference between the ASCII codes of 4 and 9?
(a) 7 (b) 5
(c) 4 (d) 6

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32. RAM is Volatile or temporary memory because–
(a) It is used for both read and write.
(b) Any location can be read directly in it.
(c) continuous power supply to maintain the data in it is needed.
(d) It does not require continuous power supply.
(e) None of these.

33. Which of the following statements are correct?
(i) TCP/IP is more reliable than OSI.
(ii) TCP/IP does not have very strict boundaries between layers.
(a) Both (i) and (ii) (b) Neither (i) nor (ii)
(c) Only (ii) (d) Only (i)

34. TCP provides a _____ data stream between remote applications.
(a) Reliable, two-way
(b) Reliable, one-way
(c) Unreliable, one-way
(d) Unreliable, two-way

35. With respect to TCP/IP, what is the full form of TFTP?
(a) Trivial File Transfer Protocol
(b) Triangular File Transmission Protocol
(c) Trivial File Transfer Page
(d) Triangular File Transfer Protocol

36. Which of the following MS-Word features draws a line passing through the text?
(a) Underline (b) Drop Cap
(c) Strikethrough (d) Subscript

37. In MS - Word 2016, options like bold, underline and italic appear under the _____menu/tab.
(a) Design (b) Insert
(c) Review (d) Home

38. Which of the following options is not available in the Page Setup group of the Layout tab in MS-Word 365?
(a) Spacing (b) Line numbers
(c) Hyphenation (d) Breaks

39. Which of the following entities is not an Internet Service Provider (ISP) in India?
(a) HSBC
(b) BSNL
(c) TATA Communications
(d) MTNL

40. Find out which of the following in the content of internet are the statements true or false?
(i) Two recent adaptations of internet technology are the intranet and the extranet.
(ii) The internet currently utilizes a portion of the total resources of the existing public telecommunication networks.
(a) (i) True (ii) False (b) (i) True (ii) True
(c) (i) False (ii) True (d) (i) False (ii) False

41. Which of the following includes core web interest groups, such as web browser developers, government agencies, researchers and universities?
(a) Internet Research Task Force
(b) Internet Engineering Task Force
(c) World Wide Web Consortium
(d) Internet Architecture Board

42. Which of the following is a component of a web search engine?
(a) Internet Protocol (b) Web browser
(c) Web server (d) Web crawler

43. Which of the following is a cross - platform Web browser that was first bundled with Windows 10 in 2015?
(a) Opera (b) Mozilla Firefox
(c) Safari (d) Edge

44. Which of the following statements is/are true about a web browser?
(i) It is a system software that interacts with the web server.
(ii) Safari is a web browser.
(a) (ii) only (b) Both (i) and (ii)
(c) (i) only (d) Neither (i) nor (ii)

45. Name the first Indian newspaper that became available on the internet.
(a) National Herald (b) The Statesman
(c) The Hindu (d) Times of India

46. How many times does the digit 2 come in place of tens in counting from 1 to 100?
(a) 20 (b) 11
(c) 10 (d) 19

47. The value of $\left\{\frac{3}{5}\times\left[3+\{3+(11+5+6)\}\right]\right\}$ is:
(a) $10\frac{2}{5}$ (b) $12\frac{6}{5}$
(c) $11\frac{4}{5}$ (d) $16\frac{4}{5}$

48. 2.666 … + 2.77 … in fraction form is:
(a) $\frac{47}{9}$ (b) $\frac{29}{9}$
(c) $\frac{31}{9}$ (d) $\frac{49}{9}$

49. Find the value of x.
$$\frac{484}{4.84}=\frac{48.4}{x}$$
(a) 0.484 (b) 0.00484
(c) 0.0484 (d) 4.84

50. What is the greatest number smaller than 5000 which when divided by 5, 6 and 7, leaves remainders of 4, 5 and 6 respectively?
(a) 4830 (b) 4829
(c) 4845 (d) 4831

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51. If the sum of two numbers is 84 and their HCF and LCM are 3 and 124 respectively, the sum of the reciprocals of the two numbers will be:

(a) $\frac{11}{31}$ (b) $\frac{9}{31}$
(c) $\frac{8}{31}$ (d) $\frac{7}{31}$

52. The ratio of Copper, Zinc and Nickel in German Silver is 4:3:2. How many kilograms of Zinc should be added to this metal of 54 kg so that the new ratio becomes 2:5:1.

(a) 50 (b) 48
(c) 36 (d) 42

53. Manoj spends 33% of his income on food. He got an increment of ₹ 1000 in his income, but he did not expand his expenditure on food. So, his expenditure on food reduced to 27%. What was his initial income?

(a) ₹4,500 (b) ₹6,500
(c) ₹5,500 (d) ₹5,000

54. Find the cost of painting all surfaces of a 10 m long hollow steel pipe whose internal and external diameters measure 15 cm and 17 cm respectively, if the cost of painting 1cm^2 of the surface is ₹0.15. [Use $\pi = \frac{22}{7}$]

(a) ₹15,160.80 (b) ₹15,100.80
(c) ₹15,200.80 (d) ₹15,000.80

55. A, B and C can complete a work in 81 days. A and B together can complete the same work in 97.2 days. B and C together can complete the same work in 162 days. In how many days can B complete the work alone?

(a) 225 (b) 234
(c) 243 (d) 261

56. Chandan covers equal distances at the speed of 3 km/h, 4 km/h and 8 km/h respectively and takes a total time of 42.5 minutes. Find the total distance in km.

(a) 4 (b) 2
(c) 1 (d) 3

57. A sum of money amount to 3 time the original sum in 15 years. In how many years will the original sum amount to 5 times of itself at the same rate of simple interest.

(a) 35 (b) 30
(c) 25 (d) 20

58. Himani bought a washing machine for ₹8000 and spent ₹500 on its repairs. She sold it at 20% profit with the money she got by selling it, she bought another washing machine and sold it at 10% loss. What is her overall loss / profit?

(a) Profit ₹640 (b) Loss ₹640
(c) Profit ₹680 (d) Loss ₹600

59. If x > 1 and $x + \frac{1}{x} = \sqrt{29}$, what is the value of $x - \frac{1}{x}$?

(a) 3 (b) 4
(c) 5 (d) 2

60. From the top of a platform 18 meters high, the elevation angle of the top of the tower is 30°. If the platform is located $75\sqrt{3}$ meters away from the tower, then what is the height of the tower?

(a) 93 m (b) 50 $\sqrt{3}$ m
(c) 75 m (d) 37.5 $\sqrt{3}$ m

61. Let a set S = {1, 2, 2, 3, 3, 3, 4, 4, 4, 4}. Then the value of 4 × mean + 2 × mode – 8 × median is :

(a) –4 (b) 14
(c) 10 (d) 4

62. If $x\sqrt{12} = 4 + x\sqrt{3}$, then the value of x is .

(a) $\sqrt{3}$ (b) $\frac{4}{\sqrt{3}}$
(c) $2\sqrt{3}$ (d) $-\sqrt{3}$

63. The sum of the present ages of two persons is seven times the difference between their ages. After 5 years the sum of their ages will be nine times the difference between their ages. What is the present ages of the elder person?

(a) 32 years (b) 10 years
(c) 20 years (d) 35 years

64. Pipe P can fill $\frac{3}{4}$ part of a tank in 18 hours and pipe Q can fill $\frac{3}{5}$ part of the same tank in 12 hours. Both P and Q were kept open for 4 hours, then both were closed. Pipe R alone was then opened and it emptied the water in the tank in $5\frac{1}{2}$ hours. Pipes P, Q and R together can fill the empty tank in:

(a) 30 hours (b) 36 hours
(c) 35 hours (d) 40 hours

65. Find the ratio of 3 days with 30 hours

(a) 7 : 6 (b) 12 : 5
(c) 6 : 7 (d) 5 : 12

66. The distance covered by a particle in time 't' is given by
s = at +bt^2 where 'a' and 'b' are two constants. The dimensional formula of 'b' is:

(a) $[M^0L^1T^{-2}]$ (b) $[M^0L^2T^{-1}]$
(c) $[M^0L^1T^{-1}]$ (d) $[M^0L^2T^{-2}]$

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67. Acceleration due to gravity is highest at_____.
(a) the poles
(b) the equator
(c) at an infinite distance from the earth
(d) the center of the earth

68. An airoplane flies at a speed of 50 m/s. How much distance will it cover in 5 hours?
(a) 895 (b) 880
(c) 850 (d) 900

69. A ball of mass m is dropped from a height H. At height H/3, the ratio of its potential energy (PE) to kinetic energy (KE) is equal to:
(a) 1 (b) 1/4
(c) 1/2 (d) 1/3

70. ____ is a mode of heat transfer by actual motion of matter.
(a) Conduction (b) Radiation
(c) Convection (d) Vaporisation

71. A copper wire of resistance R is uniformly stretched till its length is increased to n times its original length, there is no change in density on stretching, Calculate the resistance of new wire (R') ?
(a) $R' = nR$ (b) $R' = n^2R$
(c) $R' = R$ (d) $R' = \frac{R}{2}$

72. The amount of charge which will flow through a metallic wire in 90 minutes when a constant current of 0.4 ampere is flowing through it is ---------- .
(a) 5400 C (b) 2160 C
(c) 4320 C (d) 7560 C

73. _____ is the rate of energy supplied or consumed by an electric element with respect to time.
(a) Current (b) Power
(c) Frequency (d) Voltage

74. "A time- varying flux causes an induced electromotive force" What law does this statement represent?
(a) Ampere's law (b) Faraday's law
(c) Lenz's law (d) Field form of Ohm's

75. Induction type wattmeter provides accurate readings only when:
(a) frequency is constant and supply voltage is varying
(b) both frequency and supply voltage are varying
(c) both frequency and supply voltage are constant
(d) supply voltage is constant and frequency is varying

76. The output of a flow meter based on electromagnetic induction has
(a) variable frequency
(b) variable amplitude
(c) variable frequency and amplitude
(d) variable dc amplitude

77. Which of the following statement is correct?
(a) In semiconductor, electron and holes moving in an electric field and in the same direction
(b) Electric field density is exactly equal to the sum of electric field intensity and polarization
(c) Ampere's circuit law states that the line integral of $\vec{H}$ about any closed path is exactly equal to the direct current enclosed by that path
(d) None of the above

78. The force between two parallel current carrying conductors placed at a x distance apart and carrying same current I is :
(a) $\frac{2\pi\times10^{-7}I^2}{x}$ N/m (b) $\frac{2\times10^{-7}I^2}{\pi x}$ N/m
(c) $\frac{2\times10^{-7}I^2}{x}$ N/m (d) $\frac{4\pi\times10^{-7}I^2}{x}$ N/m

79. The primary reason behind identically zero magnetic field outside a coaxial cable is:
(a) Maximization of Magnetic lines of force
(b) Work done along a closed path is equal to total current flow
(c) Magnetic Polarization
(d) Force between magnetic elements

80. Pure Metals generally have:
(a) High Conductivity and Low temperature coefficient
(b) High Conductivity and High temperature coefficient
(c) Low Conductivity and zero temperature coefficient
(d) Low Conductivity and High temperature coefficient

81. The correct sequence of increasing order of electrical resistivity of the given materials is –
(a) Diamond, doped germanium, silicon, gold
(b) Gold, silicon, doped germanium, diamond
(c) Gold, doped germanium, silicon, diamond
(d) Gold, diamond, silicon, doped germanium

82. In a P-type silicon sample, the hole concentration is $2.25\times10^{15}/cm^3$. If the intrinsic carrier concentration is $1.5\times10^{10}/cm^3$, the electron concentration is
(a) zero (b) $10^{10}/cm^3$
(c) $10^5/cm^3$ (d) 1.5×10^{25} cm^3

83. A simple PN junction diode is fabricated using _____semiconductor and can be used as a _____.
(a) Intrinsic, unidirectional switch
(b) Extrinsic, unidirectional switch
(c) Extrinsic, bidirectional switch
(d) Intrinsic, bidirectional switch

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84. A BJT with β= 50 has base to collector leakage current I_{CBO} of 2.5μA. If transistor is connected in CE configuration the collector current for I_B = 0 is

(a) 0.05 μA (b) 0.1275 mA
(c) 0.157 mA (d) 0.516 mA

85. The transconductance g_m of an FET in the saturation region equals

(a) $\frac{-2I_{DSS}}{V_p}\left[1-\frac{V_{GS}}{V_p}\right]$ (b) $\frac{-2I_{DSS}}{V_p}\left[1-\frac{V_{GS}}{V_p}\right]^2$

(c) $\frac{-2I_{DSS}}{V_p}\left[1-\frac{V_{GS}}{V_p}\right]^{1/2}$ (d) $\frac{I}{V_p}[I_{DSS} X I_{DS}]^{1/2}$

86. The voltage output of a bridge rectifier is a

(a) half wave signal
(b) full wave signal
(c) bridge rectified signal
(d) sine wave

87. Which of the following contributes harmonics distortion in amplifiers?

(a) Nonlinearity in active device
(b) defective device
(c) presence of noise
(d) positive feedback

88. The gain of a bipolar transistor drops at high frequencies because of

(a) Early effect
(b) Parasitic inductive elements
(c) High current in base
(d) Transistor capacitance

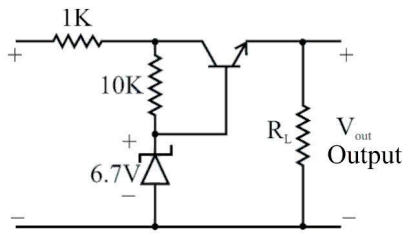
89. If the voltage gain is 100, the decibel voltage gain is

(a) 6 dB (b) 20 dB
(c) 40 dB (d) 60 dB

90. A triangular wave shape is obtained;

(a) By differentiating square wave
(b) By differentiating a sine wave
(c) By integrating a sine wave
(d) By integrating a square wave

91. The output dc voltage produced by the regulator circuit shown in the figure will be : (Assume silicon transistor with V_{BE} = 0.7V)



(a) 6.7V (b) 6.0V
(c) 5.3V (d) 5.0V

92. The zero error of a micrometer is defined as:

(a) Loading error (b) Interference error
(c) Random error (d) Systematic error

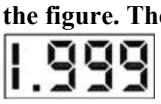
93. Damping of deflecting type instruments is done to

(a) Reduce the oscillation of the pointer in the final deflected position
(b) Make the moving system slow
(c) Make the moving system fast
(d) Reduce the angle of deflection of the pointer on the graduated scale

94. Which of the following is the correct measuring instrument type for given figure?

(a) Device with built-in measuring rectifier
(b) Moving coil instrument with rectifier
(c) Electrodynamic quotient instrument
(d) Moving coil instrument

95. The display of a digital multtimeter is shown in the figure. The multimeter is having_____.



(a) 4 digit display (b) 5 digit display
(c) $3\frac{1}{2}$ digit display (d) $4\frac{1}{2}$ digit display

96. The temperature regulating component of an automatic electric iron is ……

(a) Sole plate (b) Pressure plate
(c) Thermostat (d) Heating element

97. Which of the following binary number is equal to octal number 66.3

(a) 101101.100 (b) 1101111.111
(c) 111111.1111 (d) 110110.011

98. Karnaugh map is used

(a) To minimize the number of flip-flop in digital circuit
(b) To minimize the number of gates only in digital circuit
(c) To minimize the number of gates and fan-in requirements of the gate in the digital circuit
(d) To design gates

99. A combinational logic circuit which sends data coming from a single source to two or more separate destinations is

(a) Decoder (b) Encoder
(c) Multiplexer (d) Demultiplexer

100. An 8-bit successive approximation A/D converter is driven a 2.5 MHz clock signal. What is the value of conversion time required.

(a) 3.6 μsec (b) 4.0 μsec
(c) 3.2μsec (d) 2.8μsec

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SOLUTION : PRACTICE SET- 8

ANSWER KEY

1. (a)	11. (c)	21. (b)	31. (b)	41. (c)	51. (d)	61. (a)	71. (b)	81. (c)	91. (b)
2. (b)	12. (b)	22. (b)	32. (c)	42. (d)	52. (d)	62. (b)	72. (b)	82 (c)	92. (d)
3. (b)	13. (d)	23. (a)	33. (a)	43. (d)	53. (a)	63. (c)	73. (b)	83. (b)	93. (a)
4. (b)	14. (b)	24. (d)	34. (a)	44. (a)	54. (b)	64. (d)	74.(b)	84. (b)	94. (b)
5. (d)	15. (a)	25. (d)	35. (a)	45. (c)	55. (c)	65. (b)	75. (c)	85. (a)	95. (c)
6. (d)	16. (d)	26. (b)	36. (c)	46. (c)	56. (d)	66. (a)	76. (a)	86. (b)	96. (c)
7. (a)	17. (c)	27. (c)	37. (d)	47. (d)	57. (b)	67. (a)	77. (c)	87. (a)	97. (d)
8. (d)	18. (b)	28. (d)	38. (a)	48. (d)	58. (c)	68. (d)	78. (c)	88. (d)	98. (c)
9. (c)	19. (d)	29. (d)	39. (a)	49. (a)	59. (c)	69. (c)	79. (d)	89. (c)	99. (d)
10. (b)	20. (d)	30. (a)	40. (b)	50. (b)	60. (a)	70. (c)	80. (b)	90. (d)	100. (c)

SOLUTION

1. (a)
India conducted an anti-satellite missile test on 27th March, 2019 which was dubbed as Mission Shakti. The test successfully destroyed a live satellite in the Low Earth Orbit. Mission Shakti became a significant achievement for India for it brought the nation in the row (4th position) with the US, Russia, and China to successfully interdict and intercept a satellite in outer space-based on complete indigenous technology.

2. (b)
The 21 FIFA World Cup tournaments have been won by eight national teams. Brazil have won five times, and they are the only team to have played in every tournament. FIFA World Cup 2022 is scheduled to take place in Qatar from 21th November to 18th December, 2022.

3. (b)

Ustad Amjad Ali Khan	Sarod
Pt. Hariprasad Chaurasia	Flute
Ustaad Bismillah Khan	Shehnai/Clarinet
Shivkumar Sharma	Santoor
Pt. Ravishankar	Sitar
Kishan Maharaj	Tabla
V. Balsara	Piano
N. Rajan	Violin

4. (b)
Dada Saheb Phalke is called the father of Hindi theater of India. He was credited with making India's first indigenous feature film.

5. (d)
The Reserve Bank of India has adopted the 'Minimum Reserve System' for the note issue. Since 1957, it maintains gold and foreign exchange reserves of 200 crore, of which at least 115 crore should be in gold.

6. (d)
Under Article 243E of the constitution of India, every Panchayat, unless sooner dissolved under any law for the time being in force, shall continue for 5 years from the date appointed for its first meeting and no longer.

7. (a)
Victoria Falls is located in southern Africa, about midway along the course of the Zambezi River, at the border between Zambia to the North and Zimbabwe to the South. The most popular name for the waterfall is Mosi-oa-Tunya, which means "the smoke that thunders" in the local languages.

8. (d)
The Arvari River which originates in Aravali range, is a small river flowing through the Alwar district of Rajasthan, India. Its flow was restored after being dry for 60 years. Arvari Sansad was formed, in order to ensure its management and collective ownership of its resources.

9. (c)
The monuments built by Shah Jahan are:
- Taj Mahal, Agra
- Red Fort (Lal Quila), Delhi
- Jama Masjid, Delhi
- Agra Fort, Agra
- Jama Masjid, Agra
- Moti Masjid, Agra Fort
- Wazir Khan Mosque, Lahore
- Shalimar Gardens, Lahore

15-storey "Door of Victory" (Buland Darwaza) is the highest gateway in the world. It was constructed in 1575 AD by Mughal emperor Akbar the Great to commemorate his win over Gujarat.

10. (b)
Ras Bihari Bose along with Capt. Mohan Singh formed Azad Hind Fauz in Japan during 1941. In October 1943 AD, Ras Bihari Bose handed over the charge of INA to Subhash Chandra Bose. On 8 November 1943 AD, Japan handed over the Andaman and Nicobar Islands to Subhash Chandra Bose (Head of INA). Netaji had named them Saheed Island and Swaraj Island.

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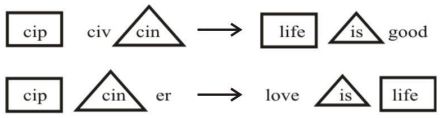
11. (c)

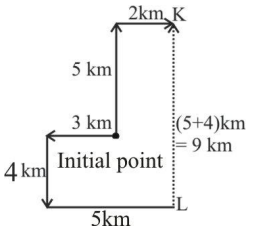
According to the question,



∴ Love will be written as 'er'.

12. (b)

According to the question, travel path of K and L is as follows:



Hence, it is clear from the above diagram that K is 9 km north of L.

13. (d)

It is clear from the above diagram that 4+2 = 6 pens are coal.

14. (b)

Statement-

$L \le R < M < N < K$

Conclusion-

(i) $L < N$ (✓)

(ii) $K > M$ (✓)

(iii) $R < N$ (✓)

Hence, all the conclusions are correct from the given statement.

15. (a)

It is clear from the logic that by increasing the fare by 10%, the bus travel company BEST, passengers can go by buses with low fares or they can go by the same bus even if the number of passengers is very high that means the number of passengers may remain the same. Hence it is clear both the predictions are implicit in the statement. Hence option (a) will be right.

16. (d)

Give me some tea → De min to te

Please give → plea de

With the help of both the statement we can say 'give' = 'de', Hence, both statements are sufficient.

17. (c)

Given that

$9 \div 5 + 3 \times 7 = 22$ and $4 \div 7 + 2 \times 15 = 29$

$\div \rightarrow \times$

$+ \rightarrow \div$

$\times \rightarrow +$

$9 \div 5 + 3 \times 7 = 9 \times 5 \div 3 + 7 = 22$

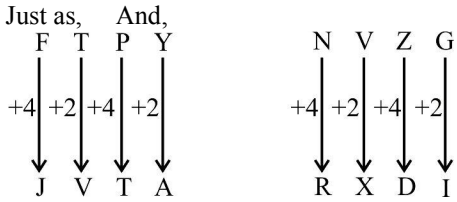
$4 \div 7 + 2 \times 15 = 4 \times 7 \div 2 + 15 = 29$

Hence, $14 \div 5 + 35 \times 9$

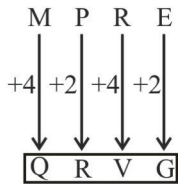
$= 14 \times 5 \div 35 + 9 = 11$

18. (b)

Just as, And,

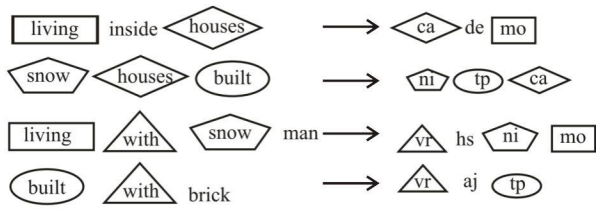


Same as,



19. (d)

According to the question,



Hence, possible code for 'brick man' will be 'aj hs'.

20. (d)

From options-

(a) $22 \times 6 + 1 = 133$

(b) $14 \times 6 + 1 = 85$

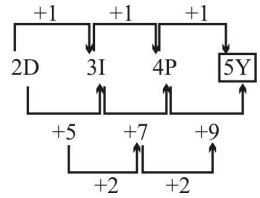
(c) $16 \times 6 + 1 = 97$

(d) $18 \times 6 + 1 = 109 \neq 107$

Hence, option (d) is different from other options.

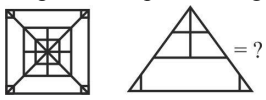
21. (b)

The given series is as follows



22. (b)

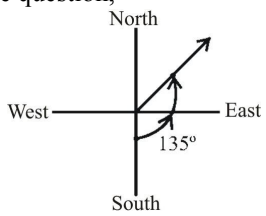
In the given question figure, the answer figure given in option (b) will complete the question figure.



So option (b) is correct.

23. (a)

According to the question,



Hence, the direction of Gautam is North-East.

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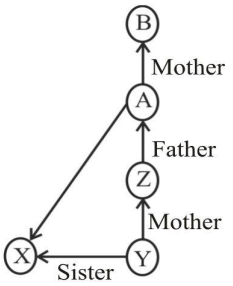
24. (d)

As per question, drawing the blood relation diagram.



Therefore, it is clear that X is a daughter's of daughter A.

25. (d)

On putting the signs from option (d),

(15×4) & 3 @ (60 $ 2) # 3

(15 – 4) × 3 = (60 ÷ 2) + 3

11 × 3 = 30 + 3

33 = 33

26. (b)

First generation	–	Vacuum tube
Second generation	–	Transistors
Third generation	–	Integrated circuit
Fourth generation	–	VLSI Microprocessor
Fifth generation Microprocessor	–	ULSI

27. (c)

Input unit is used to perform following operations-

(i) It accepts data from outside world.

(ii) It converts the data into binary code, which the computer can understand.

(iii) It sends the data in binary form to the computer for further processing.

Input unit does not converts the binary data into a human readable form which can be understood by the users.

28. (d)

OCR (Optical Character Recognition) is used to check the objective answer sheet. The document scanned by the scanner is in the form of a bitmap image, which can be edited in the picture, but not in the text. OCR recognizes the text document and converts it into word processing text so that corrective process can be conducted in it.

29. (d)

Optical input devices allow the computer to use light as a source of input. Scanners and Magnetic Ink Character Recognition (MICR) are examples of optical input devices.

30. (a)

ASCII is the acronym for American Standard code for Information Interchange. Extended ASCII uses 8 bits and provides codes for 256 characters.

31. (b)

The ASCII value of 4 is 52 and the ASCII value of 9 is 57. Therefore! 57 – 52 = 5

32. (c)

RAM is a temporary memory (volatile memory), which holds data when the computer is on and its data is lost when the power supply is turned off. RAM is available in various sizes depending on the storage capacity such as 512 MB, 1 GB, 2 GB etc. It is two types on the basis of function Static and Dynamic RAM.

33. (a)

(i) TCP/IP is more reliable than OSI.

(ii) TCP/IP does not have very strict boundaries between layers.

Hence, the both statements are correct.

34. (a)

TCP stands for Transmission Control Protocol. It is a group of Internet protocol. It is used for data transmission in communication networks such as the Internet. It provides a two way data stream between remote application.

35. (a)

Trivial File Transfer Protocol (TFTP) is a simple protocol for exchanging files between two TCP/IP machines. TFTP servers allow connections to TFTP clients to send and receive files.

TFTP - Trivial File Transfer Protocol

TCP/IP-Transmission Control Protocol/Internet Protocol

36. (c)

The strike through feature of MS - Word draws a horizontal line through the middle of each word.

Apply or remove single line strike through formatting.

(1) Select the text that you want to format.

(2) Go to Home > Strikethrough.

37. (d)

In MS - Word 2016, option like bold, underline and italic appear under the **Home** menu/tab.

38. (a)

In Microsoft Word 365, in Layout tab of Page Setup group, Line Number, Hyphenation, Breaks, Size, Orientation options are available while Spacing is available in Paragraph group.

39. (a)

HSBC institution is a foreign banking institution in India.

40. (b)

Internet is a world wide network of computers. It consists of many local, national and international networks and all these networks are interconnected. It currently uses a portion of the total resources of the existing public telecommunications network. Two recent adaptations of internet technology are the intranet and the extranet.

41. (c)

World Wide Web Consortium is an international organization. It was founded in 1994 by Tim Berners-Lee. This mainly includes core web interest groups such as web browser developers, government institutions, researchers and universities etc.

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42. (d)
A web crawler is a computer program or automated script that systematically browses the internet and collects information from websites. Web crawlers are commonly used by search engines like Google to index web pages and make them searchable. It is also known as web spider or web bot.

43. (d)
The Microsoft 'Edge' is a web browser developed by Microsoft. It was first bundled with windows 10 in 2015 and is designed to be a successor to the older Internet Explorer browser.

44. (a)
A web browser is a software application that allows users to access and view content on the world wide web. It interprets and displays web pages, which are written in languages like HTML, CSS and Java Script, Popular web browsers include Chrome, Firefox, Safari and Edge. So statement (ii) is correct.

45. (c)
The Hindu was first Indian news paper that became available on the internet.

46. (c)
From the digit come in place of tens in counting, 1 to 10 = 0 time
From 11 to 20 = 1 time
From 21 to 30 = 9 times
From 31 to 100 = 0 times
∴ Total required number = 1 + 9 = 10

47. (d)
From question,

$$\left\{\frac{3}{5}\times\left[3+\{3+(11+5+6)\}\right]\right\}$$
$$=\left\{\frac{3}{5}\times\left[3+\{3+(22)\}\right]\right\}$$
$$=\left\{\frac{3}{5}\times\left[3+\{25\}\right]\right\}$$
$$=\left\{\frac{3}{5}\times[28]\right\}$$
$$=\left\{\frac{3}{5}\times 28\right\}$$
$$=16\frac{4}{5}$$

48. (d)
2.666 ..... + 2.77.....

$$=2.\overline{6}+2.\overline{7}$$
$$=2+\frac{6}{9}+2+\frac{7}{9}$$
$$=4+\frac{6+7}{9}$$
$$=4+\frac{13}{9}$$
$$=\frac{36+13}{9}=\frac{49}{9}$$

49. (a)

$$\frac{484}{4.84}=\frac{48.4}{x}$$
$$\Rightarrow \quad x\times 484=48.4\times 4.84$$
$$\Rightarrow \quad x=\frac{484\times 484}{484\times 1000}$$

Hence, x = 0.484

50. (b)
According to the question,
Remainder = 5 – 4 = 1, 6 – 5 = 1, 7 – 6 = 1
LCM of 5, 6 and 7 = $2\times 3\times 5\times 7=210$
So,

$$\begin{array}{r} 23 \\ 210\overline{)5000} \\ 420 \\ \hline 800 \\ 630 \\ \hline 170 \end{array}$$

Hence, the required number = (5000 – 170) – 1 = 4829

51. (d)
Let the first and second numbers are Ha and Hb respectively.

$$L = Hab \Rightarrow 124 = 3ab$$
$$ab=\frac{124}{3}$$

And $H(a + b) = 84 \Rightarrow (a + b) = 28$

Then, $\frac{1}{Ha}+\frac{1}{Hb}=\frac{Ha+Hb}{Ha\times Hb}$

$$=\frac{H(a+b)}{H^2ab}$$
$$=\frac{(a+b)}{Hab}=\frac{28}{124}=\frac{7}{31}$$

52. (d)
Copper : Zinc : Nickel = 4 : 3 : 2
Let quantity is 4x, 3x and 2x kg respectively.
According to the question,
4x + 3x + 2x = 54
9x = 54
x = 6
∴ Copper = 4 × 6 = 24 kg
Zinc = 3 × 6 = 18 kg
Nickel = 2 × 6 = 12 kg
Let the new ratio will be 2:5:1 by adding y kg of Zinc

$$\frac{24}{18+y}=\frac{2}{5}$$

120 = 36 +2y
84 = 2y
y = 42 kg
So adding zinc in new metal = 42 kg

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53. (a)

Let Manoj's income = ₹x

Food expenditure $= x \times \frac{33}{100} = \frac{33x}{100}$

Manoj's new income = x + 1000

Deduction in expenditure $= (x+1000) \times \frac{27}{100}$

Previous expenditure = new expenditure

$\frac{33x}{100} = \frac{27x+27000}{100}$

33x = 27 x + 27000

6x = 27000

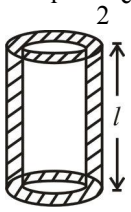
x = 4500

So, the initial income is ₹4500.

54. (b)

Given,

$R = \frac{17}{2}$ cm, $r = \frac{15}{2}$ cm, l=1000cm



Total surface area of Hollow cyclinder.

$= 2\pi(R+r)l + 2\pi(R^2-r^2)$

$= 2\pi(R+r)(l+R-r)$

$= 2 \times \frac{22}{7} \times 16 \times (1000+1)$

$= 2\times22\times16\times143$ cm^2

Cost of painting = 2×22×16×143×0.15 = 15100.8 cm^2

55. (c)

According to the question,

Work done by A, B and C in one day $= \frac{1}{81}$ part

$A+B+C = \frac{1}{81}$ ..... (i)

Then, 1 day work of A + B $= \frac{1}{97.2}$ part

$A+B = \frac{10}{972}$

$A+B = \frac{5}{486}$ ..... (ii)

On putting the value of equation (ii) in equation (i),

$C = \frac{1}{81} - \frac{5}{486}$

$C = \frac{6-5}{486} = \frac{1}{486}$ part

One day work of (B + C) $= \frac{1}{162}$ part

$B + \frac{1}{486} = \frac{1}{162}$

$B = \frac{1}{162} - \frac{1}{486}$

$B = \frac{3-1}{486} = \frac{1}{243}$ part

Hence, B will complete that work alone in 243 days.

56. (d)

Time (t) = 42.5 minutes $= \frac{42.5}{60}$ hours.

Let distance = d, $d = d_1+d_2+d_3$

and $d_1 = d_2 = d_3 = x$

Average speed = V

V_1 = 3 Km./hr. V_2 = 4 km/ hr., V_3 = 8 Km./hr.

Average speed = $(V) = \frac{d_1+d_2+d_3}{\frac{d_1}{v_1}+\frac{d_2}{v_2}+\frac{d_3}{v_3}}$

$V = \frac{x+x+x}{\frac{x}{3}+\frac{x}{4}+\frac{x}{8}}$

$V = \frac{3x}{\frac{8x+6x+3x}{24}}$

$V = \frac{3x}{\frac{17x}{24}}$

$V = \frac{3\times24}{17}$ km / hr.

Then,

Distance = speed × time

$d = \frac{42.5}{60} \times \frac{3\times24}{17}$

$d = \frac{425}{600} \times \frac{3\times24}{17}$

d = 3 km

57. (b)

Let the Principal = ₹ P,

T = 15 years, Amount = 3P

SI = Amount – Principal

= 3P – P = 2P

According to the question,

$SI = \frac{P\times R\times T}{100}$

$2P = \frac{P\times R\times15}{100}$

$R = \frac{40}{3}\%$

Again, $SI = \frac{P\times R\times T}{100}$

$4P = P \times \frac{40}{3} \times \frac{T}{100}$

T = 30 years

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58. (c)

Total Cost Price of first washing machine

$= 8000 + 500$

$=$ ₹8500

Profit on first washing machine $= 8500 \times \frac{20}{100}$

$=$ ₹1700

$SP_1 = CP_1 +$ Profit

$= 8500+1700$

$=$ ₹10200

Loss on second washing machine $= CP_2 \times \frac{10}{100}$

$= 10200 \times \frac{10}{100}$

$=$ ₹1020

Because, Selling Price of first washing machine (SP_1) = Cost Price of second washing machine (CP_2)

$\therefore$ $SP_2 = CP_2 -$ Loss

$= 10200 - 1020$

$=$ ₹9180

Overall Profit of Himani $= SP_2 - CP_1$

$= 9180 - 8500$

$=$ ₹680

59. (c)

$x + \frac{1}{x} = \sqrt{29}$

$x^2 + \frac{1}{x^2} + 2 = 29$ (On squaring of both sides)

$x^2 + \frac{1}{x^2} = 27$ _____(i)

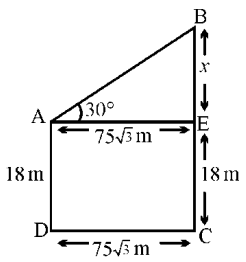
$\left(x - \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} - 2$

$\left(x - \frac{1}{x}\right)^2 = 27 - 2$ (From equation (i))

$x - \frac{1}{x} = \sqrt{25}$

$\boxed{x - \frac{1}{x} = 5}$

60. (a)



In ΔABE,

$\tan 30° = \frac{x}{75\sqrt{3}}$

$\frac{1}{\sqrt{3}} = \frac{x}{75\sqrt{3}}$

$x = 75m$

So height of the tower $= 18 + 75 = 93m$

61. (a)

Set = {1, 2, 2, 3, 3, 3, 4, 4, 4, 4, }

Mode = 4

Mean $= \frac{1+2+2+3+3+3+4+4+4+4}{10}$

$= \frac{30}{10} = 3$

In case the data is even (n = 10)

Median $= \frac{1}{2}\left[\left(\frac{n}{2}\right)^{th} \text{term} + \left(\frac{n}{2}+1\right)^{th} \text{term}\right]$

$= \frac{1}{2}\left[\frac{10}{2}^{th} \text{term} + \left(\frac{10}{2}+1\right)^{th} \text{term}\right]$

$= \frac{1}{2}(5^{th} \text{ term} + 6^{th} \text{ term})$

$= \frac{1}{2}(3+3) = \frac{1}{2} \times 6$

$= 3$

Hence, $4 \times$ mean $+ 2 \times$ mode $- 8 \times$ median

$= 4 \times 3 + 2 \times 4 - 8 \times 3$

$= 12 + 8 - 24$

$= 20 - 24$

$= -4$

62. (b)

$\Rightarrow$ $x\sqrt{12} = 4 + x\sqrt{3}$

$\Rightarrow$ $2x\sqrt{3} = 4 + x\sqrt{3}$

$\Rightarrow$ $x(2\sqrt{3} - \sqrt{3}) = 4$

$x = \frac{4}{\sqrt{3}}$

63. (c)

Let the present age of both person is x and y years.

According to the first condition,

$x + y = 7(x - y)$

$x + y = 7x - 7y$

$6x = 8y$

$\frac{x}{y} = \frac{8}{6}$

$\frac{x}{y} = \frac{4}{3} \Rightarrow x = 4k, y = 3k$

According to the second condition,

$(x + 5) + (y + 5) = 9[x + 5 - (y + 5)]$

$x + y + 10 = 9(x + 5 - y - 5)$

$x + y + 10 = 9(x - y)$

$9x - x - 9y - y = 10$

$8x - 10y = 10$

Putting the value of x and y-

$\because x = 4k$

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y = 3k
32 k – 30 k = 10
2k = 10
k =5
x =4k
= 4 × 5
= 20 years
y = 3 k
= 3 × 5
= 15 years
Therefore, age of elder person = x = 20 years

64. (d)

Part filled by pipe P in 1 hour $= \frac{3}{4\times18} = \frac{1}{24}$

Part filled by pipe Q in 1 hour $= \frac{3}{5\times12} = \frac{1}{20}$

Part filled by (P + Q) in 4 hour $= 4\left(\frac{1}{24}+\frac{1}{20}\right)$

$= 4\left(\frac{5+6}{120}\right)$

$= \frac{11}{30}$

Part emptied by pipe R in 1 hour $= \frac{11}{30}\times\frac{2}{11}$

$= \frac{1}{15}$

Part filled by all three pipes in 1 hour $= \frac{1}{24}+\frac{1}{20}-\frac{1}{15}$

$= \frac{5+6-8}{120} = \frac{3}{120}$

Hence time taken to fill the tank $= \frac{120}{3} = 40$ hours

65. (b)

$\because$ One day = 24 hours

$\therefore$ 3 days = 24 × 3 = 72 hours

Required ratio = 72 : 30 = 12 : 5

66. (a)

Given : $S = at + bt^2$ --------(i)

From the principle of dimensional homogeneity , the L.H.S of the equation dimensionally equal to the R.H.S of the equation.

So, the dimension of (s), (at) and $(bt)^2$ is same.

Dimensional formula of distance (s) = $[L]$

For the first term

$\therefore [L] = [a][T]$

$[a] = \frac{[L]}{[T]} = [LT^{-1}]$

For the second term

$\therefore [L] = [b]\,[T^2]$

$[b] = \frac{[L]}{[T^2]} = [LT^{-2}]$

Hence, the dimensional formula of 'b' is $[M^0 L^1 T^{-2}]$

67. (a)

Acceleration due to gravity (g) is highest at the poles. As the distance decreases from the centre g decrease and vice – versa.

68. (d)

distance = speed × time

$= 50\times\frac{18}{5}\times5 = 900$ km.

69. (c)

By the principle of conversation of energy, = Potential energy + Kinetic energy always remain constant.

$\frac{P.E}{K.E} = \left(\frac{\text{Remaining potential energy}}{\text{loss in potential energy}}\right)$

The object is at $\frac{2H}{3}$ distance from the releasing point.

So, potential energy at this point = $\frac{2mgH}{3}$

Hence, loss in energy $= \frac{2mgH}{3}$ = kinetic energy at point.

At $\frac{H}{3}$ height, potential energy = $\frac{mgH}{3}$

$\because \frac{\text{Potential energy}}{\text{Kinetic energy}} = \frac{mgH}{3}\times\frac{3}{2mgH} = \frac{1}{2}$

70. (c)

There are the three main methods of transfer or transmission of heat (energy) between substance from one place to another place-

1. Conduction
2. Convection
3. Radiation

Convection is the method of heat transfer from one place to another due to movement of fluid.

71. (b)

Original resistance (R) = $\frac{\rho l}{A}$

New resistance (R') = $\frac{\rho l'}{A'}$

As there is no change in value-

$lA = l'A'$

$lA = (nl)A'$ $\quad \because l' = nl$

$A' = \frac{A}{n}$

then $R' = \frac{\rho(nl)}{\frac{A}{n}} = n^2\left(\frac{\rho l}{A}\right)$

$\boxed{R' = n^2R}$

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72. (b)

Given that-

Current (i) = 0.4 Amp

Time (t) = 90 minute

= 90×60 = 5400 second

Q = it

0.4×5400 = 2160 C

73. (b)

Power is the rate of energy supplied or consumed by an electric element with respect to time.

Power is represented by 'P'

$$P = \frac{E}{t} = \frac{\text{Joule}}{\text{Second}} = \text{Watt}$$

74.(b)

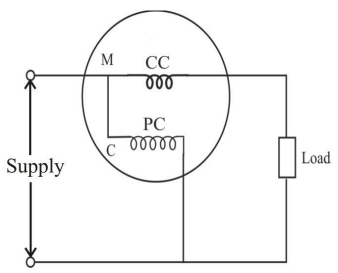
A time-varying flux causes an induced electromotive force" this statement represented by Faraday's law of electromagnetic induction and this induced electromotive force can be given by-

$$\boxed{E = -N\frac{d\phi}{dt}}$$

Where (–ve) sign represents the Lenz's law

75. (c)

Induction type wattmeter provides accurate readings only when both frequency and supply voltage are constant.



(Induction type wattmeter)

Advantage of induction type instrument -

(i) A full scale deflection of over 300º can be obtained giving a long open scale.

(ii) Damping is good.

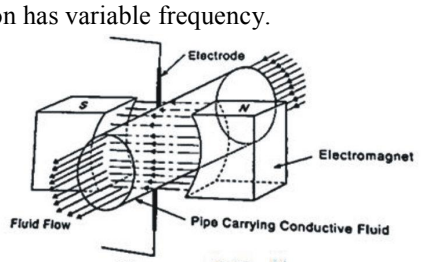
Disadvantage of induction type instrument -

(i) The instrument are only suitable for AC.

(ii) The scale is non-uniform.

76. (a)

The output of a flow meter based on electromagnetic induction has variable frequency.



Electromagnetic Flow Meter

Electromagnetic flow meter is generally used to measure the flow of electrically conductive liquid.

77. (c)

Ampere's circuit law states that the line integral of $\vec{H}$ about any closed path is exactly equal to the direct current enclosed by that path.

$$\int \vec{H}.d\ell = I_{enclosed}$$

78. (c)

The force between two parallel current carrying conductors placed at a x distance apart and carrying same current I,

$$F = \frac{\mu_0 I_1 I_2 l}{2\pi x}$$

$$\frac{F}{l} = \frac{4\pi\times10^{-7}\times I^2}{2\pi x}$$

$$\left(\because \mu_0 = 4\pi\times10^{-7} H/m\right)$$

$$\frac{F}{l} = \frac{2\times10^{-7} I^2}{x} N/m$$

79. (d)

The primary reason behind identically zero magnetic field outside a co-axial cable is force between magnetic elements.

80. (b)

Pure metal generally have high conductivity and high temperature co-efficient. Pure metal has low value of specific resistance and high value of conductivity. It has positive temperature co-efficient.

81. (c)

Material	Resistivity (Ω-m)
Silver	1.59×10^{-8}
Copper	1.68×10^{-8}
Gold	2.4×10^{-8}
Aluminium	2.88×10^{-8}
Tungsten	5.6×10^{-8}
Platinum	10.6×10^{-8}
Manganin	48.2×10^{-8}
Mercury	98×10^{-8}
Nichrome	100×10^{-8}
Germanium	$1 - 500 \times 10^{-3}$
Silicon	0.1 - 60
Diamond	$1.0 \times 10^{11} - 1.0 \times 10^{18}$

Increasing order of electrical resistivity -

Gold, doped germanium, silicon, diamond.

82. (c)

Given that,

$n_p = 2.25\times10^{15}/cm^3$

$n_i = 1.5\times10^{10}/cm^3$

$n_e = ?$

$n_i^2 = n_p.n_e$ (mass action law)

$$n_e = \frac{n_i^2}{n_p}$$

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$$\left\{\begin{array}{l}\text{Where,}\\ n_p = \text{Concentration of holes}\\ n_e = \text{Concentration of electrons}\\ n_i = \text{Concentration of intrinsic semiconductor}\end{array}\right\}$$

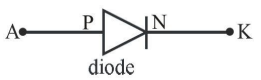
$$n_e = \frac{1.5\times10^{10}\times1.5\times10^{10}}{2.25\times10^{15}}$$

$$n_e = \frac{2.25\times10^{20}}{2.25\times10^{15}}$$

$$\boxed{n_e = 10^5/cm^3}$$

83. (b)

A simple P-N Junction diode is fabricated extrinsic semiconductor and can be used as s unidirectional switch. If a p-type and N-type materials are connected in such a way that crystal structure is obtained at the junction. then a P-N junction diode is formed, the main feature of a P-N junction that it conducts in only one direction. In the other direction its resistance become very high.



84. (b)

Given,

$\beta = 50$, $I_{CBO} = 2.5\mu A$, $I_B = 0$

$\because$ $I_C = \beta.I_B + I_{CEO}$

$I_C = \beta I_B + (1+\beta)\, I_{CBO}$

$I_C = 0\times50 + (1+50)\times2.5\ \mu A$

$I_C = 51\times2.5\mu A$

$= 127.5\ \mu A.$

$\boxed{I_C = 0.1275mA}$

85. (a)

According to schockly equation-

$$I_D = I_{DSS}\left(1-\frac{V_{GS}}{V_P}\right)^2$$

Differentiating with respect to V_{GS} on both sides-

$$\frac{dI_D}{dV_{GS}} = I_{DSS}\times2\left(1-\frac{V_{GS}}{V_P}\right)\left(0-\frac{1}{V_P}\right)$$

$$\frac{dI_D}{dV_{GS}} = \frac{-2I_{DSS}}{V_P}\left(1-\frac{V_{GS}}{V_P}\right)$$

$$\boxed{g_m = \frac{-2I_{DSS}}{V_P}\left(1-\frac{V_{GS}}{V_P}\right)}$$

Where, $g_m \rightarrow$ transconductance

86. (b)

The voltage output of a bridge rectifier is a full wave signal.

The voltage output of a center tapped rectifier is full wave signal.

The voltage output of a half wave rectifier is half wave signal.

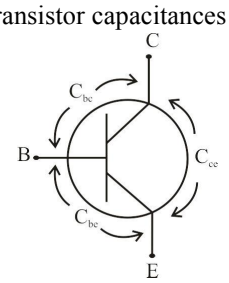
87. (a)

Harmonics distortion in amplifiers is caused by nonlinearity in the active device.

The D.C operating point in the amplifier is choosen such that it lies midway between the characteristics, due to which the characteristics are most linear and the spacing is uniform. Distortion is generated if the operating point is shifted towards the saturation point or cut-off point during operation.

88. (d)

Inter-electrode transistor capacitances



- The internal capacitance of the BJT are C_{bc}, C_{be} and C_{ce} Because of this , negative feedback take place in the circuit and due to this gain decreases.
- At High frequency C_{ce} provides a shunting effect in the output side and Reduces the gain of the amplifier.

89. (c)

Given that,

Voltage gain (A_V) = 100

Voltage gain in dB = ?

Voltage gain in dB = $20\log_{10}(A_V)$

$= 20\log_{10}(100)$

$= 20\log_{10}(10^2)$

$= 20\times2\log_{10}10$

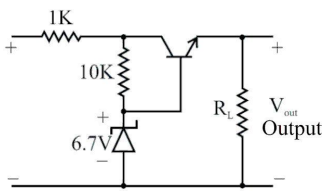
Voltage gain in dB = 40 dB

90. (d)

A triangular wave shape is obtained by integrating a square wave.

Square wave shape is obtained by differentiating a triangular wave.

91. (b)



$V_o = V_Z - V_{BE}$

$V_o = 6.7 - 0.7 = 6V$

92. (d)

The zero error of a micrometer is defined as systematic error.

Types of systematic error -

(1) Instrumental error

(2) Environmental error

(3) Observational error

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93. (a)
The deflecting torque is used for deflection, the controlling torque acts opposite to the deflecting torque. Damping of deflecting type instruments is done to reduce the oscillation of pointer in the final deflected position.
The following mechanism can be used for producing damping torque -
- Air friction damping
- Fluid friction damping
- Eddy current damping

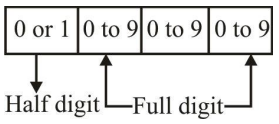
94. (b)

Instrument	Symbol
• Rectifier with moving coil instrument.	
• Moving coil instrument.	
• Iron core without electro-dynamic instrument.	
• Iron core with electro-dynamic instrument.	

95. (c)
The display of a digital multimeter is shown in the-
The multimeter is having $3\frac{1}{2}$ digital display.

$$\boxed{1.999}$$

• $3\frac{1}{2}$ digit multimeter can display three completes and one $\frac{1}{2}$ digit. Three complete digits can have any numbers from 0 to 9 and one $\frac{1}{2}$ digit can have only 0 or 1.



96. (c)
A thermostat is an important component of an electric iron that regulates its temperature.
- The main function of the thermostat in an electric iron is to make sure that the iron doesn't get too hot if it is left unattended to for a period of time.
- When an electric current is passed through a coil in an electric iron the coil becomes very hot.

97. (d)
Given,

$(66.3)_8 = (?)_2$

First of all we converts octal to decimal.

$(66.3)_8 = (54.375)_{10}$

$6\times8^1+6\times8^0+\frac{3}{8}$

$= 48+6+\frac{3}{8}$

$= 54+\frac{3}{8}$

$= \frac{435}{8} = 54.375$

Now, We will convert decimal to binary-

$(54.375)_{10} \rightarrow (\quad)_2$

2	54	0
2	27	1
2	13	1
2	6	0
2	3	1
	1	

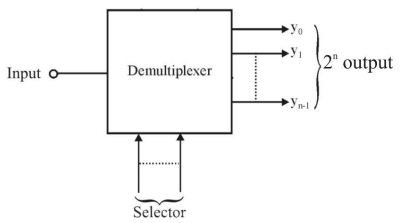
Hence, binary = 110110

$0.375\times2 = 0.750 = 0$
$.750\times2=1.500 \quad = 1$
$.500\times2 = 1.000 \quad = 1$

Hence, $(66.3)_8 = (110110.011)_2$

98. (c)
Karnaugh map (K-map) is used to minimize the number of gates and fan-in requirements of the gate in the digital circuit.

99. (d)
De-Multiplexer - It is a circuit that receives information on a single line and transmits this information on one of 2^n possible output lines.
- It has single input, 'n' selection lines and maximum of 2^n output.
- It is called series to parallel converter.
- It is also called data distributor.



100. (c)
Given,

N = 8 bit
f = 2.5 MHz

conversion time of SAR A/D converter is -

$T = N.\ T_{CLK}$

$= \frac{N}{f} = \frac{8}{2.5\times10^6}$

$\boxed{T = 3.2\mu\,sec}$

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PRACTICE SET - 9

1. Which of the following is INCORRECT in respect of geostationary satellite?
(a) Orbits are used for IRS satellite
(b) Many of these satellite orbits are also sun-synchronous
(c) Altitude should be Approximately 36000 km
(d) Rotate with speed and direction of earth

2. 'Silly point', 'Slip' and 'Gully' are terms used in:
(a) Football (b) Cricket
(c) Cycling (d) Hockey

3. 'Cheriyal' a style of painting that has been in news recently, is unique to which state?
(a) Madhya Pradesh (b) Andhra Pradesh
(c) Telangana (d) Karnataka

4. Who created comic strip Calvin and Hobbes?
(a) Bob Marley (b) Chuck Jones
(c) Tex Avery (d) Bill Watterson

5. Which of the following money is deposited to individual.
(a) M_1 (b) M_4
(c) M_2 (d) M_3

6. Which institution governs the area that is in transition from rural to urban?
(a) Gram Panchayat (b) City Councils
(c) Panchayat Samitis (d) Gram Sabha

7. Atlas mountain range lies in which of the following continents?
(a) Asia (b) North America
(c) Europe (d) Africa

8. At Devprayag (Uttarakhand), which of the following two rivers confluence and form river Ganga?
(a) Alaknanda and Yamuna
(b) Bhagirathi and Yamuna
(c) Yamuna and Gomti
(d) Alaknanda and Bhagirathi

9. Which of the following Nawabs of Awadh built the Bara Imambara in Lucknow?
(a) Asaf-ud-Daula (b) Asif jah Mirza
(c) Shuja -ud-Daula (d) Yamin-ud-Daula

10. Quit India Movement played an important role in the freedom struggle of India. Which of the following incident happened after this movement?
(a) The Labour Government of Britain sent a Cabinet Mission to India.
(b) Rowlatt Act
(c) Dandi Yatra
(d) All India Muslim League was established in British

11. If the sum of number-clusters 395 and 727 is represented as 101112; and by the same code, the sum of number clusters 276 and 957 is represented as 111213, then which of the following will be code for sum of number clusters 689 and 877?
(a) 141312 (b) 131415
(c) 121314 (d) 141516

12. Anil starts walking from point K. He walks 30 m towards the east, turns right and walks for 20 m to reach point M. He then takes a left turn. Walks for 35 m, takes a right turn and walks for 28 m to reach point R, He finally takes a right turn and walks for 50 m to reach point X.
In which direction is point X with respect to point K?
(a) West (b) South-East
(c) North-East (d) South

13. A team is to be selected from 13 players P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12 and P13. There will be seven players in the team. P2 cannot be selected with P1, P6 or P4. P7 cannot be selected with P2, P10, P11 or P13. If P8 and P13 both are selected, then P5 must be selected, P4 cannot be selected with P2, P6, P12 or P11.
Which of the following is a correct selection of the team?
(a) P1, P3, P4, P5, P8, P9, P13
(b) P1, P6, P11, P12, P13, P3, P4
(c) P2, P3, P5, P7, P8, P9, P13
(d) P1, P3, P4, P5, P6, P8, P9

14. Statement:
$P = Q < S \leq V$
Conclusion :
I. $S > P$
II. $V > Q$
III. $P < V$
(a) Only conclusion I is true
(b) All conclusion are true
(c) Only conclusion III is true
(d) Only conclusion II is true.

15. Statement:
Teachers should attend the workshop
Inference :
I. Workshop updates teachers knowledge
II. Workshops kill time
(a) Neither inference (I) nor (II) is implicit
(b) Both inference (I) and (II) are implicit
(c) Only inference (I) is implicit
(d) Only inference (II) is implicit

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16. Question:
What is code for 'here'?
Statement:
1. 'Come here' is written as 'La pe'
2. 'Here it is' is written as 'Pe aa li'
(a) Both statements 1 and 2 together are sufficient.
(b) Only statement 1 is sufficient
(c) Neither statement 1 nor 2 is sufficient
(d) Only statement 2 is sufficient

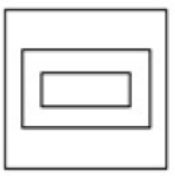
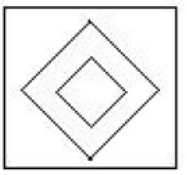
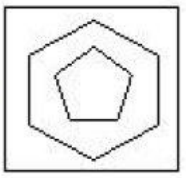
17. Study the given pattern carefully and select the number from among the given options that can replace the question mark (?).

(a) 19 (b) 20
(c) 13 (d) 21

18. Select the option that is related to the third number in the same way as the second number is related to the first number :
343 : 1331 : 729 : ?
(a) 2187 (b) 2197
(c) 2184 (d) 2211

19. In a certain code language, 'she is beautiful' is written as 'mat mug bit', and 'beautiful and water' is written as 'bit cap lan'. How will 'beautiful' be written in that language?
(a) bit (b) mug
(c) cap (d) mat

20. Four figures have been given, out of which three are alike in some manner and one is different. Select the figure that is different.

(a) 
(b) 
(c) 
(d)

21. Select the letter that can replace the question mark (?) in the following series.
70, V, 63, R, 56, O, 49, ?
(a) L (b) M
(c) N (d) K

22. Mahesh was facing east when he started from home. He took two right turns and one left turn to reach his school. In which direction, is he facing after reaching his school?
(a) North (b) South
(c) West (d) East

23. Evan travelled 16 km from his residence towards the north. He then turned 90 degrees towards the left and travelled 12 km. He turned 90 degrees left again and travelled 16 km and stopped. How far is Evan from his residence?
(a) 12 km (b) 16 km
(c) 4 km (d) 28 km

24. If A is the brother of B, B is the father of C and D is the wife of A, then how is D related to C ?
(a) Aunt (b) Niece
(c) Uncle (d) Nephew

25. If '>' meaning'+', '<'meaning '–', '+' meaning '÷', '$\wedge$' meaning '×' and '–' meaning '=' then find the true given equations?
(a) $6<18+3>10\wedge 3-32$
(b) $10<9+3\wedge 6>5-47$
(c) $6<18+3>12\wedge 3-48$
(d) $7<18+2\wedge 12>3-2<100$

26. Which of the following statements is/are true about second generation computers?
(i) Vacuum tubes are used in these.
(ii) In this generation, magnetic core was used as primary memory.
(a) Only (i) (b) Only (ii)
(c) Neither (i) nor (ii) (d) Both (i) and (ii)

27. Device which is used to read a mark sense answer sheet of particular test is
(a) image scanner
(b) Bar-code reader
(c) facsimile machine
(d) character or mark recognition device

28. The technology of scanning that recognized handwritten text and printed text is
(a) MICR (b) OMR
(c) OCR (d) BCR

29. Which of the following is an example for input device?
(a) RAM (b) Bar code reader
(c) Projector (d) Monitor

30. Which memory cannot be accessed directly by the computer?
(a) RAM (b) Cache memory
(c) ROM (d) Memory card

31. Which among the following is/are storage device/devices used in computers?
(a) Floppy disk
(b) Hard disk
(c) Punched tape
(d) All options are correct

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32. WORM stands for-
(a) Write Once, Read Many
(b) Write Read Memory
(c) Wipe Only, Read Memory
(d) Read Write Memory

33. In the abbreviation HTTPS, what is the full form of the second 'T'?
(a) Truncation (b) Termination
(c) Transition (d) Transfer

34. Which of the following statements are correct?
(i) TCP/IP is more reliable than OSI.
(ii) TCP/IP does not have very strict boundaries between layers.
(a) Both (i) and (ii) (b) Neither (i) nor (ii)
(c) Only (ii) (d) Only (i)

35. TCP provides a _____ data stream between remote applications.
(a) Reliable, two-way (b) Reliable, one-way
(c) Unreliable, one-way (d) Unreliable, two-way

36. With respect to TCP/IP, what is the full form of TFTP?
(a) Trivial File Transfer Protocol
(b) Triangular File Transmission Protocol
(c) Trivial File Transfer Page
(d) Triangular File Transfer Protocol

37. IMAP protocol is used in:
(a) E-mails (b) Image processing
(c) Encryption (d) File transfer

38. Which of the following protocol (TCP/IP) handles the exchange of messages between e-mail services on a network?
(a) FTP (b) HTTP
(c) SMTP (d) TELNET

39. What is the meaning of the term TCP/IP?
(a) Transmission Control Protocol/Internal Protocol
(b) Transmission control protocol/Internet protocol
(c) Transport control protocol/Internet protocol
(d) Transmission control permission/Internet protocol

40. Which of the following statements is incorrect with respect to the Help option in MS-Word 365?
(a) The F5 function key can be used to open the Help Viewer window at any time.
(b) You have to need to add a help shortcut to the Quick Access Toolbar to get it easily.
(c) The Help option can be accessed from the File menu.
(d) To get help you have to type your query "Tell me what you want to do" in the box.

41. In MS-Word, the keyboard shortcut 'Ctrl + E' is used for which of the following purposes?
(a) Left-align text (b) Justify text
(c) Right-align text (d) Center text

42. Which of the following options is not available in the Editing group of the Home tab in MS-Word 365?
(a) Find (b) Start Dictation
(c) Replace (d) Select

43. Which of the following keyboard shortcuts can be used in Google Chrome to open a link in a new window?
(a) Alt + click a link (b) Double click a link
(c) Shift + click a link (d) Ctrl + click a link

44. Which of the following symbols is used to leave a placeholder that may be automatically filled by the search engine later while searching?
(a) Asterisk (*) (b) Hyphen (-)
(c) Colon (:) (d) Plus (+)

45. Which of the following statements is incorrect regarding the internet?
(a) Internet and World Wide Web are the same
(b) Every computer connected to the internet is identified by an IP address
(c) A computer connected to the internet is called a client
(d) Internet works with the help of clients and servers

46. Which of the following is a prime number?
(a) 143 (b) 173
(c) 123 (d) 213

47. Simplify
$$0.3 \div \left(0.6 \times \frac{2}{3}\right) \times 0.2\left(0.2 \times 2 \div \frac{1}{2} + 0.2\right)$$
(a) 0.05 (b) 0.15
(c) 1.5 (d) 0.02

48. The value of $0.\overline{56} + 0.\overline{43} + 0.\overline{89}$ is
(a) $1.\overline{98}$ (b) $1.\overline{87}$
(c) $1.\overline{89}$ (d) $1.\overline{88}$

49. If 493 ÷ 29 = 17, then 4.93÷ 0.0017 = ?
(a) 290 (b) 0.29
(c) 2.9 (d) 2900

50. Find the least number which divided by 20, 25, 35 and 40 leaves remainder 14, 19, 29 and 34 respectively?
(a) 1364 (b) 1394
(c) 1384 (d) 1374

51. What is the product of the LCM and the HCF of 15 and 25?
(a) 375 (b) 225
(c) 75 (d) 150

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52. Two numbers are in the ratio 3 : 2. If 8 is subtracted from the first number and 6 is subtracted from the second number, the ratio becomes 5 : 4. The numbers are:
(a) 24, 16 (b) 3, 2
(c) 2, 3 (d) 16, 24

53. 50% of a number is 21 less than $\frac{4}{5}$th of that number. Find the number.
(a) 40 (b) 70
(c) 60 (d) 50

54. If area of base of a cylinder is 346.50 cm^2 and height 21 cm. Then find his total surface area (using $\pi = \frac{22}{7}$)
(a) 2352 cm^2 (b) 2231 cm^2
(c) 2145 cm^2 (d) 2079 cm^2

55. 3 boys and 5 girls can finish a project in 6 days, while 2 boys and 7 girls can finish it in 8 days. In how many days will 8 girls complete it?
(a) 33 (b) 30
(c) 36 (d) 35

56. A man rides his bicycle for 10 km at an average speed of 12 km/h and further travels 12 km at an average speed of 10 km/h. What is his approximate average speed for the entire trip?
(a) 8 km/h (b) 8.19 km/h
(c) 10.8 km/h (d) 8.10 km/ h

57. If an amount doubles in 5 years, at the rate of simple interest how many times of the original amount, will it be after 8 years with same rate of simple interest?
(a) $3\frac{3}{5}$ times (b) $2\frac{3}{5}$ times
(c) $2\frac{1}{5}$ times (d) $3\frac{2}{5}$ times

58. The cost price of a car was ₹1,50,000. It was sold by X at a profit of 5% to Y. It was later sold back to X by Y at a 1% loss. Find X's profit in the entire transaction.
(a) ₹4000 (b) ₹3,150
(c) ₹4500 (d) ₹1,575

59. If $a + \frac{1}{a} = -3$ then find the value of $a^6 + \frac{1}{a^6}$
(a) 36 (b) 322
(c) 729 (d) 18

60. If x = a sinθ, and y = btan θ, then find the value of $\frac{a^2}{x^2} - \frac{b^2}{y^2}$.
(a) 2 (b) -1
(c) 0 (d) 1

61. The mean of three numbers is 35 and the range of data was 24. Difference between the largest and middle number is equal to three times of the difference between the smallest and the middle number. Which is the largest numbers among these three numbers.
(a) 51 (b) 50
(c) 49 (d) 52

62. If $\sqrt{7}$ = 2.6457 and $\sqrt{3}$ =1.732, Then find the value of $\frac{1}{\sqrt{7}-\sqrt{3}}$
(a) 1.0944 (b) 1.944
(c) 1.009 (d) 1.0844

63. John is 15 years younger than Jill. 12 years ago, Jill's age was 1.5 times that of John. Jill is now .....years old.
(a) 57 (b) 45
(c) 30 (d) 42

64. Tap P and Q can fill a bucket individually in 12 min and 15 min. Both the taps are opened, but after 3 minutes tap P is closed. What extra time will be taken by Q to fill the bucket?
(a) 6 minutes 15 sec. (b) 8 minutes 15 sec.
(c) 6 minutes 30 sec. (d) 9 minutes

65. The ratio of Sand and Macadam in a mixture is 41 : 30. While the mixture of Macadam and cement is 6 : 7. What is the ratio of sand and cement in the mixture?
(a) 8 : 6 (b) 11 : 7
(c) 77 : 48 (d) 41 : 35

66. Which of the following is dimensionless?
(a) Velocity (b) Angle
(c) Mass (d) Area

67. Find the length of the edge of a metal cube of density 8 g/cm^3 which weight 17.28 kN. (Use g = 10 m/s^2)
(a) 9 cm (b) 8 cm
(c) 10 cm (d) 6 cm

68. ..... is defined as the total path length travelled by an object divided by the total time interval during which the motion has taken place.
(a) Instantaneous acceleration
(b) Average speed
(c) Uniform acceleration
(d) Instantaneous velocity

69. If the total energy of the reactants is more than the products of the reaction, heat is released and the reaction is said to be a/an ___ reaction.
(a) Work (b) Endothermic
(c) Potential (d) Exothermic

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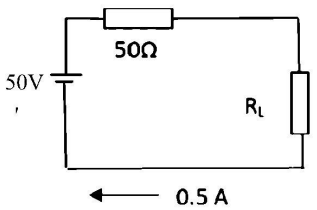
70. The Fahrenheit and Celsius scales converge at _____.

(a) -50^0 (b) -40^0
(c) -30^0 (d) -20^0

71. Power dissipated in R_L is



(a) 1W (b) 50W
(c) 0.5W (d) 12.5W

72. Two capacitor of value 8μF are connected in series and this combination is in parallel with a capacitor of 10μF. What is the equivalent capacitance of the system?

(a) 20 μF (b) 8 μF
(c) 14 μF (d) 16 μF

73. Two coils having inductance of 0.2H and 2.45H are coupled and their mutual inductance is 0.14H. The coefficient of coupling is.

(a) 1 (b) 0.2
(c) 0.1 (d) 0.5

74. When the current in a coil is increased from 2 A to 4 A in 0.05 seconds, the e.m.f. induced in the coil is 8 V. The self inductance of the coil is

(a) 0.8 H (b) 0.4 H
(c) 0.2 H (d) 0.1 H

75. Induction type single phase energy meters measure electric energy in :

(a) kW (b) Wh
(c) kWh (d) VAR

76. _____ is defined as the unit of energy in joules which equals to the amount of work to be done for bringing one electron an electric field of potential difference 1 volt.

(a) 1V (b) 1 kWh
(c) 1W (d) 1 eV

77. Magnetic field intensity (H), within a magnetic material where:

$M = 150$ A/m, $\mu = 1.5\times10^{-5}$ H/m, $\mu_r = 30$;

(a) 14.921 A/m (b) 14.138 A/m
(c) 1.82 A/m (d) 13.715 A/m

78. The source of a magnetic field is

(a) an isolated magnetic pole
(b) static electric charge
(c) magnetic substances
(d) current loop

79. The Poynting vector measures:

(a) Power (b) Energy
(c) Energy Density (d) Power Density

80. Charge velocity is defined as the:

(a) Speed with which the effect of EMF is experienced at all parts of the conductor resulting in the flow of current
(b) Electrons moving at the Fermi speed
(c) Speed with which charge drifts in a conductor
(d) Holes moving at the Fermi speed

81. The temperature coefficient of resistance of an insulator is :

(a) Positive and independent of temperature
(b) Negative and independent of temperature
(c) Negative and dependent on temperature
(d) Positive and dependent on temperature

82. In a semiconductor current is flow due to_____.

1. Drift current
2. Displacement current
3. Diffusion current

(a) 1, 2 and 3 (b) 1 and 2 only
(c) 1 and 3 only (d) 2 and 3 only

83. The diffusion capacitance of a PN junction diode

(a) Increases exponentially with forward bias voltage
(b) Decreases exponentially with forward bias voltage
(c) Increases linearly with forward bias voltage
(d) Decreases linearly with forward bias voltage

84. Which of the following statement is correct?

(a) P-Type transistors are preferred over N-type Transistors because mobility of holes is more than that of electrons
(b) N- Type transistors are preferred over P-type Transistors because N-type transistors are easily biased
(c) N-Type transistors are preferred over P-type Transistors because mobility of electrons is more than that of holes
(d) P-Type transistors are preferred over N-type Transistors because P-type transistors are easily biased

85. The output V-I characteristics of an enhancement type MOSFET has

(a) Only an ohmic region
(b) Only a saturation region
(c) An ohmic region at low voltage value followed by a saturation region at higher voltages
(d) An ohmic region at large voltage values preceded by a saturation region at lower voltages

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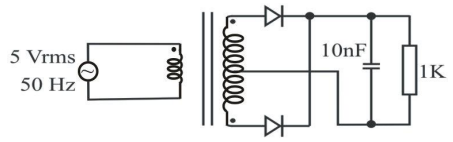
86. Which is the correct waveform across capacitor in the following circuit?



(a)
(b)
(c)
(d)

87. In a common Emitter amplifier, the unbypassed Emitter resistance provides

(a) voltage-shunt feedback
(b) current-series feedback
(c) negative voltage feedback
(d) positive current feedback

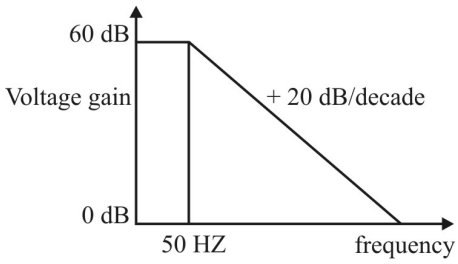
88. For an n-channel E-MOSFET V_{th} =5V, what is the condition to turn ON the device?

(a) $V_{DS} > 5V$ (b) $V_{GS} < 5V$
(c) $V_{GS} > 5V$ (d) $V_{DS} = 5V$

89. The 3-dB frequency of an amplifier is one at which gain reduces to :

(a) unity
(b) zero
(c) $1/\sqrt{2}$ of its midband value
(d) half of its midband value

90. The voltage gain versus frequency curve of an Op-Amp is shown in the given figure. The Gain-Bandwidth product of the Op-Amp is



(a) 30kHz (b) 50kHz
(c) 200KHz (d) 2 MHz

91. Which of the following is NOT a type of switching voltage regulator?

(a) Step-up regulator
(b) Step-down regulator
(c) Inverter voltage regulator
(d) Series voltage regulator

92. The measured value of a capacitor is 100μF. The true value of the capacitor is 110μF. The % relative error is-

(a) 9.99% (b) 9.09%
(c) 4.76% (d) 10%

93. To increase the sensitivity of a deflecting type instrument

(a) Torque/weight ratio should be high
(b) Torque/weight ratio should be low
(c) It should be lightly damped
(d) Control torque must be reduced

94. A linear scale used in ———

(a) Thermocouple meters
(b) Moving iron meters
(c) Hotwire meters
(d) None of these

95. A digital voltmeter has a read-out range from 0 to 9999 counts. When full scale reading is 9.999 V. The resolution of the instrument will be:

(a) 100 mV (b) 99 mV
(c) 9 mV (d) 1 mV

96. Compute the gauge factor if change in resistance is 0.2Ω per Ohm and change is length in 0.6 per meter.

(a) 0.33 (b) 0.6
(c) 0.2 (d) 3

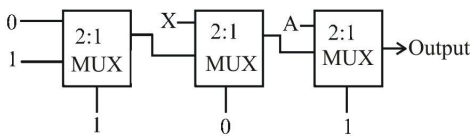
97. Gray code of decimal 3 is :

(a) 1001 (b) 0010
(c) 0110 (d) 1100

98. IC 7400 is a _____ gate IC.

(a) NAND (b) AND
(c) NOT (d) NOR

99. The output of the circuit shown in Figure is.



(a) 0 (b) X
(c) A (d) 1

100. A 5-bit D/A converter has a step-size of 20mV. The full-scale output voltage is _____

(a) 0.5 V (b) 0.8 V
(c) 0.7 V (d) 0.6 V

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SOLUTION : PRACTICE SET- 9

ANSWER KEY

1. (b)	11. (d)	21. (b)	31. (d)	41. (d)	51. (a)	61. (c)	71. (d)	81. (c)	91. (d)
2. (b)	12. (b)	22. (b)	32. (a)	42. (b)	52. (b)	62. (a)	72. (c)	82. (c)	92. (b)
3. (c)	13. (a)	23. (a)	33. (d)	43. (c)	53. (b)	63. (a)	73. (b)	83. (a)	93. (a)
4. (d)	14. (b)	24. (a)	34. (a)	44. (a)	54. (d)	64. (b)	74. (c)	84. (c)	94. (d)
5.(a)	15. (c)	25. (d)	35. (a)	45. (a)	55. (a)	65. (d)	75. (c)	85. (c)	95. (d)
6. (b)	16. (a)	26. (b)	36. (a)	46. (b)	56. (c)	66. (b)	76. (d)	86. (d)	96. (a)
7. (d)	17. (d)	27. (d)	37. (a)	47. (b)	57. (b)	67. (d)	77. (d)	87. (b)	97. (b)
8. (d)	18. (b)	28. (c)	38. (c)	48. (c)	58. (d)	68. (b)	78. (d)	88. (c)	98. (a)
9. (a)	19. (a)	29. (b)	39. (b)	49. (d)	59. (b)	69. (d)	79. (d)	89. (c)	99. (b)
10.(a)	20. (c)	30. (d)	40. (a)	50. (b)	60. (d)	70. (b)	80. (c)	90. (b)	100.(d)

SOLUTION

1. (b)

A geo-stationary satellite is an earth-orbiting satellite and placed directly over the equator. It revolves in the same direction the earth rotates (west to east) and takes 24 hours to complete one rotation. A geostationary satellite is in an orbit that can only be achieved at an altitude very close to 35,786 km (22,236 miles) and which keeps the satellite fixed over one longitude at the equator. The satellite appears motionless at a fixed position in the sky to ground observers. A geostationary satellite is used in Direct broadcast TV, Communication network, global positioning or GPS. Therefore, Remote sensing satellite placed in geostationary orbit .

2. (b)

'Silly point', 'Slip' and 'Gully' are the terms used for cricket fielding positions.

3. (c)

Cheriyal scroll painting is a stylized version of Nakashi art, rich in the local motifs peculiar to the Telangana. They are at present made only in Hyderabad, Telangana.

State	Art Style
Bihar	– Madhubani Art
Maharashtra	– Warli painting
Odisha	– Pattachitra painting
Andhra Pradesh	– Kalamkari painting
Madhya Pradesh	– Gond painting
Rajasthan	– Phad painting, Mandana
West Bengal	– Kalighat painting
Gujarat	– Athiya

4. (d)

Calvin and Hobbes is a popular children's comic strip that discussed topics such as life, live, relationship and various insightful humors. It is a daily American comic strip developed by cartoonist Bill Watterson that was syndicated from 1985 to 1995. Commonly cited as "the last great newspaper comic". It has enjoyed broad and enduring popularity, influence and academic and philosophical interest.

5.(a)

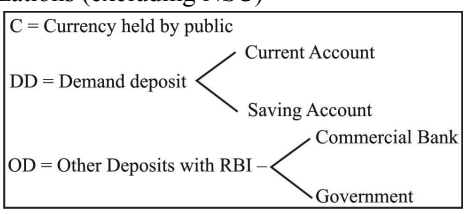
In Indian economy, there are four types of money.

M_1 = Money deposited with the people = C + DD + OD

M_2 = M_1 + Deposit with Post office.

M_3 = M_1 + Net time deposites commercial Banks

M_4 = M_3 + Total deposits with post office savings organizations (excluding NSC)



Hence option (a) is correct.

6. (b)

City councils govern the area that is in transition from rural to urban.

It exercises the legislative powers of city government, including adopting the annual city budget, ordinances and resolutions setting appropriate tax levies, Mayoral veto over ride authority and setting the council agenda.

7. (d)

The Atlas mountain range is located in African continent. It extends across northwestern Africa, Spanning Morocco, Algeria and Tunisia.

8. (d)

River confluence	Prayag
Alaknanda and Dhauliganga	Vishnu Prayag
Nandakini and Alaknanda	Nand Prayag
Alaknanda and Pindar	Karn Prayag
Alaknanada and Mandakini	Rudra Prayag
Bhagirathi and Alakhnada	Dev Prayag

9. (a)

The Bara Imambara of Lucknow is one of the most famous monuments of the city, also known as Asafi Imambara, after the name of the Nawab of Lucknow

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who got it constructed .The Bara Imambara in Lucknow was built by Asaf-ud-daula in 1784. It is believed that the construction of this grand building was started when a devastating famine had hit Awadh, and the nawab's objective was to provide employment for people in the region for almost a decade while the famine lasted.

10.(a)

Incident	**Date**
• Quit India Movement	8 August, 1942
• Cabinet Mission reached Delhi	March 24, 1946
• Rowlatt Act	March 18, 1919
• Dandi March	March 12 to April 6, 1930
• All-India Muslim League	December 30, 1906

It is clear that after the Quit India Movement, the Cabinet Mission was sent to India, whereas all the other events given are before that.

11. (d)

Just as,

$3 + 7 = 10$
$9 + 2 = 11$
$5 + 7 = 12$

And,

$2 + 9 = 11$
$7 + 5 = 12$
$6 + 7 = 13$

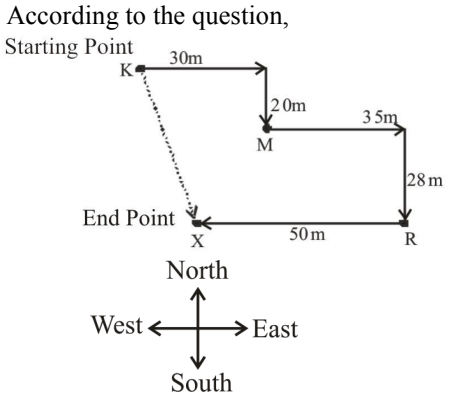
Same as,

$6 + 8 = 14$
$8 + 7 = 15$
$9 + 7 = 16$

Hence, the coded number is 141516.

12. (b)

According to the question,



It is clear from above diagram that point X is in South-East direction with respect to point K.

13. (a)

To be selected	not selected
P1, P6 or P4	P2
P2, P10, P11 or P13	P7
P2, P6, P12 or P11	P4
P8, P13,	P5

The relation of P_3 and P_9 is not mentioned but there is a total of 7 people to be selected. Then both of them will be in the team.

P1, P3, P4, P5, P8, P9, P13

14. (b)

Statement : $P = Q < S \leq V$

Conclusion :

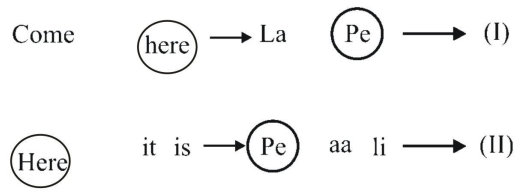
(i) $S > P$ (√)
(ii) $V > Q$ (√)
(iii) $P < V$ (√)

Hence, all the conclusions are true from the above statement.

15. (c)

According to the given statement only inference I is implicit in the statement because the workshop helps in updating the knowledge of teachers timely.

16. (a)



It is clear from the above explanation that statement (1) and statement (2) both are required together.

17. (d)

On adding the sides of the figures in the given pattern,

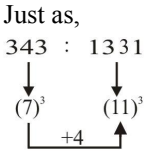
$4 + 5 + 3 + 6 + 3 = ?$

$? = 21$

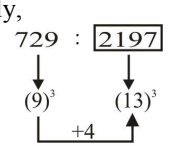
Hence option (d) will be correct.

18. (b)

Just as,



Similarly,



19. (a)

According to the question,

she is [beautiful] → mat mug [bit]

[beautiful] and water → [bit] cap lan

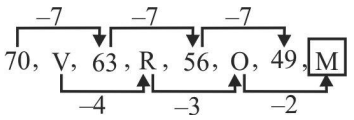
Hence it is clear from above code that 'beautiful' will be written as 'bit'.

20. (c)

It is clear from the given diagrams that option (c) is different from the other.

21. (b)

The given series will be as follows–



Hence, ? = M

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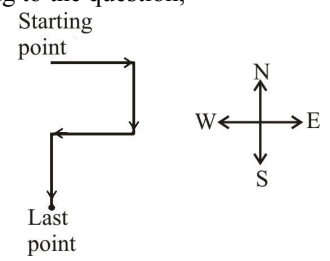
22. (b)

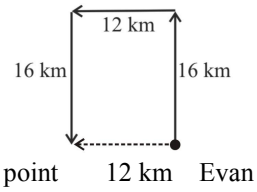
According to the question,



From the given figure, it is clear that Mahesh is in South direction after reaching at the school.

23. (a)

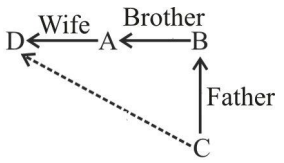
According to the question,



Hence, it is clear that Evan is 12 km away from his residence.

24. (a)

According to the question, on drawing blood relation diagram.



Hence, it is clear from above diagram that D is Aunt of C.

25. (d)

From option (d)-

$$7 < 18 + 2 \wedge 12 > 3 - 2 < 100$$

On changing the symbol with signs,

$$7 - 18 \div 2 \times 12 + 3 = 2 - 100$$

$$7 - 9 \times 12 + 3 = -98$$

$$-108 + 10 = -98$$

$$-98 = -98$$

L.H.S = R.H.S

So, option (d) is correct on interchange of signs.

26. (b)

The second generation computer was introduced in the year 1956. Transistors were used in computers of this generation. Due to transistors the size of the second generation of computer was smaller than the first generation assembly language and high level languages were also used in computers of this generation.

27. (d)

Character or Mark Recognition devices are input devices which are used to read a mark sense answer sheet of particular test. They are used to scan information printed on paper. These devices read the information and convert into digital signal these signals are input to the computer for further processing. The commonly used mark and character recognition devices are- MICR (Magnetic-ink character recognition), OMR (Optical Mark Recognition), OCR (Optical Character Recognition), Magnetic Strip Card, Smart Card etc.

28. (c)

OCR (Optical Character Recognition) is a technology of scanning that recognizes handwritten text and printed text.

29. (b)

Barcode Reader is an input device which is used to read bar coded data. Bar code data is used to gather information about the commodities some example of input devices are as follows– Mouse, Joystick, Light pen, Track ball, Scanner, Graphic tablet, Microphone, Magnetic Ink Character Recognition (MICR), Optical Character Recognition (OCR), Bar Code Reader, Optical Mark Recognition (OMR).

30. (d)

RAM, cache memory, ROM are directly accessed by processor (C.P.U.) because these are all examples of primary memory. Hence, memory card is an example of secondary memory. These are not accessed directly by the CPU.

31. (d)

A storage device a kind of hardware, which is also known as storage or storage media thus has the ability to store information temporarily or permanently. Floppy disk, Hard disk and Punched tape all are example of secondary memory.

32. (a)

WORM, is short form of 'Write-once and read-many. It is a data storage technology mechanism that stores unerasable information.

33. (d)

The full form of HTTPs is Hyper Text Transfer Protocol secure. This is an extended secure version of HTTP. It is used for secure communication on computer network.

34. (a)

(i) TCP/IP is more reliable than OSI.

(ii) TCP/IP does not have very strict boundaries between layers.

Hence, the both statements are correct.

35. (a)

TCP stands for Transmission Control Protocol. It is a group of Internet protocol. It is used for data transmission in communication networks such as the Internet. It provides a two way data stream between remote application.

36. (a)

Trivial File Transfer Protocol (TFTP) is a simple protocol for exchanging files between two TCP/IP machines. TFTP servers allow connections to TFTP clients to send and receive files.

TFTP - Trivial File Transfer Protocol

TCP/IP- Transmission Control Protocol/Internet Protocol

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37. (a)
IMAP (Internet Message Access Protocol) is a protocol used for retrieval and storage of emails via TCP/IP connections to email servers. It is an application layer protocol based on the OSI model.

38. (c)
SMTP is the short form of Simple Mail Transfer Protocol. There is a set of SMTP communication guidelines. Software that allows to transmit electronic mail over the internet allows. SMTP is used to send messages to other computer users based on e-mail addresses.

39. (b)
TCP/IP is the short form of the Transmission Control Protocol/Internet Protocol. TCP ensures end to end delivery of data to different nodes. TCP works in conjunction with IP. Before transferring data, TCP establishes a connection between the source and the destination.

40. (a)
For the Help option in MS Word 365, Word Help can be opened at any point of time by using F1 function key and help option can be accessed from File menu.

41. (d)
In MS-Word, the keyboard shortcut 'Ctrl + E' is used to center align the text. Some keyboard shortcuts are following-
Ctrl + L - Left-align text
Ctrl + R - Right-align text
Ctrl + J - Justify text

42. (b)
Find, Replace, Select options are available in Editing group of Home tab in MS Word 365 whereas Start Dictation option is not available in Home tab and Editing group.

43. (c)
Shift + click a link keyboard shortcuts can be used in Google Chrome to open a link in a new window.

44. (a)
The asterisk wildcard will leave a placeholder that will be filled automatically by the search engine. This wildcard is an easy way to find a parameter if we don't know all the words.

45. (a)
The full form of the internet is an interconnected network. It was developed by Bob Kahn and Vint Cerf in 1969. The network of networks are called internet and its information and data exchanged through this medium. The World Wide Web is a service of the internet. Through this web pages are received in which text, images, audio, video and other multimedia are also available. Statement (a) is false regarding internet.

46. (b)
Prime number are the numbers, which are only divisible by 1 and itself.
From the given options-
(a) 143 is divisible by 11, so it is not a prime number.
(b) 173 is divisible by 1 and itself, so it is a prime number.
(c) 123 is divisible by 3, so it is not a prime number.
(d) 213 is divisible by 3, so it is not a prime number.

47. (b)
According to question-

$$0.3\div\left(0.6\times\frac{2}{3}\right)\times0.2\left(0.2\times2\div\frac{1}{2}+0.2\right)$$

$$=0.3\div(0.4)\times0.2(0.2\times4+0.2)$$

$$=0.3\div(0.4)\times0.2(1)$$

$$=\frac{0.3}{0.4}\times0.2$$

$$=0.15$$

48. (c)

$$0.\overline{56}+0.\overline{43}+0.\overline{89}$$

$$=\frac{56}{99}+\frac{43}{99}+\frac{89}{99}$$

$$=\frac{188}{99}=1+\frac{89}{99}=1.\overline{89}$$

49. (d)
Given,

$$493\div29=17,$$

So, $\frac{493}{17}=29$

$$4.93\div0.0017=\frac{4.93}{0.0017}$$

$$=\frac{4.93\times10000}{0.0017\times10000}=\frac{49300}{17}$$

$$=2900$$

50. (b)
According to the question,

$20-14=6$
$25-19=6$
$35-29=6$
$40-34=6$

Hence, the required number
= (LCM of 20, 25, 35 and 40) – 6

2	20	25	35	40
2	10	25	35	20
2	5	25	35	10
5	5	25	35	5
5	1	5	7	1
7	1	1	7	1
	1	1	1	1

$$=(2\times2\times2\times5\times5\times7)-6=1400-6=1394$$

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51. (a)

LCM of 15 and 25

$15 = 3\times 5$

$25 = 5 \times 5$

LCM = 75

and, HCF = 5

Hence Product = LCM × HCF

= 75 × 5

= 375

52. (b)

Let the first number and second number are 3x and 2x respectively.

According to the question,

$$\frac{3x-8}{2x-6}=\frac{5}{4}$$

$$12x-32=10x-30$$

$$12x-10x=-30+32$$

$$2x=2$$

$$x=1$$

Hence the numbers $3x = 3\times1 = 3$

$2x = 2\times1 = 2$

53. (b)

Let the number is x

According to the question,

$$x\times\frac{50}{100}=x\times\frac{4}{5}-21$$

$$\Rightarrow \quad \frac{x}{2}=\frac{4x}{5}-21$$

$$\Rightarrow \quad \frac{4x}{5}-\frac{x}{2}=21$$

$$\Rightarrow \quad \frac{8x-5x}{10}=21$$

$$\Rightarrow \quad 3x=210$$

$$\Rightarrow \quad x=70$$

54. (d)

According to the question,

Area of base of cylinder = 346.50 cm.

$$\pi r^2 = 346.50$$

$$r^2=\frac{34650\times7}{22\times100}$$

$$r=\frac{21}{2}$$

total surface area of cylinder $=2\pi r(h+r)$

$$=2\times\frac{22}{7}\times\frac{21}{2}\left(21+\frac{21}{2}\right)$$

$$=2\times\frac{22}{7}\times\frac{21}{2}\times21\left(1+\frac{1}{2}\right)$$

$$=2\times\frac{22}{7}\times\frac{21}{2}\times21\times\frac{3}{2}$$

$$=2079\ (cm)^2$$

55. (a)

Let a boy do that work in x days and a girl can do that work in y days.

According to the question,

$$\frac{3}{x}+\frac{5}{y}=\frac{1}{6}\text{.....(i)} \quad , \quad \frac{2}{x}+\frac{7}{y}=\frac{1}{8}\text{.....(ii)}$$

By subtracting eq (i) ×2 and eq (ii) ×3,

$$\frac{6}{x}+\frac{10}{y}=\frac{1}{3}$$

$$=\quad \frac{6}{x}+\frac{21}{y}=\frac{3}{8}$$

$$\frac{10}{y}-\frac{21}{y}=\frac{1}{3}-\frac{3}{8}$$

$$-\frac{11}{y}=\frac{8-9}{24}$$

$$-\frac{11}{y}=-\frac{1}{24}$$

$$y=264$$

∴ Time taken by 8 girl to complete the work

$$=\frac{264}{8}=33 \text{ days}$$

56. (c)

Time taken to cover a distance of 10 km with a speed of 12km/h $=\frac{10}{12}$ h

Time taken to cover a distance of 12 km with a speed of 10 km/h

$$\text{Average speed}=\frac{\text{Total distance}}{\text{Total time}}$$

$$=\frac{10+12}{\frac{10}{12}+\frac{12}{10}}$$

$$=\frac{22}{\frac{100+144}{120}}$$

$$=\frac{22}{244/120}$$

$$=\frac{22}{244}\times120$$

$$=10\cdot8196$$

$$=10\cdot8 \text{ km/h (Approx)}$$

57. (b)

Let principal amount = ₹ P

Amount = ₹ 2P

Time (t) = 5 years

Rate of interest = r %

According to the question,

Amount = Principal + Interest

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$$2P = P + \frac{P \times r \times 5}{100}$$

$$\Rightarrow P = \frac{P \times r}{20}$$

$$\Rightarrow r = 20$$

$$\therefore \text{ Amount } = P + \frac{P \times 20 \times 8}{100}$$

$$= P + \frac{8P}{5}$$

$$= \frac{13P}{5} = 2\frac{3}{5}P$$

Hence at the rate of simple interest, this amount will become $2\frac{3}{5}$ times of itself after 8 years.

58. (d)

Cost price of car = ₹ 1,50,000

X will sell the car to Y after taking 5% profit = 105% of 1,50,000

$$= 150000 \times \frac{105}{100}$$

= ₹ 157500

Now according to the question Y will sell it back to X at a loss of 1%

$$= \frac{99}{100} \times 157500$$

= ₹ 155925

Hence profit of X = 157500 – 155925

= ₹1575

59. (b) According to the question-

$$a + \frac{1}{a} = -3$$

Squaring on both sides,

$$\left(a + \frac{1}{a}\right)^2 = (-3)^2$$

$$a^2 + \frac{1}{a^2} + 2 = 9$$

$$a^2 + \frac{1}{a^2} = 7 \text{---------(I)}$$

By cubing both sides,

$$\left(a^2 + \frac{1}{a^2}\right)^3 = (7)^3$$

$$a^6 + \frac{1}{a^6} + 3a^2 \times \frac{1}{a^2}\left(a^2 + \frac{1}{a^2}\right) = 343$$

…From equation (I)

$$a^6 + \frac{1}{a^6} = 343 - 21 = 322$$

60. (d)

x = a sin θ, y = b tan θ

$$\therefore \quad \frac{a}{x} = \frac{1}{\sin\theta}, \frac{b}{y} = \frac{1}{\tan\theta}$$

then, $$\frac{a^2}{x^2} - \frac{b^2}{y^2} = \frac{1}{\sin^2\theta} - \frac{\cos^2\theta}{\sin^2\theta}$$

$$= \frac{1 - \cos^2\theta}{\sin^2\theta} \qquad (\therefore \sin^2\theta + \cos^2\theta = 1)$$

$$= \frac{\sin^2\theta}{\sin^2\theta}$$

$$= 1$$

61. (c)

Suppose numbers is as a, b, c where a> b> c

$$\text{Mean} = \frac{a+b+c}{3} = 35$$

a+b+c = 105 .....(1)

range a-c = 24 .....(2)

and a-b = 3(b-c) .....(3)

where a-b = 3b -3c

a+3c = 4b

a + c = 4b-2c .....(4)

Substituting the value of a+c from aquation (4) in equation (1)

b+ 4b-2c=105

5b-2c= 105.....(5)

Substituting a = 24 + c in equation (1) from equation (2),

24+c + b + c =105

b+2c = 81 .....(6)

Solving equation (5) and (6)

b = 31 c= 25

from equation (1)

a+31+25= 105

a + 56 = 105

$\boxed{a = 49}$

Hence, the largest number = (a) = 49

62. (a)

Given,

$$\sqrt{7} = 2.6457$$

and $\sqrt{3} = 1.732$

then,

$$\frac{1}{\sqrt{7} - \sqrt{3}} = \frac{\left(\sqrt{7} + \sqrt{3}\right)}{\left(\sqrt{7} - \sqrt{3}\right) \times \left(\sqrt{7} + \sqrt{3}\right)} = \frac{\sqrt{7} + \sqrt{3}}{4}$$

$$= \frac{2.6457 + 1.732}{4} = \frac{4.3777}{4} = 1.0944$$

Hence, the required value is 1.0944.

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63. (a)

Let the age of John is x years and age of Jill is y years.

According to the question,

$y - x = 15$ .....(i)

And $(y-12) = (x - 12)\ 1.5$

$y - 12 = 1.5\ x - 18$

$y - 1.5\ x = -6$ .....(ii)

From equation (i) and (ii)−

$y - x - (y - 1.5x) = 15 - (-6)$

$y - x - y + 1.5x = 15 + 6$

$0.5\ x = 21$

$x = \frac{21}{0.5}$

$x = 42$

Putting the value of x in equation (i)−

$y - 42 = 15$

$y = 15+42 = 57$

So, present age of Jill is 57 years.

64. (b)

Let the extra time taken by tap Q to fill the bucket is t minutes.

According to the question,

$$\frac{3}{12} + \frac{3+t}{15} = 1$$

$$\frac{3+t}{15} = 1 - \frac{1}{4}$$

$$\frac{3+t}{15} = \frac{3}{4}$$

$12 + 4t = 45$

$4t = 33$

$$t = \frac{33}{4}$$

$$t = 8\frac{1}{4} = 8 \text{ min } 15 \text{ sec.}$$

65. (d)

$$\frac{\text{Sand}}{\text{Macadam}} = \frac{41}{30} \text{ and } \frac{\text{Cement}}{\text{Macadam}} = \frac{7}{6} = \frac{7\times5}{6\times5} = \frac{35}{30}$$

$$\text{So } \frac{\text{Sand}}{\text{Cement}} = \frac{\text{Sand}}{\text{Macadam}} \times \frac{\text{Macadam}}{\text{Cement}} = \frac{41}{30} \times \frac{30}{35} = \frac{41}{35}$$

$= 41:35$

66. (b)

Angle is defined as the ratio of the length of arc to the radius.

$$\text{Angle } (\theta) = \frac{\text{length of arc}(\ell)}{\text{radius}(r)}$$

$$\theta = \frac{[M^o LT^o]}{[M^o LT^o]} = 1$$

Hence, an angle is a dimensionless quantity.

67. (d)

$$\text{volume} = \frac{\text{mass}}{\text{density}}$$

$$\text{Volume of cube} = \frac{17.28\times10^3}{10\times8} = 216\text{cm}^3$$

$\because$ Volume of cube $= a^3$ (a = side of cube)

$a^3 = 216\ \text{cm}^3$

$a = (216)^{\frac{1}{3}}\ \text{cm} = 6\ \text{cm}$

68. (b)

Average speed is defined as the total path length covered by an object which is divided by time interval during which the motion occurred.

69. (d)

If the total energy of the reactants is more than the products of the reactions, then the energy is released, in such reactions in the form of heat and are called as an exothermic reaction.

Example:- formation of water, burning of graphic in air etc.

70. (b)

Let the Fahrenheit and Celsius scale are oriented one (x). then,

$$\frac{C}{5} = \frac{F-32}{9}$$

Where, $C° = F° = x°$

$$\frac{x°}{5} = \frac{x°-32}{9}$$

$9x° = 5x° - 32 \times 5$

$9x° = 5x° - 160$

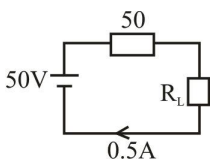
$4x° = -160$

$$x° = -\frac{160}{4}$$

So, $x° = -40°$

71. (d)

Given, circuit is -



Current in the circuit -

$$0.5 = \frac{50}{50+R_L}$$

$25+0.5R_L = 50$

$R_L = 50\Omega$

Power consumption in R_L, $P = I^2R_L$

$= (0.5)^2\times50$

$= 0.25 \times50$

$= 12.5\text{Watt}$

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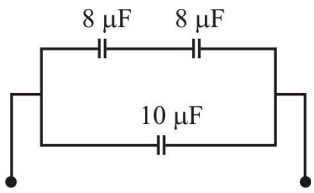
72. (c)



When to 8μF capacitor connected in series

$C_1 = \frac{8\times 8}{8+8} = 4\mu f$

When 10μF capacitor connected in parallel with 8μF of 2 capacitor in series combination-

$C = C_1 + 10$

$= 4 + 10 = 14\mu F$

73. (b)

Given that–

$L_1 = 0.2H$, $L_2 = 2.45H$, $M = 0.14H$, $K = ?$

$M = K\sqrt{L_1 \cdot L_2}$

Where, K = coefficient of coupling

M = Mutual inductance

$0.14 = K\sqrt{0\cdot 2\times 2\cdot 45}$

$0.14 = K\sqrt{0\cdot 49}$

$K = \frac{0.14}{0.7}$

$\boxed{K = 0.2}$

74. (c)

Given-

$i_1 = 2A$, $i_2 = 4A$, $t = 0.05$ sec, $e = 8V$

$\because \quad e = L\frac{di}{dt}$

$8 = L\frac{(4-2)}{0.05} \Rightarrow L = \frac{8\times 0.05}{2} = 0.2H$

$L = 0.2H$

75. (c)

Induction type 1–ϕ energy meter :

$\boxed{E = \int_0^t P.dt}$ or energy = ∫VIcosϕdt

⇒ Energy is measured in kWh.

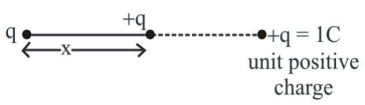
1 unit = 1 kWh

1 unit = 1000 W × 60 × 60 sec

$= 1000\frac{\text{Joule}}{\text{Sec}} \times 3600 \text{ sec}$

$\boxed{1 \text{ unit} = 3.6 \times 10^6 \text{ Joule}}$

76. (d)



The work done in bringing a unit positive charge from infinite distance to the electric field is equal to its potential energy.

Therefore $V = \frac{W}{q}$

or $W = qV$

if q = 1 coulomb and V = 1 Volt

Then W = 1eV

77. (d)

Given,

$M = 150$ A/m

$\mu = 1.5\times 10^{-5}$ H/m

$\mu_r = 30$

$\mu_0 = 4\pi\times 10^{-7}$

$\because \quad \mu_r = \frac{\mu}{\mu_0}$

$= \frac{1.5\times 10^{-5}}{4\pi\times 10^{-7}}$

$= 11.94$

$M = \chi_m H$

Where, χ_m = Magnetic susceptibility

$\chi_m = \frac{M}{H}$

$\chi_m = \mu_r - 1 \Rightarrow \chi_m = 11.94 - 1 = 10.94$

Magnetic field intensity,

$H = \frac{M}{\chi_m} = \frac{M}{\mu_r - 1} = \frac{150}{10.94}$

H = 13.715A/m

78. (d)

The source of a magnetic field is current loop. When current flow in a conductor, a magnetic field is generated around the conductor. Similarly, if current flow in two parallel conductor then the force will be attraction or repulsion between them.

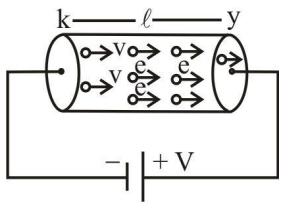
79. (d)

The poynting vector may be defined as power per unit area i.e. It may be defined as power spectral density.

$\boxed{\vec{p} = |\vec{E}\times\vec{H}|}$ watt / m^2

80. (c)

Charge velocity- The speed of charged flows in a conductor is called charge velocity.



$\boxed{V_d = \frac{I}{neA}}$

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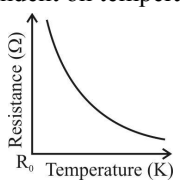
Where, I = flowing current
n = Electron density
e = Charge of electron
A = Area of cross section.

81. (c)
The temperature co-efficient of resistance of an insulator is negative and dependent on temperature.



82. (c)
The current flow in semiconductors due to both drift current and diffusion current. The flow of current in a semiconductors is due to both minority charge carrier and majority charge carrier.
The minority charge carrier depends on the temperature while majority carrier depends upon doping.

83. (a)
The diffusion capacitance of a P-N junction diode increases exponentially with forward bias voltage.

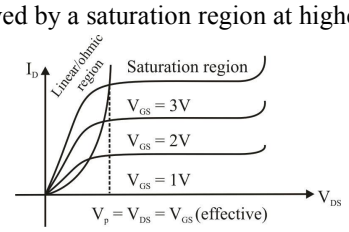
$$C_D \propto e^{\frac{V_D}{\eta V_T}}$$

- Diffusion capacitance is also called storage capacitance and it occurs when the diode is in forward bias.
- Diffusion capacitance $(C_D) = \frac{\tau \cdot I_S}{\eta V_T}$

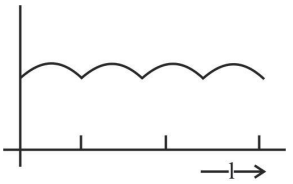
84. (c)
N-type transistors are preferred over p-type transistors because mobility of electrons is more than that of holes.

	Ge	Si
e^- mobility(μ_n)	3800 cm^2/Vsec	1300 cm^2/Vsec
Hole mobility(μ_p)	1800 cm^2/Vsec	500 cm^2/Vsec
μ_n/μ_p	2.1:1	2.6:1

85. (c)
The output V-I characteristics of an enhancement type MOSFET has an ohmic region at low voltage value followed by a saturation region at higher voltages.



86. (d)
The output voltage of the full wave rectifier will be received across the capacitor. Due to which the capacitor will be charged to its peak value in every half time interval. So the output get near to smooth dc wave.

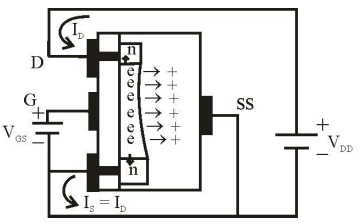


87. (b)
In a Common Emitter amplifier, the unbypassed Emitter resistance provides current-series feedback.

Performance parameter-
- Input impedance increases.
- Provides linear operation for large input signals.
- This current acts as series feedback.

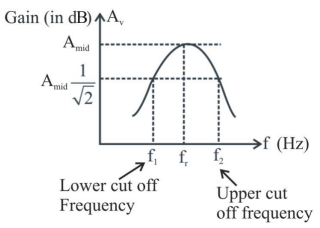
88. (c)
The condition to turn ON the device is

$$V_{GS} > V_{TH}$$
$$V_{GS} > 5V$$



89. (c)
The 3-dB frequency of an amplifier is one at which gain reduces to $1/\sqrt{2}$ of its midband value

$$BW = f_2 - f_1 = \frac{f_r}{Q}$$



90. (b)
60dB = 20 $\log_{10}$ gain, gain = 10^3
Bandwidth = 50 – 0 = 50Hz
[Gain Bandwidth product = Gain × BW]
= 50 × 10^3 = 50KHz

91. (d)
Switching voltage regulator:- Switching power supply its most advantage is efficiency, size and weight. Its design is complex, capable of handling higher power. Switching voltage regulator output voltage was higher than input voltage and it invest less, while series voltage starts decreasing and the comparator circuit instructs the control element to increases the control element to increases its output.
There are three types of switching voltage regulator-
(i) Step up (ii) Step down (iii) Inverter voltage regulator

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92. (b)

$$\%\text{Relative error} = \frac{\text{Measured Value}}{\text{True Value}} - 1$$

$$= \frac{100}{110} - 1 = -9.09\%$$

Relative error 9.09%.

93. (a)

To increase the sensitivity of a deflecting type instrument torque to weight ratio should be high.

$$\boxed{\text{Sensitivity} = \frac{\text{Torque}}{\text{Weight}}}$$

and $$\boxed{\text{Sensitivity} \propto \frac{1}{\text{Stability}}}$$

94. (d)

Sr..	Instruments	Scale
1.	Thermocouple meter	Non-linear
2.	Moving iron meter	Non-linear
3.	Hot wire meter	Non-linear
4.	PMMC	Linear
5.	Induction type meter	Non-linear
6.	Electrodynamometer	Non-linear
7.	Electrostatic type meter	Non-linear
8.	Rectifier type meter	Linear

95. (d)

Resolution of the instrument = 1 count in 9.999

$$\text{Resolution} = \frac{\text{FSD}}{10^n}$$

$$= \frac{1}{10^4} \times 9.999$$

$$= 0.9999 \times 10^{-3} \text{ Volt}$$

$$\simeq 1 \text{ mVolt}$$

96. (a)

Given, $\Delta R = 0.2\Omega$, $R = 1\Omega$, $\Delta\ell = 0.6\text{m}$

$$\ell = 1\text{m}$$

$$\text{Gauge factor} = \frac{\Delta R / R}{\Delta\ell / \ell} = \frac{0.2/1}{0.6/1}$$

$$\boxed{K = \frac{0.2}{0.6} = 0.33}$$

97. (b) Decimal 3, in binary = 0011

Binary code $b_3 \oplus b_2 \oplus b_1 \oplus b_0$

Gray code $g_3 \quad g_2 \quad g_1 \quad g_0$

$b_3 \quad b_3 \oplus b_2 \quad b_2 \oplus b_1 \quad b_1 \oplus b_0$

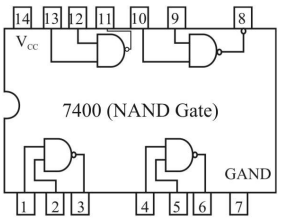
$0 \quad 0 \oplus 0 \quad 0 \oplus 1 \quad 1 \oplus 1$

$0 \quad 0 \quad 1 \quad 0$

Hence the gray code of 0011 will be 0010.

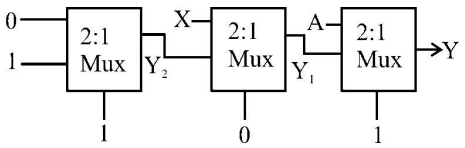
98. (a)

IC 7400 is a NAND gate IC



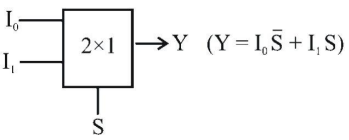
IC No	IC NAME
7400	NAND gate
7402	NOR gate
7404	NOT gate
7408	AND gate
7232	OR gate
7286	EX – OR gate
747266	EX – NOR gate

99. (b)



We know that

Output of MUX



$(Y = I_0\bar{S} + I_1 S)$

So,

$$Y_2 = 0.\bar{1} + 1.1$$

$$Y_2 = 1$$

and $$Y_1 = X.\bar{0} + Y_2.0$$

$$Y_1 = X$$

And output $Y = A.\bar{1} + Y_1.1$

$$Y = Y_1$$

$$\boxed{Y = X} \quad (\because Y_1 = X)$$

100. (d)

Given-

n = 5 bits, step size= 20 mV

The full scale output voltage

$$V_{FS} = (2^n - 1) \times \text{step size}$$

$$V_{FS} = (2^5 - 1) \times 20 \times 10^{-3}$$

$$V_{FS} = \frac{31 \times 20}{10^3}$$

$$\boxed{V_{FS} = 0.62\text{V}}$$

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PRACTICE SET - 10

1. Which of the following is correct about International Space Station (ISS)?
(a) It has been assembled mainly by USA and China.
(b) It is expected to operate until 2050.
(c) It is located in low earth orbit.
(d) Only astronauts from USA and China are allowed to visit ISS.

2. Nixan Gold Cup is associated with which sport?
(a) Basketball (b) Badminton
(c) Football (d) Volleyball

3. Traditional weaving of Gujarat is known as ..... .
(a) Tushar (b) Kanjivarm
(c) Jamdani (d) Patola

4. Who is the youngest Indian girl to climb Mount Everest?
(a) Dipika Rathore (b) Bachhendri Pal
(c) Shivangi Pathak (d) Premlata Agrawal

5. Open Market Operation refers to the sale and purchase of .....by RBI.
(a) Immovable Property
(b) Foreign Currency
(c) Bunions
(d) Government Securities

6. What is term of office of the Chief Election Commissioner of India?
(a) Five years term or continue till the age of 65, whichever is earlier
(b) Six years term or continue till the age of 70, whichever is earlier
(c) Six years term or continue till the age of 65, whichever is earlier
(d) Four years term or continue till the age of 60, whichever is earlier

7. The Appalachians mountain region is a part of which continent?
(a) South America (b) Asia
(c) North America (d) Africa

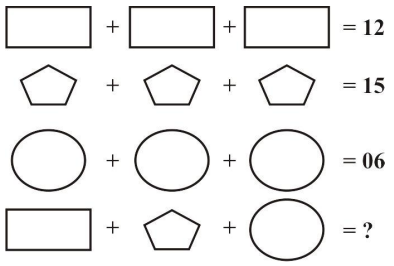
8. Bari Doab is the area between:
(a) Ravi and Ganga (b) Beas and Ravi
(c) Sutlej and Ravi (d) Beas and Sutlej

9. The constructon of ___ was started in 1632 AD and it was completed at the end of 1648 AD.
(a) Taj Mahal (b) Qutubminar
(c) Red Fort (d) Moti Mahal

10. Which of the following events is known as the Calcutta killings ?
(a) Quit India Movement
(b) Direct Action Day
(c) Salt Satyagraha
(d) Bengal Satyagraha

11. Four abbreviations have been given out of which three are a like in same manner and one is different. Select the odd one.
(a) NTPC (b) CRPF
(c) BHEL (d) SAIL

12. Study the given pattern carefully and select the number that can replace the question mark (?) in it



(a) 12 (b) 8
(c) 13 (d) 11

13. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.
Statements:
1. All the cars are four-wheelers
2. All the four-wheelers are vehicles
Conclusions:
I. All the vehicles are four-wheelers
II. All the cars are vehicles
(a) Either I or II (b) Both I and II
(c) Only I (d) Only II

14. Statement:
F ≤ H < J ≥ V > E
Conclusion :
I. H < V
II. J > E
III. F< E
(a) Only conclusion I is correct.
(b) Only conclusion II is correct.
(c) Only conclusion III is correct.
(d) Only conclusion I and III are correct.

15. Statement: Honesty is the best policy.
Inference :
I. Honest people are policy makers.
II. Each policy must contain honesty.
(a) Neither inference (I) nor (II) is implicit
(b) Only inference (I) is implicit
(c) Only inference (II) is implicit
(d) Both inference (I) and (II) are implicit/

16. A question is given followed by two statements labelled I and II. Identify which of the statements is/are sufficient to answer the question.

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Question:
In which year was Dheeraj born?
Statements:
(I) Dheeraj at present is 35 years younger to his mother Parvati.
(II) Dheeraj's brother Shan, who was born in 1998, is 45 years younger to his mother Parvati.
(a) I alone is sufficient, while II alone is not sufficient
(b) Both I and II together are sufficient
(c) Either I alone or II alone is sufficient
(d) II alone is sufficient, while I alone is not sufficient

17. How many words can be formed with or without meaning by using all letters of the world DELHI?
(a) 1 (b) 20
(c) 120 (d) 5

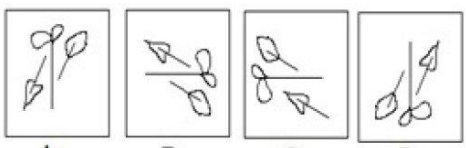
18. Select the number from among the options given that is related to the fifth number in the same way as the second and fourth numbers are related to the first and third numbers respectively
11 : 143 :: 13 : 221 :: 7 : ?
(a) 35 (b) 56
(c) 57 (d) 77

19. In this question, a group of numbers/symbols is coded using letters as per the table given below and the conditions which follow. The Correct combination of codes following the condition is your answer.

Number/Symbol	5	4	+	@	?	3	<	#	2	%	!	9	=	6
Code	B	S	R	T	U	P	D	Y	A	V	C	X	E	H

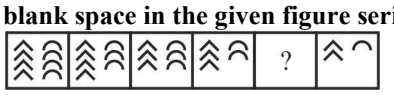
Conditions:
(i) If the first element is a symbol and the last a number, the codes for these two are to be interchanged.
(ii). If the first element is an odd number and the last, an even number, the first and last elements are to be coded as ∅.
(iii). If both second third elements are either symbols or numbers, the third element is to be coded as the code for the second element.
How will '5% = 3 ! 9' be coded?
(a) ∅VEPC∅ (b) BVVPCX
(c) XVEPCB (d) BVEPCX

20. Four figures have been given, out of which three are alike in some manner and one is different. Select the odd one.



A. B. C. D.
(a) C (b) A
(c) D (d) B

21. Select the option that will correctly fit in the blank space in the given figure series.



(a) (b)
(c) (d)

22. During his morning walk Vidyanshu walks some kilometer towards the sun, after some time, he turns to his right and walks 5 km. He turns right again and continue to walking, finally in which direction is Vidyanshu walking?
(a) East (b) South
(c) North (d) West

23. According to the directions given by the coach, Jhulan walks 7 metres to the south-east from point X. Then Jhulan walks 14 metres to the west. She then walks 7 metres to the north-west. Finally, Jhulan walks 4 metres to the east and reaches point Y. What is the shortest distance between X and Y?
(a) 7 meters (b) 18 meters
(c) 10 meters (d) 19 meters

24. If I is J's maternal uncle, K's son, M's only sibling, L's father and N's nephew, how is M related to J
(a) Mother (b) Cousin
(c) Father (d) Aunt

25. Interchanging which two signs will make the following equation correct?
$16 + 4 \div 2 - 21 \times 7 = 21$
(a) + and × (b) + and ×
(c) – and ÷ (d) × and ÷

26. In which of the following generation of computers C++, COBOL and Java programming language were used?
(a) Fourth (b) Third
(c) Fifth (d) First

27. A/An _____ is an output device that produces high quality graphics using an ink pen.
(a) Dot Matrix Printer (b) Plotter
(c) VDU (d) Inkjet Printer

28. Which of the following is NOT a type of monitor?
(a) TFT Monitor
(b) High-Definition Multimedia Interface (HDMI)
(c) LCD Monitor
(d) CRT Monitor

29. Computer monitor is also known as-
(a) Video Display Unit
(b) Vertical Dialysis Unit
(c) Vertical Display Unit
(d) Video Dialysis Unit

30. A computer store its permanent memory on:
(a) Mother Board (b) Hard Disc
(c) Monitor (d) C.P.U.

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31. Which is not a secondary storage device?
(a) CD (b) RAM
(c) DVD-ROM (d) Floppy

32. Which memory isn't accessed directly by the CPU, instead, data accessed from this memory is first loaded into RAM and is then sent to the processor?
(a) Secondary memory
(b) Volatile memory
(c) Primary memory
(d) RAM

33. Which of the following options correctly defines a firewall (in the context of computing)?
(a) It is a hardware device
(b) It is the name of a software
(c) It is a combination of both, software and hardware devices to permit or deny network transmission based on a set of rules
(d) It is a combination of software and hardware-based devices to permit any and every network transmission

34. Which of the following statements about firewall (in the context of computing) is incorrect?
(a) It is a combination of both, software and hardware devices.
(b) It is frequently used to protect a computer network from unauthorised access.
(c) It is unable to permit legitimate communication to pass
(d) It permits network transmission based on a set of rules.

35. A firewall is
(a) an established network performance reference point
(b) a network security system designed to isolate a private network from a public network
(c) a virus that infects macros
(d) a predefined encryption key used to encrypt and decrypt data transmissions

36. Which of the following is not a menu bar option in MS-Word 365?
(a) References (b) Dictate
(c) Mailings (d) Developer

37. A footnote appears_____ in an MS-Word 365 document.
(a) A top of page
(b) On top of the document
(c) Below the document
(d) At bottom of page

38. Which of the following indent book styles is used for printing and when you select it, the left and right margins becomes inside and outside margin in MS Word 365?
(a) Mirror (b) Right
(c) Left (d) Special

39. Which of the following statements is correct about the Internet?
(a) Internet and World Wide Web are the same.
(b) It is collection of web pages that is accessed through browsers.
(c) It uses the TCP/IP protocol.
(d) It is a private network that connects computers of an organisation.

40. What is the full form of PDN?
(a) Pocket Data Network
(b) Packet Data Network
(c) Packet Discharged Network
(d) Pocket Discharged Network

41. Internet, initially started as–
(a) TCP/IP experiment
(b) Network for the defense force of America
(c) Group of research scientists of Bell Lab
(d) Contribution was done by all the above institutions

42. Web browsers store the URLs you visit most often, which helps you jump to a web page from a list instead of typing the URL multiple times. In what context is this list talking?
(a) History (b) Cookies
(c) Bookmarks (d) Downloads

43. Which of the following are small programs that extend or extend the browsers features?
(a) Cookies (b) Favorites
(c) Add-ons (d) Bookmarks

44. Identify whether the given statements are true or false.
(i) Lycos is a web search engine.
(ii) To reload your web browser you have to press 'Ctrl + F5' keyboard shortcut.
(a) (i) False, (ii) True (b) (i) True, (ii) False
(c) (i) False, (ii) False (d) (i) True, (ii) True

45. In Doordarshan broadcasting, picture message are transmitted through–
(a) By amplitude modulation
(b) By frequency modulation
(c) Phase modulation
(d) Angle modulation

46. How many total prime numbers are in first 200 odd natural numbers?
(a) 45 (b) 49 (c) 50 (d) 46

47. $\{20-(25-33)\}\div\{-5\times4-(-6)\}+56\div(-27+13)=?$
(a) -2 (b) -6
(c) -4 (d) 4

48. Correct expression of $1.4\overline{27}$ = ? (Bar sign indicates to recurring decimal)
(a) $\frac{1427}{1000}$ (b) $\frac{157}{110}$
(c) $\frac{1427}{10000}$ (d) $\frac{157}{111}$

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49. Which of the following is true?
(a) $\frac{29}{6}=\frac{53}{12}$ (b) $\frac{29}{6}=\frac{43}{12}$
(c) $\frac{29}{6}>\frac{43}{12}$ (d) $\frac{29}{6}<\frac{43}{12}$

50. Three containers contain 72 litres, 90 litres and 144 litres of milk respectively. What should be the biggest 'measuring -can', which can measure all the different quantities exactly (Without a remainder)?
(a) 17 litres (b) 18 litres
(c) 11 litres (d) 13 litres

51. Three numbers in the ratio 3:4:5 have the LCM 2400. What is the HCF of these number?
(a) 80 (b) 40
(c) 120 (d) 200

52. The ratio of the sum of money Arun and Ahaan had is 9 : 5. If Arun gives ₹12 from his share to Ahaan, then the ratio will change to 4 : 3. How much money did Arun have initially?
(a) ₹144 (b) ₹126
(c) ₹108 (d) ₹90

53. Find the value of x, if 20% of 75 = 225 –x% of 420.
(a) 50 (b) 1535
(c) 20 (d) 3

54. The total surface area of a solid cylinder is 462 cm^2. Its curve surface is one third of the entire surface area. Find its volume:
(a) 964 cm^3 (b) 810 cm^3
(c) 539 cm^3 (d) 1024 cm^3

55. A and B working together can complete a work in 10 days. C alone can complete the same work in 14 days. If A, B and C work together, then how many days will they take to complete three - fifth of the same work?
(a) 3 (b) $\frac{7}{2}$
(c) $\frac{7}{3}$ (d) $\frac{35}{6}$

56. On increasing the speed 5 km/hr of a train. It takes 2 hour less in covering a distance of 300 km find its general speed?
(a) 30 km/hr (b) 25 km/hr
(c) 20 km/hr (d) 35 km/hr

57. If the simple interest is 12.5% more than the principal and the number of years. (n) and the rate (r) is numerically in a ratio of 2:1 then find the value of n and r.
(a) n = 12, r = 6% (b) n = 15, r = $7\frac{1}{2}$%
(c) n=20, r=10% (d) n= 14, r = 7%

58. Ram Kumar bought two LED TV sets for ₹41000. By selling one at a profit of 20% and the other at a loss of 15%, he found that the selling prices of both the TV sets are the same. Find his overall gain or loss.
(a) ₹ 400 profit (b) ₹ 200 loss
(c) ₹ 200 profit (d) ₹ 400 loss

59. When $3x^2+2ax+4b$ is divided by x + 3, leaves a remainder of 15 and when $2x^2+3bx+5a$ is divided by x-3, leaves a remainder 65 then the value of a+b is.
(a) 9 (b) 6
(c) 7 (d) 11

60. In a triangle ABC, the lengths of its sides $\overline{AB}, \overline{AC}$ and $\overline{BC}$ and are 4 cm, 5 cm and 6 cm respectively. An angle bisector $\overline{AD}$ is drawn from A onto $\overline{BC}$, intersecting at D. Find $m(\overline{BD})$, correct to two places of decimal.
(a) 1.50 cm (b) 2.25 cm
(c) 3.00 cm (d) 2.67 cm

61. If the mean and median of the numbers 3, 4, a, b, 10 are 6 and 5 respectively where a>b, What will be the value of a and b.
(a) 7,6 (b) 5,8
(c) 6,7 (d) 8,5

62. If $\sqrt{50}+\sqrt{128}=\sqrt{N}$ then what is the value of N?
(a) 26 (b) 390
(c) 338 (d) 182

63. My age is 5 times more than my son's age. After six years, my age will be three times of my son's age. After two years what will be ours age.
(a) 30 years and 10 years
(b) 32 years and 8 years
(c) 26 years and 12 years
(d) 28 years and 14 years

64. Pipe A can fill an empty reservoir in 6.8 hrs while pipe B can fill it in 10.2 hrs. Only pipe B is opened for 1.7 hours, after which pipe A is also opened. What is the total time to fill the reservoir?
(a) 5 hours 6 minutes (b) 5 hours 10 minutes
(c) 5 hours 12 minutes (d) 5 hours 5 minutes

65. a : b = 7 : 9, b : c = 5 : 11. Then find a : b : c ?
(a) none of these (b) 99 : 45 : 35
(c) 45 : 35 : 99 (d) 35 : 45 : 99

66. Which one of the following physical quantities is a scalar quantity?
(a) Dipole moment
(b) Angular momentum
(c) Torque
(d) Electric current

67. If the specific gravity of a body is less than1, it will float on ___.
(a) Water (b) Liquid
(c) Mercury (d) Air

68. When you double the speed of a car, it takes ..... times more distance to stop it.
(a) four (b) one
(c) two (d) three

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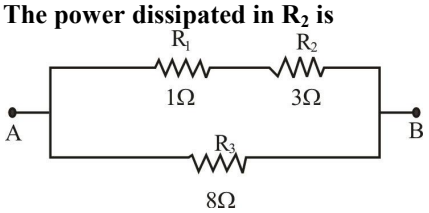
69. A girl of weight 440 N climbs up a rope through a height of 7 m in 20 s. The power expended by the girl is:
(a) 36 W (b) 15.4 W
(c) 72 W (d) 154 W

70. _____ is the unit of thermal conductivity.
(a) $J \cdot s^{-1} \cdot K$ (b) $J \cdot s^{-1} \cdot m^{-1} \cdot K^{-1}$
(c) $J^{-1} \cdot s^{-1} \cdot kg^{-1}$ (d) $J \cdot s \cdot K$

71. Two electric lamps each are 50 watts 230 V are connected in series to a supply of 230 volts. The power consumed would be
(a) 50 Watts (b) 25 Watts
(c) 100 watts (d) 200 Watts

72. If 60J of energy is available for every 15C of charge then, what is the voltage?
(a) 8 V (b) 4 V
(c) 12 V (d) 10 V

73. Power dissipated across R_3 in the circuit shown below is 2W when connected to a DC source. The power dissipated in R_2 is



(a) 1W (b) 1.5W
(c) 2W (d) 3W

74. The induced e.m.f. will be maximum when a conductor cuts the magnetic field at an angle of
(a) 15^0 (b) 30^0
(c) 45^0 (d) 90^0

75. The household energy meter is :
(a) an indicating instrument
(b) a recording instrument
(c) an integrating instrument
(d) both integrating and indicating instrument

76. Which of the following is NOT true about magnetic flux lines?
(a) Each magnetic flux line is a closed loop.
(b) Two similar lines of force travel side by side and attract each other.
(c) It is the total number of magnetic lines of force in the field.
(d) No two flux lines cross each other.

77. The force on a point charge +q kept at a distance d from the surface of an infinite grounded metal plate in a medium of permittivity ε is:
(a) 0
(b) $\frac{q^2}{16\pi\varepsilon d^2}$ away from the plate
(c) $\frac{q^2}{16\pi\varepsilon d^2}$ towards the plate
(d) $\frac{q^2}{4\pi\varepsilon d^2}$ towards the plate

78. The induced voltage across a coil with 250 turns that is located in a magnetic field that is changing at a rate of 8 Wb/s is-
(a) 1000 V (b) 2000 V
(c) 31.25 V (d) 63 V

79. The reluctance offered by a magnetic circuit consisting of two parallel paths acted upon by same magneto motive force is equal to
(a) half the reluctance of each path
(b) the reluctance of each path
(c) twice the reluctance of each path
(d) thrice the reluctance of each path

80. Materials in which large number of free electrons are available in outermost orbit are called :
(a) Semiconductors
(b) Conductors
(c) Insulators
(d) Magnetic materials

81. Varnishes protect the insulating materials against
(a) dust and oil
(b) moisture, dirt and oil
(c) moisture and fire hazards
(d) None of the above

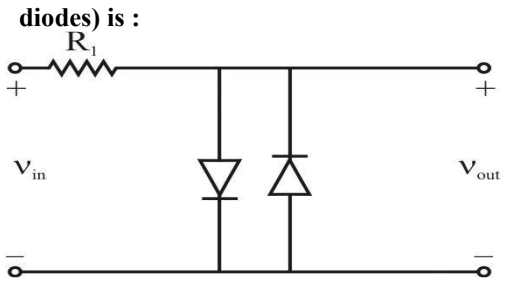
82. The Fermi level represents the energy state with____ probability of being filled if no forbidden band exists.
(a) 80% (b) 100%
(c) 50% (d) 45%

83. For LED emitting 5×10^{14} Hz, the wavelength of emitted light is_____.
(a) 60 nanometers
(b) 60×10^{-6} meters
(c) 6 nanometers
(d) 0.6×10^{-6} meters

84. Input resistance is least in the case of..... Configuration of transistors :
(a) CE (b) CB (c) CC (d) CC or CE

85. To double the drain current of an N-channel enhancement mode MOSFET biased in saturation
(a) Channel length should be doubled
(b) channel width should be halved
(c) channel length should be halved
(d) Oxide thickness should be doubled

86. The circuit shown in fig. (D_1 and D_2 are silicon diodes) is :



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(a) Simple clamper circuit
(b) Simple clipping circuit
(c) Simple full wave rectifier circuit
(d) Simple half wave rectifier circuit

87. Which amplifier will be preferred for highest gain?
(a) Darlington pair
(b) Cascade amplifier
(c) Cascode amplifier
(d) Depends on the circuitry

88. The pinch off voltage is the voltage?
(a) At which gate source junction breaks down
(b) Which causes depletion region to meet
(c) The voltage applied between drain & source
(d) None of the above

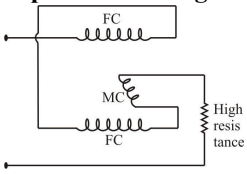
89. For microwave frequencies, a _____ oscillator is required.
(a) Klystron (b) Wien Bridge
(c) Hartley (d) Colpitts

90. The feedback scheme used in a simple op-amp based non- inverting amplifier is
(a) Series-series (b) Series-shunt
(c) Shunt-series (d) Shunt-shunt

91. IC Timer 555 can be operated from:
(a) A dual DC supply
(b) A single DC supply
(c) Both (A) & (B)
(d) It does not require a dc supply

92. The symbol for "instrument air Line" on instrumentation diagram is:
(a)
(b)
(c)
(d)

93. Which meter/instrument are used measurement only direct current.
(a) Moving iron type
(b) Parmanent magnet type
(c) Electro-moting type
(d) Hot wire type

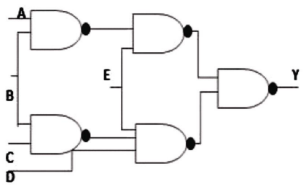
94. Which type of measuring instrument is depicted in the figure below?


(a) Ammeter
(b) Voltmeter
(c) Power meter
(d) Barometer

95. Choose the correct statement:
(a) Digital multimeters are built using current measuring elements, while analog multimeters are built using voltage measuring units
(b) Digital multimeters are built using Voltage measuring units while analog multimeters are built using current measuring
(c) Both digital and analog multimeter are built using voltage measuring multimeter used
(d) Both digital and analog multimeters are built using current measuring units

96. Consider the following in context of linear variable differential transformer and identify the correct choice.
P: LVDT consumes low power and has lower hysteresis loss.
Q: The dynamic response of LVDT is instantaneous.
(a) P and Q both are correct
(b) P is correct, Q is incorrect
(c) P is incorrect, Q is correct
(d) P and Q both are incorrect

97. 11001, 1001 and 111001 correspond to the 2's complement representation of which one of the following sets of number?
(a) 25, 9 and 57 respectively
(b) –6, –6 and –6 respectively
(c) –7, –7 and –7 respectively
(d) –25, –9 and –57 respectively

98. Identify the circuit equation.


(a) $Y = \left(\overline{AB}.E\right) + \left(\overline{BC}.D.E\right)$
(b) $Y = \left(\overline{AB}.D\right)E + \left(\overline{BC}.D.E\right)$
(c) $Y = \left(\overline{AB}.D\right) + \left(\overline{BC}.E\right)$
(d) $Y = \left(\overline{AB}.C\right) + \left(\overline{BC}.E\right)$

99. A device which converts BCD to Seven Segment is called:
(a) Encoder
(b) Decoder
(c) Multiplexer
(d) Demultiplexer

100. The fastest ADC among the following is.
(a) Successive approximation type
(b) Dual slope type
(c) Sigma-Delta ADC
(d) Flash converter

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SOLUTION : PRACTICE SET- 10

ANSWER KEY

1. (c)	11. (b)	21. (b)	31. (b)	41. (b)	51. (b)	61. (b)	71. (b)	81. (b)	91. (c)
2. (c)	12. (d)	22. (d)	32. (a)	42. (c)	52. (c)	62. (c)	72. (b)	82. (c)	92. (b)
3. (d)	13. (d)	23. (c)	33. (c)	43. (c)	53. (a)	63. (b)	73. (d)	83. (d)	93. (b)
4. (c)	14. (b)	24. (a)	34.(c)	44. (d)	54. (c)	64. (a)	74. (d)	84. (b)	94. (b)
5. (d)	15. (a)	25. (d)	35. (b)	45. (a)	55. (b)	65. (d)	75. (c)	85. (c)	95. (b)
6. (c)	16. (b)	26. (b)	36. (b)	46. (a)	56. (b)	66. (d)	76. (b)	86. (b)	96. (b)
7. (c)	17. (c)	27. (b)	37. (d)	47. (b)	57. (b)	67. (a)	77. (c)	87. (b)	97. (c)
8. (b)	18. (d)	28. (b)	38. (a)	48. (b)	58. (b)	68. (a)	78. (b)	88. (b)	98. (a)
9. (a)	19. (b)	29. (a)	39. (c)	49. (c)	59. (c)	69. (d)	79. (a)	89. (a)	99. (b)
10.(b)	20. (a)	30. (b)	40. (b)	50. (b)	60. (d)	70. (b)	80. (b)	90. (c)	100. (d)

SOLUTION

1. (c)

The International Space Station (ISS) is a modular space station (habitable artificial satellite) in Low Earth Orbit. It is an international partnership of space agencies that provides and operates the elements of the ISS. The five participating principal space agencies are: NASA (United States), Roscosmos (Russia), JAXA (Japan), ESA (Europe), and CSA (Canada). It was launched on 20 November 1998 for a period of 22 years ago.

2. (c)

Sports	Cups & Trophy
Football	Nixan Gold Cup, Durand Cup, Santosh Trophy
Cricket	Ashes, Reliance Cup, C.K. Naidu Trophy
Badminton	Thomas Cup, Agarwal Cup, Chadha Cup
Lawn Tennis	French Open, U.S Open Australian open, Wimbledon.

3. (d)

Traditional Weaving	States
Kanjivaram	Tamil Nadu
Patola	Gujarat
Jamdani	West Bengal

4. (c)

India's Shivangi Pathak has become youngest women of the country to scale Mount Everest from Nepal side. At the age of 16, she made history to climb the world's highest peak, Mount Everest. She hails from Hisar in Haryana. Bacchendri Pal is an Indian mountaineer, who become the first Indian women to reach the summit of Mount Everest.

5. (d)

'Open Market Operation (OMOs)' are market operation conducted by RBI by way of the sale/purchase of Government Securities from the market with the objective to adjust the rupee liquidity condition in the market on a durable basis.

6. (c)

Appointment and Tenure of the Chief Election Commissioner (CEC):–

- CEC and Election Commissioner are appointed by the President.
- CEC and Election Commissioner have a fixed tenure of six years or up to the age of 65 years, whichever is earlier.
- CEC and Election Commissioner enjoy the same status and receive salary and perks as available to Judges of the Supreme Court of India.

7. (c)

The Appalachian Mountains are great high land system of mountains in eastern to northeastern North America and the Eastern part of the Rocky Mountains. It was formed in Ordovician period.

Andes Mountains, one of the longest continental mountain rage in the world, forming a continuous highland along the western edge of South America.

Atlas Mountains, Marrah Mountains, Nuba Mountains, Simein Mountains are found in Africa.

8. (b)

Doab	Lies Between
Bari Doab	Beas & Ravi
Sindh Sagar Doab	Indus & Jhelum
Chaj Doab	Jhelum & Chenab
Rechna Doab	Chenab & Ravi
Bist Doab	Beas & Sutlej

9. (a)

The construction of Taj Mahal was started in 1632 AD and it was completed at the end of 1648 AD. It is situated in Agra, UP. Taj Mahal was built by Mughal Emperor Shah Jahan in memory of his beloved wife Mumtaz Mahal. It was designed by Ustad Ahmad Lahouri & Ustad Isa. It was built from white marble which was brought from the quarries of Makrana in district Nagaur, Rajasthan. In 1983, it was designated as a UNESCO World Heritage Site.

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10.(b)

In the modern history the event "Direct Action Day'' is termed also in the name of Calcutta killings It started due to, Muslim League's withdrawal from 'Cabinet Mission Plan'' and they started general strike and 16th Aug 1946 was termed as Direct Action Day. The League's only demand was a divided India. This created a huge chaos between masses and paved way for lot of community killings.

11. (b)

CRPF is a police force where as NTPC, BHEL and SAIL are Maharatna companies. Therefore, option (b) is odd one out.

12. (d)

According to the question,

▭ + ▭ + ▭ = 3 Rectangle = 12

Value of one rectangle = $\frac{12}{3} = 4$

⬠ + ⬠ + ⬠ = 3 Pentagon = 15

Value of one pentagon = $\frac{15}{3} = 5$

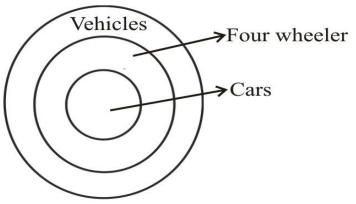
And ◯ + ◯ + ◯ = 3 circle = 6

Value of one circle = $\frac{6}{3} = 2$

Thus, ▭ + ⬠ + ◯ = 4 + 5 + 2 = 11

13. (d)

On making Venn diagram,



Hence, It is clear from the Venn diagram that all the cars are vehicles. Hence, only conclusion (II) follows.

14. (b)

Statement : $F \le H < J \ge V > E$

Conclusion :

(i) $H < V$ (✗)

(ii) $J > E$ (✓)

(iii) $F < E$ (✗)

Hence, only conclusion II is true.

15. (a)

In the given statement it is clear that neither inference (I) nor inference (II) is implicit in the statement. Therefore, option (a) is the right answer.

16. (b)

Dheeraj's brother Shan was born in 1998.

According to the question,

Birth year of Dheeraj's mother = 1998 – 45

= 1953

Birth year of Dheeraj = 1953 + 35 = 1988

Hence, it is clear that in 1988 Dheeraj was born.

Hence, both statements (I) and (II) are sufficient to answer the question.

17. (c)

Total number of letters in the word DELHI = 5

Number of words can be formed with or without meaning = 5!

$= 5 \times 4 \times 3 \times 2 \times 1$

= 120 Words

18. (d)

On multiplying into 11 to its next prime number –

$11 \times 13 = 143$

Similarly, on multiplying into 13 to its next prime number = $13 \times 17 = 221$

Same as, on multiplying into 7 to its next prime number = $7 \times 11 = 77$

11 : 143 :: 13 : 221 :: 7 : 77

Hence, ? = 77

19. (b)

According to the question,

From condition (iii),

5	%	=	3	!	9
↓	↓	↓	↓	↓	↓
B	V	V	P	C	X

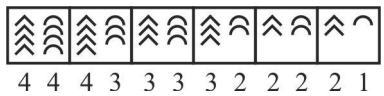
Hence, option (b) is correct.

20. (a)

Figure 'C' is different from other figures. So option (a) is correct.

21. (b)

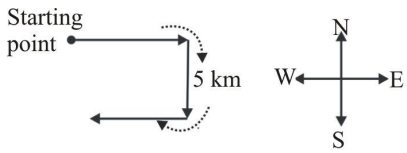
The number of picture in each box in the series of picture given in the question will be as follows-



Hence, option (b) will be in the blank picture place.

22. (d)

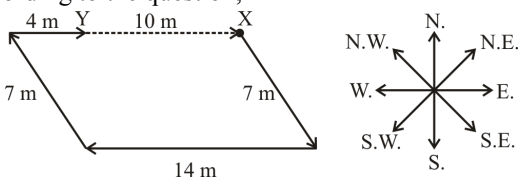
According to the question,



It is clear from the diagram that Vidyanshu is walking towards 'West' direction at the end.

23. (c)

According to the question,



Distance between X and Y = 14 – 4

= 10 m.

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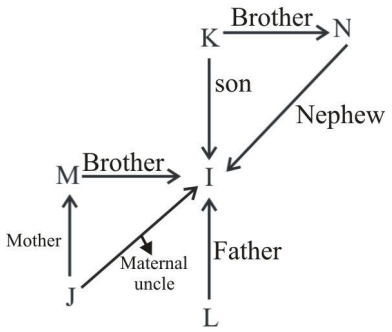
24. (a)

According to the question, blood relation diagram follows:



Hence, it is clear from blood relation diagram that 'M' is the mother of 'J'.

25. (d)

Given,

$$16 + 4 \div 2 - 21 \times 7 = 21$$

On interchanging × and ÷ signs from option (d),

$$16 + 4 \times 2 - 21 \div 7 = 21$$
$$16 + 4 \times 2 - 3 = 21$$
$$16 + 8 - 3 = 21$$
$$21 = 21$$

26. (b)

The period of the third generation of computer is considered to be from 1963-1972. This generation used IC. Due to which the speed and efficiency of the computer increased significantly, C++, C, PASCAL, FORTAN and COBOL etc.

27. (b)

Plotter is an output device that is used to print high quality graphics and image. It uses one or more pens to produce a high quality drawing.

28. (b)

TFT, LCD and CRT are types of monitor whereas High Definition Multimedia Interface (HDMI) is the most frequently used HD signal for transferring both high definition audio and video over signal cable.

29. (a)

VDU stands for "Visual Display Unit" or "Video Display Unit", it is also called monitor or screen. VDU displays images generated by a computer or other device.

30. (b)

Hard disk is a permanent memory and it is also known as secondary memory other example of secondary memory are floppy disk, USB flash derive, SSD etc.

31. (b)

RAM comes under primary memory while CD, DVD-ROM, Floppy etc. are example of secondary storage device.

32. (a)

Secondary memory data CPU can not access directly. Firstly the data of secondary memory is loaded into RAM and then it is sent to the processor. So the access time of secondary memory is higher than primary memory.

33. (c)

In computing, a firewall is a network security system that monitors incoming and outgoing network traffic based on predefined security rules. Firewalls are after used to prevent unauthorized Internet users from accessing private networks connected to the Internet. Firewalls can be hardware software or a combination of both.

34.(c)

Firewall permits the legitimate communication to pass. Hence statement is incorrect. A firewall is a system to protect the computer, which protects all type of computers and their networks from hackers and malware. Which secretly comes our computer and transmits all the personal details to the hackers sending that software, who take wrong advantage of it.

35. (b)

A firewall is a network security device that monitors incoming and outgoing network traffic and decides whether to allow or block specific traffic based on a defined set of security rules.

36. (b)

In MS - Word 365, there are Home, Insert, References, Mailing, Developer etc. under the Menu bar whereas Dictate is not the menu bar.

37. (d)

Footnotes appear at the bottom of the page and endnotes come at the end of the document. A number or symbol on the footnote or endnote matches up with a reference mark in the document.

38. (a)

General, Indentation and spacing options are available under paragraph dialog box.

Under Indent options, mirror indent book style is used for printing and when you select it, the left and right margins become inside and outside in MS Word 365.

39. (c)

The Internet is a global network of interconnected computers and servers that allows people all over the world to communicate, share information, access resources and engage in various online activities. It facilitates the transfer of data through a system of protocols, including TCP/IP, enabling services like web browsing, email, social media and much more.

40. (b)

PDN stands for Public Data Network or packet data network. This is a generic term for a network providing data services as Internet and Intranet.

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41. (b)

The first workable prototype of the internet came in the late 1960s with the creation of ARPANET or the Advanced Research Projects Agency Network. Originally funded by the U.S. Department of defence, ARPANET used packet switching to allow multiple computers to communicate on a single network. It was started by Videsh Sanchar Nigam Limited (VSNL) on August 15 1995.

42. (c)

Bookmark allows the user to save a particular website for later viewing so that it can be revisited when needed.

The bookmarks feature can usually be identified by a star - shaped icon located to the right of your browser's main search bar which is used for bookmarks.

43. (c)

Add-ons are programs integrated into a web browser that extend or extend the browsers features.

44. (d)

In the above question both statements (i) and (ii) are true.

45. (a)

Amplitude modulation is a process in which a message (modulated) signal is transmitted via a channel by enveloping it with a carrier signal of much greater frequency.

46. (a)

Total prime numbers in first 200 odd natural numbers = 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97, 101, 103, 107, 109, 113, 127, 131, 137, 139, 149, 151, 157, 163, 167, 173, 179, 181, 191, 193, 197, 199 = 45

47. (b)

$\{20-(25-33)\}\div\{-5\times4-(-6)\}+56\div(-27+13)=?$

$=\{20+8\}\div\{-20+6\}+56\div(-14)$

$=\{28\}\div\{-14\}-4$

$=-2-4=-6$

48. (b)

$1.4\overline{27}=1+4\overline{27}$

$=1+\frac{427-4}{990}$

$=1+\frac{423}{990}=1+\frac{47}{110}=\frac{157}{110}$

49. (c)

From options–

(a) $\frac{29}{6}=\frac{53}{12}\Rightarrow 4.83=4.41$ (false)

(b) $\frac{29}{6}=\frac{43}{12}\Rightarrow 4.83=3.58$ (false)

(c) $\frac{29}{6}>\frac{43}{12}\Rightarrow 4.83>3.58$ (true)

(d) $\frac{29}{6}<\frac{43}{12}\Rightarrow 4.83<3.58$ (false)

Hence, option (c) is correct.

50. (b)

Capacity of the largest 'Measuring Can' = HCF of 72, 90 and 144 litres.

$72=2\times2\times2\times3\times3$

$90=2\times3\times3\times5$

$144=2\times2\times2\times2\times3\times3$

HCF = 18

Hence, the capacity of the largest 'Measuring Can' is 18 litres.

51. (b)

Let the numbers are 3x, 4x and 5x.

So, the LCM of 3x, 4x and 5x = 60x

$\Rightarrow$ 60x = 2400

$\Rightarrow$ x = 40

So, the numbers = 120, 160, 200

HCF of 120, 160, 200

$120\Rightarrow \underline{2\times2\times2}\times3\times\underline{5}$

$160\Rightarrow \underline{2\times2\times2}\times2\times2\times\underline{5}$

$200\Rightarrow \underline{2\times2\times2}\times5\times\underline{5}$

Hence, HCF = 2 × 2 × 2 × 5 = $\boxed{40}$

52. (c)

Let the sum of money Arun and Ahaan be ₹9x and ₹5x respectively.

According to the question,

$\frac{9x-12}{5x+12}=\frac{4}{3}$

27x – 36 = 20x + 48

7x = 48 + 36

7x = 84

$x=\frac{84}{7}$

$\boxed{x=12}$

Hence the money with Arun = 9x

= 9 × 12

= ₹108

53. (a)

20% of 75 = 225 – (x% of 420)

$\frac{20}{100}\times75=225-x\%\text{ of }420$

15=225–4.2 x

4.2 x=210

x = 50

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54. (c)

Given

Total surface area of cylinder $= 462\ cm^2$

$2\pi r\ (h+r) = 462$ ----(i)

Curved surface area of cylinder $= 462 \times \frac{1}{3}$

$2\pi rh = 154$ cm ----(ii)

From equation (i) and (ii)-

$$\frac{2\pi r(h+r)}{2\pi rh} = \frac{462}{154}$$

$$\frac{(h+r)}{h} = 3$$

$h + r = 3h$

$r = 2h$ ----(iii)

From equation (ii)−

$2\pi rh = 154$

$$2 \times \frac{22}{7} \times 2h \times h = 154$$

$$4 \times \frac{22}{7} \times h^2 = 154$$

$$h^2 = \frac{49}{4}$$

$$h = \frac{7}{2}$$

From equation (iii)−

$r = 2h$

$$r = 2 \times \frac{7}{2} = 7 \text{ cm}$$

Volume of cylinder $(\pi r^2 h) =$

$$\frac{22}{7} \times 7 \times 7 \times \frac{7}{2} = 11 \times 49 = 539\ cm^3$$

55. (b)

According to the question,

Work done by (A+B) in one day $= \frac{1}{10}$ part

Work done by 'C' in one day $= \frac{1}{14}$ part

Work done by (A+B+C) in 1 day $= \frac{1}{10} + \frac{1}{14}$

$$= \frac{7+5}{70}$$

$$= \frac{12}{70} \text{ part}$$

Time taken by (A+B+C) to complete the work $= \frac{70}{12}$

Time taken by (A+B+C) to complete $\frac{3}{5}$ part of the work

$$= \frac{3}{5} \times \frac{70}{12}$$

$$= \frac{7}{2} \text{ days}$$

56. (b)

Let the normal speed of train = x km/hr.

According to the question,

$$\frac{300}{x} - \frac{300}{x+5} = 2$$

$$\frac{300(x+5) - 300x}{x(x+5)} = 2$$

$300x + 1500 - 300x = 2x^2 + 10x$

$2x^2 + 10x - 1500 = 0$

$x^2 + 5x - 750 = 0$

$x^2 + 30x - 25x - 750 = 0$

$x\ (x+30) - 25\ (x+30) = 0$

$(x+30)\ (x-25) = 0$

$x - 25 = 0$

$x = 25$

Hence the normal speed of train is 25 km/hr.

57. (b)

Let Principal = ₹ P

Time = 2x Years, Rate = x%

$\therefore$ Simple interest $= \frac{112.5}{100} \times P$

Simple interest $= \frac{P \times R \times T}{100}$

$$\frac{112.5}{100} \times P = \frac{P \times 2x \times x}{100}$$

$112.5 = 2x^2$

$x^2 = 56.25$

$$x = 7.5 = 7\frac{1}{2}$$

Hence Rate $7\frac{1}{2}\%$ and Time (n) $= 2 \times 7\frac{1}{2} = 15$ Years

58. (b)

Let cost price of LED is x.

$\therefore$ Cost price of the other LED TV = ₹ (41000 – x)

According to the question

$$x \times \frac{120}{100} = (41000 - x) \times \frac{85}{100}$$

$$\frac{6x}{5} = (41000 - x) \times \frac{17}{20}$$

$24x = 41000 \times 17 - 17x$

$41x = 41000 \times 17$

$x =$ ₹17000

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Total selling price $= 17000 \times \frac{120}{100} + 24000 \times \frac{85}{100}$

$= 20400 + 20400$

$=$ ₹ 40800

Loss $= 41000 - 40800$

$=$ ₹ 200 loss

59. (c)

First expression $= 3x^2 + 2ax + 4b$

Second expression $= 2x^2 + 3bx + 5a$

Divide first expression from x + 3 left remainder is 15

$x + 3 = 0$

Putting in first expression x = -3

$3 \times (-3)^2 + 2a \times (-3) + 4b = 15$

$27 - 6a + 4b = 15$

$3a - 2b = 6$ .....(i)

Divide second expression from x – 3 left remainder is 65

$x - 3 = 0$

x = 3 Putting in second expression

$2(3)^2 + 3b(3) + 5a = 65$

$18 + 9b + 5a = 65$

$5a + 9b = 47$ .....(ii)

equation (i) × 9 + equation (ii) × 2

$27a - 18b = 54$

$10a + 18b = 94$

$37a = 148$

$a = 4$

Putting the value of a in equation (i)

$3a - 2b = 6$

$3 \times 4 - 2b = 6$

$12 - 6 = 2b$

$6 = 2b$

$b = 3$

So b = 3

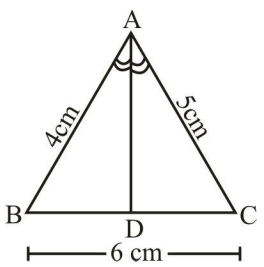
Then a + b = 4 + 3 = 7

60. (d)

Given- $\overline{AB} = 4cm$, $\overline{AC} = 5cm$, $\overline{BC} = 6cm$

According to question,

From the theorem of angular biosector,



$\frac{DC}{BD} = \frac{AC}{AB}$

$\frac{DC + BD}{BD} = \frac{AC + AB}{AB}$

$\frac{6}{BD} = \frac{5+4}{4}$

$BD = \frac{6 \times 4}{9}$

$BD = \frac{24}{9}$

= 2.666

=2.67cm

61. (b)

mean of 3,4,a,b, 10 is 6 and median 5 a < b

$\text{Mean} = \frac{\text{sum of total number}}{\text{total number}}$

$6 = \frac{3 + 4 + a + b + 10}{5}$

$30 = 17 + a + b$

$a + b = 13$

median is 5–

number of terms (n) = 5

median= $\left(\frac{5+1}{2}\right)^{th}$ term= 3rd term

$5 = a$

$a + b = 13$

$5 + b = 13$

$b = 8$

a = 5, b = 8

62. (c)

Given,

$\sqrt{50} + \sqrt{128} = \sqrt{N}$

$\sqrt{25 \times 2} + \sqrt{64 \times 2} = \sqrt{N}$

$5\sqrt{2} + 8\sqrt{2} = \sqrt{N}$

$13\sqrt{2} = \sqrt{N}$

Squaring on both side,

$\left(13\sqrt{2}\right)^2 = \left(\sqrt{N}\right)^2$

$169 \times 2 = N$

$338 = N$

$\boxed{N = 338}$

63. (b)

Let the present age of son = x years

∴ Present age of father = 5x years

According to the question,-

$(5x + 6) = (x + 6) \times 3$

$5x + 6 = 3x + 18$

$2x = 12$

$x = 6$

Present age of father → 5x= 5 × 6 = 30 years

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Age of father after 2 years = 30 + 2 =32 years
Age of son after 2 years = 6 +2
= 8 years

64. (a)

Filled part by A in 1 hour = $\frac{1}{6.8}$

Filled part by B in 1 hour = $\frac{1}{10.2}$

Filled part by B in 1.7 hours = $\frac{1.7}{10.2} = \frac{1}{6}$

Remaining part = $1 - \frac{1}{6} = \frac{5}{6}$ part

Filled part by (A+B) in 1 hour

$$= \left(\frac{1}{6.8} + \frac{1}{10.2}\right) = \frac{25}{102} \text{ part}$$

Time taken by (A+B) to fill $\frac{5}{6}$ part = $\frac{5}{6} \times \frac{102}{25}$ part

$$= \frac{17}{5} = 3.4 \text{ hours}$$

Total time taken = 1.7+3.4= 5.1 hours
or 5 hours 6 minutes

65. (d)

Given

a : b = 7 : 9
b : c = 5 : 11

Hence, a : b : c = 7 × 5 : 9 × 5 : 9 × 11 = 35 : 45 : 99

66. (d)

- A scalar quantity is defined as the physical quantity that has only magnitude e.g. Mass, electric current, volume, speed, temperature etc.
- A vector quantity is defined as the physical quantity that has magnitude as well as direction e.g. Angular momentum, torque, force, acceleration, displacement, dipole moment etc.

67. (a)

If specific gravity comes out to be less than one. It simply means that it is less than dense than water. Hence, it will float on water, And if the value is more than one, it means it is denser than water and it would sink in water.

68. (a)

$$v^2 = u^2 - 2as$$
$$0 = u^2 - 2as$$
$$s = \frac{u^2}{2a}$$

If initial velocity is 2 time then distance will be 4 times,

69. (d)

Weight of girl (W) = mg = 440N
Height climed by the girl (h) = 7m [g = 10 m/s^2]
Power (P) = work /time
And work = Force × distance = mgh

Power = $\frac{mgh}{t} = \frac{440 \times 7}{20} = 154$ watt

70. (b)

In physics, heat conductivity is that property of substance which shows how easily heat can flow through that substance. Silver metal has the highest heat and electrical conductivity among metals. Thermal conductivity is a scalar quantity. Its unit is watt meter^{-1} kelvin^{-1} (W.m^{-1}.K^{-1}) or (Joule second^{-1} meter^{-1}Kelvin^{-1})

71. (b)

$\because P_1 = P_2 = 50W$

$\because$ It is connected in series

Therefore,

$$P_t = \frac{P_1 P_2}{P_1 + P_2} = \frac{50 \times 50}{50 + 50} = 25W$$

72. (b)

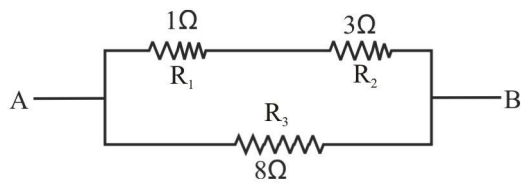
Given that,

Q = 15C, W = 60J

We know that,

$$V = \frac{W}{Q} = \frac{60}{15} = 4V$$

73. (d)



Voltage across A B –

$$P = \frac{V^2}{R}$$
$$2 = \frac{V^2}{8}$$
$$V^2 = 16$$
$$V_{AB} = 4V$$

Voltage across R_2, $V_2 = \frac{V_{AB} \times R_2}{R_1 + R_2}$

$$V_2 = \frac{4 \times 3}{3 + 1}$$
$$V_2 = 3V$$

Power across $R_2 = P = \frac{V_2^2}{R_2}$

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$$= \frac{(3)^2}{3}$$

$$\boxed{P_2 = 3\,W}$$

74. (d)

EMF induced in the coil,

$$e = VB\ell \sin\theta$$

Where,

$V \rightarrow$ Velocity

$B \rightarrow$ Magnetic field density

$\ell \rightarrow$ Length of the coil

$\theta \rightarrow$ Angle between the coil and magnetic field

Hence, the induced emf will be maximum when a conductor cuts the magnetic field at an angle of 90º.

75. (c)

The household energy meter is an integrating type instrument.

Integrating type instruments –

These instruments give the integration of the inputs applied over a particular period of time.

Example – Watthour meter, Ampere-hour meter etc.

76. (b)

Magnetic flux (force) lines have the following properties-

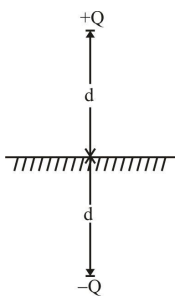
(i) Every magnetic field line is a closed loop.

(ii) It is the total number of magnetic line of force in the field.

(iii) Similar magnetic lines of force do not attract each other.

(iv) Magnetic lines of force do not cross each other.

77. (c)



Force between two point charge-

$$F = \frac{1}{4\pi\varepsilon}\frac{Q_1Q_2}{r^2}$$

Given that- $Q_1 = Q_2 = Q,\ r = 2d$

$$F = \frac{1}{4\pi\varepsilon}\frac{-Q^2}{(2d)^2}$$

$$\boxed{F = \frac{-Q^2}{16\pi\varepsilon d^2}}$$

Hence the negative sign indicates that the direction of the force is towards the plate

$$\boxed{F = \frac{Q^2}{16\pi\varepsilon d^2}}$$

78. (b)

Number of turn = 250

Rate of change of flux, $\frac{d\phi}{dt}$ = 8 Wb/sec

We know that-

$$E = -N\frac{d\phi}{dt}$$

$$|E| = 250 \times 8$$

$$|E| = 2000 \text{ Volts}$$

79. (a)

The reluctance offered by a magnetic circuit consisting of two parallel path acted upon by same magneto motive force is equal to half the reluctance of each path.

80. (b)

The large number of free electrons are available in outermost orbit are called conductor.

Example- Cu, Ag, Al etc.

81. (b)

Varnishes protect the insulating materials against moisture, dirt and oil.

Properties of Good Varnish -

(i) It should be soft.

(ii) It should be dry quickly.

(iii) Is should not shrink or crack after drying.

82. (c)

The probability that electrons will occupy a certain energy level at a certain temperature is given by the Fermi- Dirac distribution function

$$f(E) = \frac{1}{1+e^{(E-E_F)/KT}}$$

$$E = E_F$$

$$P(E) = \frac{1}{1+1} = \frac{1}{2} = 0.5$$

Such that at thermodynamic equilibrium this energy level would have a 50% probability of being occupied at any given time.

83. (d)

Given that,

$$f = 5 \times 10^{14} \text{ Hz}$$

$$c = f\lambda$$

$$\lambda = \frac{c}{f} = \frac{3\times10^8}{5\times10^{14}} \quad (\text{Velocity of light} \rightarrow 3\times10^8\,m/s)$$

$$\lambda = 0.6\times10^{-6} \text{ meter}$$

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84. (b)

Input resistance is least in the case of common base configuration of transistors.

Characteristics	CB	CE	CC
Input resistance	Very low (20Ω)	Low (1kΩ)	Very large (1MΩ)
Output resistance	Very large (1MΩ)	high (10kΩ)	Low (1kΩ)
Current gain	Less than unity	high (100)	High (100)
Voltage gain	Large (1000)	High (100)	less than unity
Power gain	Medium	Very large	less
Leakage current	Very small	Very large	Very large
Phase shift	0º	180º	0º
Application	Voltage and power amplifica-tion	Voltage curren and power amplification	For, Better impedance matching

85. (c)

In N-channel enhancement mode MOSFET to double the drain current and the channel length has to be halved.

$$\because \quad I_D = \frac{V_{DS} \times A}{\rho.\ell}$$

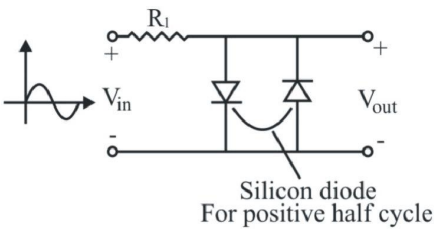
So,

$$I_D \propto \frac{1}{\ell}$$

$\therefore$ If the length is halved the current will be twice.

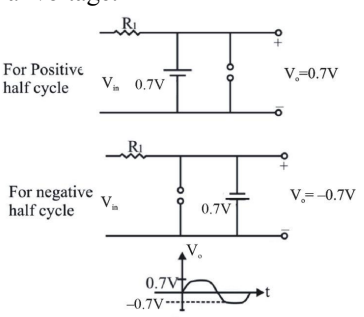
86. (b)

The circuit shown in fig is simple clipping circuit.



A clipper circuit is an electronic circuit that removes unwanted portions of a signal without affecting the signal itself.

Clippers clip the values above and below a specific level of signal voltage.



87. (b)

Cascade amplifiers are preferred for highest gain.

Total gain in cascade (CE - CC) amplifier

$$\boxed{A_{V_T} = A_{V_1} \cdot A_{V_2} \cdot A_{V_3}}$$

and total current gain,

$$\boxed{A_{i_T} = -A_{V_T} \frac{Z_{i_1}}{R_L}}$$

Current gain in darlington pair (CC-CC),

$$\boxed{\beta_D = \beta_1 \ \beta_2}$$

$$\boxed{\beta_D = \beta_1^2} \quad (\beta_1 = \beta_2)$$

(CE-CB) of the cascode amplifier has low gain.

88. (b)

Pinch off voltage is that voltage which due to depletion region is meet.

- The minimum, drain to source voltage at which the I_{DS} current reacts saturation.
- Maximum pinch off voltage is achieved when V_{GS}=0
- When applied to V_{GS} then the pinch of voltage starts decreasing.
- The pinch off voltage JFET is around 5V.

89. (a)

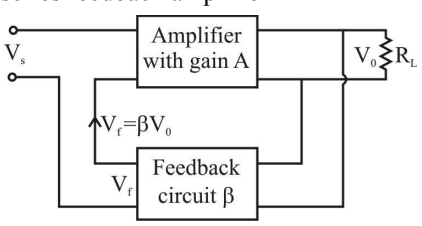
For microwave frequency a klystron oscillator required.

Parameters	Magnetron	Klystron	TWTs
Frequency	1-25 GHz	Few GHz to 100 GHz	1-20GHz
Output	Several kW	10 MW	order or kW
Efficiency	30-60%	10%	20%
Use	oscillator	Oscillator and amplifier	Oscillator and amplifier.

90. (c)

The feedback scheme used in a simple op-amp based non-inverting amplifier is shunt series.

Voltage series feedback amplifier -



- The feedback circuit is connected in shunt with the output in such a way that it decreases the output impedance and increases the input impedance.

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91. (c)

IC timer 555 can be operated from a single DC supply & dual DC supply.

- 555 IC is capable of working as a timer, it consist of 23 transistors, 16 resistors and 2 diodes. By this a time delay of few microseconds to several hours can be generated.

It requires internal supply of $\frac{2}{3}V_{cc}$ and $\frac{V_{cc}}{3}$.

92. (b)

- → Instrument Air
- → Piping
- → Hydraulic
- → Electric
- → capillary
- → Bursting Disk.

93. (b)

Permanent magnet type meter/instrument are used for the measurement of only direct current.

Advantage of PMMC -

- It has a linear scale.
- It has high torque to weight ratio of moving parts.
- The power consumption is very low.
- Error due to stray magnetic field are less.

94. (b)

Given circuit instrument is of a electrodynamometer type voltmeter.

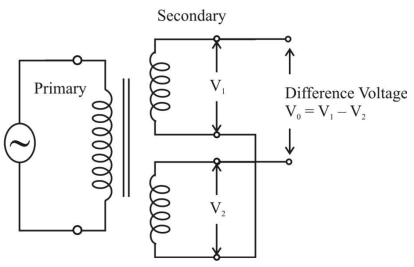
- Voltmeter is a voltage measuring device whose resistance is very high.
- To increase the range of the voltmeter need to connect a high resistance in series with the voltmeter.

95. (b)

Digital multimeter are built using voltage measuring unit while analog multimeter are built using current measuring.

- An analog multimeter uses a needle to show the measured value while a digital multimeter will show the results as numbers on a screen.

96. (b)



- LVDT is sensitive to stray magnetic field so it always requires a set-up to protect them from stray field.
- LVDT also gets affected by temperature and vibrations.
- High sensitivity low hysteresis high range are some of the advantage of LVDT.
- LVDT consumes low power and has lower hysteresis loss.

97. (c)

2′s complement binary = 11001

Value in decimal $= -1\times2^4+1\times2^3+0\times2^2+0\times2^1+1\times2^0$

$= -16+8+1$

$= -7$

Note - To convert 2's complement from binary number to decimal number keep the MSB negative and the remaining bit keep positive.

Binary of 2′s complement = 1001

Value in decimal $= -1\times2^3+0\times2^2+0\times2^1+1\times2^0$

$= -8+1$

$= -7$

Binary of 2′s complement =111001

Value in decimal -

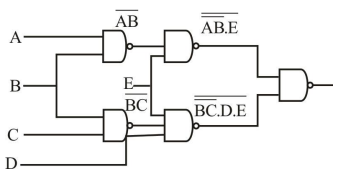
$= -1\times2^5+1\times2^4+1\times2^3+0\times2^2+0\times2^1+1\times2^0$

$= -32+16+8+1$

$= -32+25$

$= -7$

98. (a)



$$Y = \overline{\left(\overline{\overline{AB}.E}\right)\left(\overline{\overline{BC}.D.E}\right)}$$

$$= \overline{\overline{\left(\overline{AB}.E\right)}} + \overline{\overline{\left(\overline{BC}.D.E\right)}}$$

$$= \left(\overline{AB}.E\right) + \left(\overline{BC}.D.E\right)$$

99. (b)

A device which converts BCD to seven segment is called decoder. It has four input lines and seven output lines. This is a BCD to seven segment decoder.

100. (d)

Flash converter is the fastest ADC among all. Flash converter is also known as parallel comparator type ADC. A flash type ADC produces an equivalent digital output for a corresponding analog input in one time. Hence, flash type ADC is the fastest ADC.

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PRACTICE SET - 11

1. Which is the heaviest and most powerful communication satellite of India?
(a) Kalpana-1 (b) IRNSS-1D
(c) GSAT-11 (d) GSAT-6

2. The record of being India's youngest Chess grandmaster is recorded in which of the following?
(a) D. Gukesh (b) V. anand
(c) G.N. Gopal (d) Parimarjan Negi

3. _____is an exclusive martial dance form of Manipur that includes unique display of skill. creativity and agility in which the performers enact a mock fight sequence
(a) Thang Ta (b) Rangama
(c) Chakyar Koothu (d) Singhi Chham

4. Who among the following is popular as "Mozart of Madras"?
(a) Bhardwaj (b) Ilaiyaraaja
(c) Aniruddh Ravichandar (d) A.R. Rahman

5. Excess demand leads to:
(A) inflationary gap.
(B) rise in employment level.
(a) Only B (b) Both A and B
(c) Only A (d) Neither A nor B

6. The budget of a state under President's rule is presented before_____.
(a) Lok Sabha
(b) Prime Minister of India
(c) Rajya Sabha
(d) President of India

7. In which country is the Taklamakan desert located?
(a) Iraq (b) Yaman
(c) Mongolia (d) China

8. Savitri river is located in:
(a) Maharashtra (b) Tripura
(c) Gujarat (d) Goa

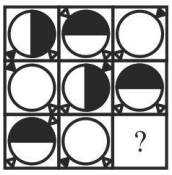
9. Who was the founder of the social reform movement for Sikhism - the Nirankari movement?
(a) Baba Balak Singh (b) Baba Gurmeet Dev
(c) Shri Sohan Singh (d) Baba Dyal Das

10. Provincial Autonomy was granted by ___.
(a) Government of India Act, 1935
(b) Montagu - Chelmsford Report, 1919
(c) Government of India Act, 1919
(d) Indian Independence Act, 1947

11. Four letter-clusters have been given, out of which three are alike in some manner and one is different. Select the one that is different.
(a) KNF (b) UXQ
(c) PSL (d) JMF

12. Select the Answer Figure that correctly fits in the blank space in the given Problem Figure.

Problem Figure



Answer Figures

(a) D (b) B
(c) C (d) A

13. Three statements are followed by three conclusions numbered I, II and III. You have to consider these statements to be true, even if they seem to be at variance with commonly known facts. Decide which of the given conclusions logically follow(s) from the given statements.
Statements:
Some pencils are lanterns
Some lanterns are rubbers
Some candies are pencils.
Conclusions:
(I) Some candies are lanterns
(II) Some rubbers are candies
(III) All pencils are rubbers
(a) Only conclusion II follows
(b) Either conclusion I or III follows
(c) None of the conclusions follow
(d) Only conclusion I follows

14. Statement:
Should CBDT abolish income tax in India?
Argument 1 : Yes, it is an unnecessary burden on the wage earners in India.
Argument 2 : No, it is a good source of revenue for Indian Government.
(a) Both arguments 1 and 2 are strong
(b) Neither argument 1 nor 2 is strong
(c) Only argument 1 is strong
(d) Only argument 2 is strong

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15. A statement is given followed by two arguments. Decide which of the arguments is/are strong with respect to the statement.

Statement:

Everyone should read a newspaper daily

Arguments:

1. Yes, because it will help knowing about what is happening around and increasing general awarenss

2. No, because everyone does not prepare for competitive exams

(a) Both argument 1 and 2 are strong
(b) Neither 1 nor 2 argument is strong
(c) Only argument 1 is strong
(d) Only argument 2 is strong

16. A question is given followed by two arguments. Decide which of the arguments is/are strong with respect to the question.

Question:

Should students cheating in exams be punished?

Arguments:

1. No, cheating is common fact among successful people

2. Yes, as the exams are conducted to assess the competency of an individual, so they should give exams honestly

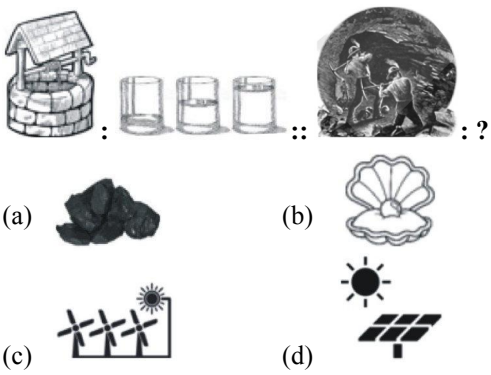
(a) Neither Arguments 1 nor 2 is strong
(b) Only Arguments 1 is strong
(c) Both, Arguments 1 and 2 are strong
(d) Only Arguments 2 is strong

17. Of the three given equations, the first two are solved on the basis of a certain system. Find the correct answer for the unsolved third equation on the same basis.

32 × 34 = 96
25 × 14 = 29
18 × 51 = ?

(a) 58 (b) 15
(c) 18 (d) 59

18. Select the missing figure based on the given related pair of figures :



19. In this question, a group of numbers/symbols is coded using letters as per the table given below and the conditions which follow. The correct combination of codes following the conditions is your answer.

Number/ Symbol	6	5	4	3	%	#	8
Codes	R	G	U	W	K	P	B

Conditions:

(i). If the first element is an odd number and the last element is an even number, the codes for these two (the first and the last elements) are to be interchanged.

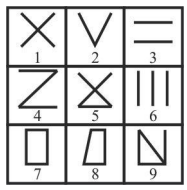
(ii). If the second element is a symbol and the first element is an even number, the codes for these two (the second and the fifth element) are to be interchanged.

(iii). If the third element is a number and the fourth element is a symbol, both these elements (the third and the fourth elements) are to be coded as Y.

Question: 6 # % 3 8 5 # 4

(a) B U K W P G P R
(b) R P K W B G P U
(c) R B K W P G P U
(d) R B Y Y P G P U

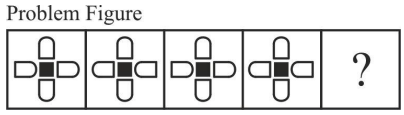
20. Form three groups using each figure only once given below. The three groups thus formed are:



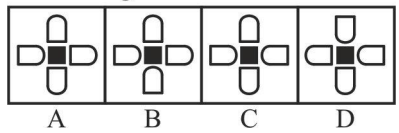
(a) (1,4,3), (2,5,6), (9,7,8)
(b) (1,2,3), (4,5,6), (9,7,8)
(c) (1,2,6), (4,5,3), (9,7,8)
(d) (1,2,3), (4,7,6), (9,5,8)

21. Select answer figure that replace the ? mark in question figure-

Problem Figure



Answer Figures



(a) A (b) B
(c) C (d) D

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22. In the morning, X and Y walk towards each other in a park. When they meet, then Y's shadow falls toward the left side of X. In which direction was X facing?
(a) South (b) West
(c) North (d) East

23. Starting from a point, Ganesh walks 12 m to the 'North'. Then he turned to the right and walks 10 m, he again turned to the 'Right' and walks 12 m, then he turned to the 'Left' and walks 5 m. now how far and in which direction he is from the starting point?
(a) 15 m, east (b) 10 m, west
(c) 10 m, east (d) 5 m, west

24. If
'S#T' means S is the father of T,
'S$T' means S is the mother of T,
'S@T' means S is the husband of T,
'S = T' means S is the son of T,
then how is E related to L in the following expression?
L $ Q = B #D @ E $ O
(a) Mother (b) Daughter
(c) Daughter-in-law (d) Mother-in-law

25. Interchanging which two sign will make the following equation correct
$42 \div 4 + 2 - 3 \times 5 = 29$
(a) + and × (b) + and –
(c) – and × (d) ÷ and +

26. The use of third generation computers started from the years.
(a) 1940–1956 (b) 1965-1971
(c) 1957–1962 (d) 1973- At present.

27. Which of the following is NOT a softcopy device?
(a) Monitor (b) Plotter
(c) Projector (d) Speaker

28. Which of the following peripheral devices displays information to the users?
(a) Monitor
(b) Keyboard
(c) Secondary Storage Device
(d) Secondary Storage Media
(e) None of these

29. The higher the resolution of the monitor _____
(a) Pixels will be more than that
(b) Screen will be less clear
(c) Pixels become more and more distinct.
(d) Pixels would pass by
(e) None of these

30. Which of the following is the major defect of magnetic tape?
(a) Non-volatile
(b) Economical
(c) Sequential format
(d) Flexible plastic usage

31. Identify sequential ability media–
(a) Magnetic tape (b) Digital video disc
(c) Floppy disc (d) Optical disc

32. In the context of computers, the time taken to receive data from a storage device or to obtain data from a peripheral unit is known as .....
(a) Time slicing (b) Access time
(c) Downtime (d) Time sharing

33. Which of the following is a low power, local area wireless communication technology?
(a) Bluetooth (b) Wi-Max
(c) Ethernet (d) Cellular network

34. Which of the following statements is/are true regarding data communication?
(i) It is simply the act of sending or receiving text messages.
(ii) Protocol is set of rules which one to be followed by sender and receiver at the time of the data communication.
(a) Both (i) and (ii) (b) Neither (i) or (ii)
(c) Only (ii) (d) Only (i)

35. Which of the following is the transmission control protocol/Internet Protocol (TCP/IP) that specifies how computers will exchange electronic mail?
(a) Simple Mail Transfer Protocol (SMTP)
(b) Hypertext Transfer Protocol (HTTP)
(c) User Database Protocol (UDP)
(d) File Transfer Protocol (FTP)

36. Which of the following options of page setup is used to select the page size for a document in MS Word 365?
(a) Columns (b) Margins
(c) Orientation (d) Size

37. In MS - Word 365, which of the following is not a valid option in the delete cell pop-up window when deleting a row or column in a table?
(a) Delete entire row (b) Shift cells left
(c) Shift cells up (d) Shift cells right

38. Which of the following options in MS - Word 365 changes the on - screen font size without affecting any other features?
(a) Subscript (b) Superscript
(c) Zoom (d) Change case

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39. With reference to Host to Host layer, which among the following is/are NOT its protocols?
A Transmission Control Protocol
B. User Datagram Protocol
(a) Both A and B (b) Only A
(c) Only B (d) Neither A nor B

40. Which of the following statements is INCORRECT with reference to TCP/IP model?
(a) TCP/IP follows a horizontal approach.
(b) TCP/IP has seven layers
(c) TCP/IP is more reliable when compared to OSI model
(d) TCP refers to Transmission Control Protocol

41. Which of the following WAN technology is a method of data transmission in which a message is divided into several Parts called packets and is sent independently, in triplicate, over the same route as each packet that is optimized for and reassembled at the destination?
(a) Packet over SONET (b) Overlay network
(c) Circuit switching (d) Packet switching

42. Which of the following keyboard shortcut is used to close the active tab in Google Chrome?
(a) Shift + W (b) Ctrl + T
(c) Alt + W (d) Ctrl + W

43. Which of the following algorithms is used by Google search to rank websites according to their search engine results?
(a) Internet Rank (b) Site Rank
(c) Page Rank (d) Engine Rank

44. What is generally used by a web client to view the web page?
(a) Web server (b) Web engine
(c) Web protocol (d) Web browser

45. _____is used to specify the size of the character?
(a) Ctrl (b) Scaling
(c) Tab (d) Shift

46. Which of the following number is not composite?
(a) 209 (b) 203
(c) 161 (d) 109

47. Solve the following.
2550 – [510 – {270 – (90 – 80 + 70)}]
(a) 2240 (b) 2230
(c) 2220 (d) 2210

48. Simplify : $\frac{6}{27} \div \frac{27}{30} \div \frac{20}{81}$
(a) 9 (b) 6
(c) 3 (d) 1

49. The numerator of a fraction is less than its denominator by 2. If we subtract 2 from the numerator and add 2 to the denominator, then the new fraction is 1/3 what is the original fraction?
(a) 5/7 (b) 5/9
(c) 1/3 (d) 3/7

50. If the HCF of 51 and 85 is expressed in the form of 51 m – 85, then the value of m will be:
(a) 3 (b) 1
(c) 5 (d) 2

51. What is the highest common factor of 360 and 450?
(a) 90 (b) 45
(c) 10 (d) 9

52. The salary of Charan and Rajat is in the ratio of 5 : 4 If the salary of each is increased by 3,000 then their new ratio become 6 : 5. What is salary of Charan.
(a) ₹ 15,000 (b) ₹ 12,000
(c) ₹ 8,000 (d) ₹ 20,000

53. If 75% of 480 + x % of 540 = 603, then find the value of 'x'.
(a) 55 (b) 65
(c) 35 (d) 45

54. Find the total surface area (in m^2) of a right circular cone whose radius of base is 70 cm and perpendicular height is 240 cm. $\left[\text{Use } \pi = \frac{22}{7}\right]$
(a) 704 (b) 0.704
(c) 7.04 (d) 70400

55. A can complete a piece of work in 24 days. He worked for 21 days and then B finished the remaining work in 5 days. In how many days can A and B together finish the work?
(a) 24 days (b) 40 days
(c) 15 days (d) 45 days

56. A train overtakes two persons who are walking at 15 m/s and 35 m/s, respectively, in the same direction as that of the train in 20 seconds and 40 seconds, respectively. The length of the train is :
(a) 800 m (b) 1000 m
(c) 700 m (d) 900 m

57. A certain sum was invested at 40% p.a compound interest for two years and the interest was compounded annually. If the interest was compounded half-yearly, the amount payable of maturity after two years would have been ₹ 4,544 more. What was the sum invested?

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(a) ₹ 42,500 (b) ₹ 40,000
(c) ₹ 42,000 (d) ₹ 37,500

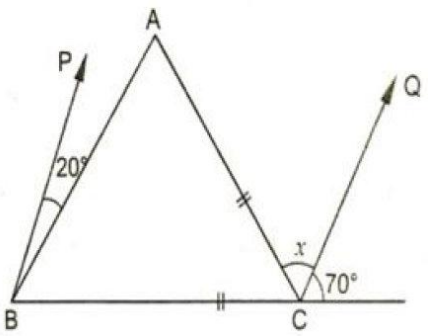
58. A shopkeeper uses a weight of 950 gm instead of 1 kg sells the articles at the marked price, which is 15% above the cost price. What is his profit percentage?

(a) $23\frac{7}{19}\%$ (b) $20\frac{5}{19}\%$
(c) $21\frac{1}{19}\%$ (d) $22\frac{3}{19}\%$

59. Find the roots of $\frac{6}{x}-\frac{2}{x-1}-\frac{1}{x-2}=0$

(a) $\frac{4}{5}$ and $\frac{3}{2}$ (b) $\frac{4}{3}$ and 3
(c) $\frac{4}{5}$ and 3 (d) $\frac{4}{3}$ and $\frac{3}{2}$

60. In the given figure, if BP || CQ and AC = BC, then the measure of x is:



(a) 20º (b) 25º
(c) 30º (d) 35º

61. The four integers a, b, c and d arranged in ascending order, the range of the set is 20. The difference between c and a is equal to the difference between d and b. The arithmetic mean of the numbers is 25. In the following what will be the value of a?

(a) 13 (b) 15
(c) 14 (d) 16

62. If $\sqrt{54}+\sqrt{150}=a$, What will be the value of $\sqrt{96}+\sqrt{216}$

(a) 1.20a (b) 1.50a
(c) 1.60a (d) 1.25a

63. Neeraj's age is half of Suraj's age. If 8 years is subtracted from Neeraj's age and 5 years is added in Suraj's age then Suraj's age will be 5 times more than Neeraj. Two years ago Suraj's and Neeraj's age was -

(a) 30 years and 15 years
(b) 28 years and 14 years
(c) 26 years and 12 years
(d) 28 years and 13 years

64. Three pumps can fill a water tank individually in 15, 20 and 30 hrs respectively. All three pumps were opened together at 8 A.M. At that time 1/5 of tank was filled. After 4 hours first pump was closed. After next two hours the third pump was also closed. At which time tank will be fully filled?

(a) 2:30 p.m. (b) 2:40 p.m.
(c) 3:20 p.m. (d) 1:20 a.m.

65. If a : b = 3 : 4 and d : b = 4 : 3, then find the ratio of a to d.

(a) 9 : 16 (b) 3 : 4
(c) 4 : 3 (d) 16 : 9

66. Which of the following is NOT a base unit?

(a) Radian (b) Mole
(c) Ampere (d) Candela

67. The volume of a certain amount of water between 0°C to 4°C is ____.

(a) Increases (b) Decreases
(c) Remains constant (d) Zero

68. A car accelerating for two seconds would cover ..... times the distance of a car accelerating for only one second (cars starts from rest with the same acceleration in both the cases).

(a) Four (b) Three
(c) Two (d) One

69. One horse - power (hp) 1 hp = ... W.

(a) 746 (b) 500
(c) 846 (d) 646

70. When 1 kg of water is cooled from 4ºC to 0ºC, its volume _____.

(a) first decreases and then increases
(b) decreses
(c) remains the same
(d) increases

71. Which of the following is stored by inductors?

(a) Potential energy
(b) Heat energy
(c) Charge
(d) Magnetic energy

72. The resistance of the conductor in the electrolytic cell _____ with an increase in temperature.

(a) Increase
(b) Decrease
(c) Slightly increase
(d) Do not change

73. Resistors contribute to _____ power in electrical circuits.

(a) Reactive (b) Active
(c) constructive (d) conductive

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74. Consider a very long straight wire carrying current I-The magnetic flux density 'B' at a perpendicular distance 'r' from the wire is-

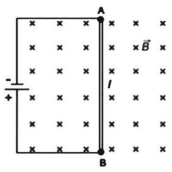
(a) $B = \frac{\mu_0 I}{2\pi r^2}$ (b) $B = \frac{\mu_0 I}{2\pi r}$

(c) $\frac{\mu_0 I^2}{2\pi r}$ (d) $B = \frac{\mu_0 IR}{2\pi}$

75. Wattmeter cannot be designed on the principle of–

(a) electrostatic instrument
(b) thermocouple instrument
(c) moving iron instrument
(d) electrodynamic instrument

76.



Calculate the value of current flowing through a conductor (at rest) when a straight wire 3m long (denoted as AB in the given figure) of resistance 3 ohm is placed in the magnetic field with magnetic induction of 0.3T.

The conductor is connected to a voltage source of 3V.

(a) I=1A (b) I =1mA
(c) I =9A (d) I =3.3A

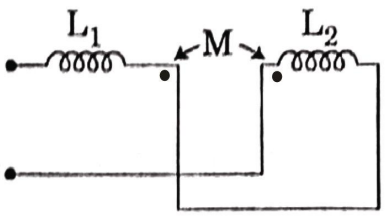
77. Which of the following remains constant inside a conducting sphere?

(a) Electric intensity (b) Potential
(c) Charge (d) Electric flux

78. When a current carrying conductor is placed perpendicular to a magnetic field, it tends to move

(a) perpendicular to itself
(b) perpendicular to the field
(c) perpendicular to the field as well as itself
(d) in any direction

79. The effective inductance of two coils with self inductances L_1, L_2 and mutual inductance M (as connected shown in figure) will be:



(a) $L_1 + L_2 + M$ (b) $L_1 - L_2 - 2M$
(c) $L_1 + L_2 + 2M$ (d) $L_1 + L_2 - 2M$

80. All conducting materials have a resistivity of less than

(a) $10^{-3}\,\Omega m$ (b) $10^{-2}\,\Omega m$
(c) $10^{-6}\,\Omega m$ (d) $10^{3}\,\Omega m$

81. Which one of the following material is not a Piezoelectric Material?

(a) $BaTiO_3$ (b) Quartz
(c) Rochelle Salt (d) Yttrium garnet

82. The electrical conductivity of a semiconductor increases when a radiation of wavelength shorter than 1000 nm is incident on it. The band gap of the semiconductor is:

(a) 2.4 eV (b) 1.2 eV
(c) 3.4 eV (d) 4.0 eV

83. The arrow in the schematic symbol of a diode points to.

(a) The n-type material, which is called the anode
(b) The n-type material, which is called the cathode
(c) The p-type material, which is called the anode
(d) The p-type material, which is called the cathode

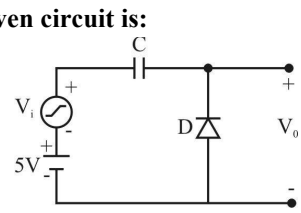
84. A BJT is in inverse active mode if:

(a) E-B junction is reverse biased and C-B junction is forward biased.
(b) Both E-B junction and C-B junction are forward biased.
(c) Both E-B junction and C-B junction are reverse biased.
(d) Operation of the device is very poor.

85. In a P–well fabrication process, the substrate is :

(a) N–type semiconductor and is used to build P–channel MOSFET
(b) P–type semiconductor and is used to build P–channel MOSFET
(c) N–type semiconductor and is used to build N–channel MOSFET
(d) P–type semiconductor and is used to build N–channel MOSFET

86. The given circuit is:



(a) Negative clamper
(b) Clipper
(c) Rectifier
(d) Positive clamper

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87. The Darlington pair is mainly used for
(a) Impedance matching
(b) Wide band voltage amplification
(c) Power amplification
(d) Reduce distortion

88. Thermal runaway is not possible in FET because as the temperature of FET increase :
(a) The mobility decreases
(b) The trans-conductance increases
(c) The drain current increases
(d) None of the other options

89. A relaxation oscillator is one which:
(a) has two stable states
(b) one stable and one quasi-stable states
(c) relaxes indefinitely
(d) produces non-sinusoidal output

90. In an ideal Op-amp circuit, which of the following statements is true?
(a) It has infinite open loop gain.
(b) Its output impedance is infinite
(c) Its input impedance is zero
(d) The bandwidth is limited to 5KHz

91. A monostable multivibrator can be used to generate
(a) Pulse
(b) Sweep
(c) Sinusoidal
(d) All of the above

92. Repeatability and Reproducibility are related to-
(a) Accuracy of the instrument
(b) Precision of the instrument
(c) Both accuracy of the instrument & precision of the instrument
(d) None of these

93. A moving–coil permanent–magnet instrument can be used as flux–meter :
(a) by using a low resistance shunt
(b) by eliminating the control springs
(c) by using a high series resistance
(d) by making control springs of large moment of inertia

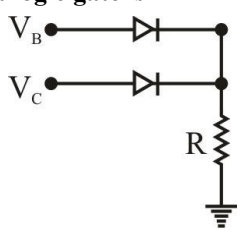
94. Deflecting torque in moving iron instruments is given by:
(a) $\frac{1}{2}I^2\frac{dL}{d\theta}$ (b) $\frac{1}{2}LI^2$
(c) $\frac{1}{4}I^2$ (d) $2LI^2$

95. Which of the following digital voltmeters has the ability of measuring accurately in the presence of noise?
(a) Successive approximation DVM
(b) Integrating DVM
(c) Continuous balance DVM
(d) Ramp type DVM

96. Dummy strain gauge is used along with measuring strain gauge to
(a) To compensate for the change caused by change in battery voltage
(b) To compensate for the change caused by humidity variation
(c) To compensate for the change caused by temperature variation
(d) To compensate for the change caused by resistance variation

97. The number of 1's in the binary representation of $13*16^3 + 11*16 + 2$ is:
(a) 8 (b) 7 (c) 9 (d) 12

98. For the connections shown below, the equivalent logic gate is



(a) OR gate (b) AND gate
(c) XOR gate (d) NAND gate

99. Which of the following statements about the demultiplexers is INCORRECT?
(a) 1-line to 8-line demultiplexer consist of eight AND gates, all of them connected to a single line data input
(b) It is used as anti-clock demultiplexers in synchronous data transmission systems in the receivers and security monitoring system etc.
(c) It takes single input and distributes it over several outputs
(d) It takes one input data source and selectively distributes in to 1-of-N output channels just like a multi-position switch

100. 8 bit DAC is applied input 10101101. The converted analog output is___V. (LOW = 0V, HIGH = + 5V)
(a) 1.696V (b) 3.392V
(c) 1.474V (d) 0.678V

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SOLUTION : PRACTICE SET- 11

ANSWER KEY

1. (c)	11. (a)	21. (a)	31. (a)	41. (d)	51. (a)	61. (b)	71. (d)	81 . (d)	91. (a)
2. (a)	12. (a)	22. (c)	32. (b)	42. (d)	52. (a)	62. (d)	72. (b)	82. (b)	92 . (b)
3. (a)	13. (c)	23. (a)	33. (a)	43. (c)	53. (d)	63. (d)	73. (b)	83. (c)	93. (b)
4. (d)	14. (d)	24. (c)	34. (c)	44. (d)	54. (d)	64. (b)	74. (b)	84. (a)	94. (a)
5. (c)	15. (c)	25. (d)	35. (a)	45. (b)	55. (c)	65. (a)	75. (c)	85.(a)	95.(b)
6. (a)	16. (d)	26. (b)	36. (d)	46. (d)	56. (c)	66. (a)	76. (a)	86. (d)	96. (c)
7. (d)	17. (d)	27. (b)	37. (d)	47. (b)	57. (b)	67. (b)	77. (b)	87. (a)	97.(b)
8.(a)	18. (a)	28. (a)	38. (c)	48. (d)	58. (c)	68. (a)	78. (c)	88. (a)	98. (a)
9. (d)	19. (c)	29. (d)	39. (d)	49. (a)	59. (b)	69 (a)	79. (c)	89. (d)	99. (b)
10. (a)	20. (b)	30. (c)	40. (b)	50. (d)	60. (c)	70. (d)	80. (a)	90. (a)	100. (b)

SOLUTION

1. (c)
India's heaviest and most powerful communication satellite is GSAT - 11. It was launched by European Space Agency's Ariane-5 VA-246 Rocket from Guiana Space Centre, French Guiana on 5 December 2018. It's total weight is about 5854 kg.

2. (a)
At the time when question was asked D. Gukesh at the age of 12 years 7 months and 17 days became the second youngest Grandmaster of the world & India's youngest Grandmaster. At present Abhimanyu Mishra is the World's youngest Grandmaster at the age of 12 years 4 months and 25 days.

3. (a)
Thang Ta "the art of the sword and spear" is the traditional martial art of Manipur. It integrates various external weapons the sword, spear, dagger etc.
Rangama is a dance of Nagaland. Chakyar Koothu is a performance art from Kerala. Singhi is lion dance of Sikkim. In this dance form the dancers perform in a lion costume that represents the snow lion.

4. (d)
A.R. Rahman is popularly known as "Mozart of Madras" Time magazine dubbed him "the Mozart of Madras" and placed him in its list of the world's 100 most influential people in 2009. He is musician, singer and his most famous film Slumdog Millionaire earned him BAFTA, Golden Globe, Academy and Grammy awards.

5. (c)
Excess demand is the excess of aggregate demand over and above its level required to maintain full employment equilibrium in the Economy, as it does not cause any change in the level of employment or output. As a result inflation occurs in the Economy.

6. (a)
Article 356 of the Indian Constitution provides for President's rule. Accordingly, it should be known to the President that if the government of a state is not being run according to the Constitution, then he can impose President's rule. With the imposition of President's rule, the government and legislature of the state will be dissolved, the governor will govern as the representative of the President and all the legislative and financial functions of the state will be done by the Parliament of the Union. **Hence, the budget of the state under President's rule will be presented in the Lok Sabha.**

7. (d)

Deserts	Related Country
Atacama	Chile
Thar	India and Pakistan
Gobi	China and Mangolia
Taklamakan	China
Kalahari	Botswana, Namibia and South Africa
Pantagonian	Argentina

8.(a)
Savitri river originates from Mahabaleshwar, in Maharashtra and drains Arabian Sea. Also Mahabaleshwar is a source of five rivers:- Krishna, Koyna, Venna, Savitri, Gayatri.

9. (d)
Baba Dyal Das was the founder of the social reform movement for Sikhism is name a - the Nirankari movement. It was founded in 1851, to restore the practices and other beliefs of Sikhs, prevalent during the establishment of Sikhism by Guru Nanak Dev.

10. (a)
Provincial Autonomy was granted under the Government of India Act, 1935. The act gave more

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autonomy to provinces. Diarchy was abolished at the provincial levels. The act divided powers between centre and provinces in term of three list federal, provincial and concurrent list. Residuary powers were given to the Viceroy. Government of India Act 1935 provided for the establishment of federal court in India.

11. (a)

From options-

(a) $K \xrightarrow{+3} N \xrightarrow{-8} F$

(b) $U \xrightarrow{+3} X \xrightarrow{-7} Q$

(c) $P \xrightarrow{+3} S \xrightarrow{-7} L$

(d) $J \xrightarrow{+3} M \xrightarrow{-7} F$

Hence, option (a) is different one.

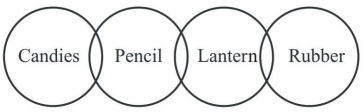
12. (a)

Answer figure 'D' will complete the given question figure.

Hence, option (a) is correct.

13. (c)

According to the statement the Venn diagram is as follows-



Conclusion : I. (×)
II. (×)
III. (×)

Hence, it is clear from above that 'None of the conclusions follows'.

14. (d)

Income Tax in India should not be abolished by CBDT as it is the main source of revenue in India. Hence, only argument 2 is strong.

15. (c)

Reading newspaper daily helps us to get information about the activities around and increase general awareness.

Hence only argument 1 is strong with respect to the statement.

16. (d)

According to the given question only Argument 2 is strong.

17. (d)

Just as,

$$32 \times 34 \equiv (3 \times 3) \ \& \ (2 + 4) \equiv 96$$

$$25 \times 14 \equiv (2 \times 1) \ \& \ (5 + 4) \equiv 29$$

Same as,

$$18 \times 51 \equiv (1 \times 5) \ \& \ (8 + 1) \equiv 59$$

18. (a)

The way water is extracted from the well by digging it. In the same way various ore or coal etc....are extracted from it by digging the mine.

19. (c)

According to the II conditions. On interchanging the place of second and fifth element 6#%385#4 → RBKWPGPU

20. (b)

In the figures given in the question,

The figure (1, 2 and 3) are formed using two straight lines,

The figure (4, 5 and 6) are formed using three straight lines.

The figure (9, 7 and 8) are formed using four straight lines,

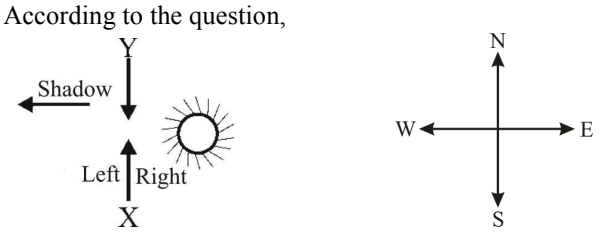
Hence option (b) is correct.

21. (a)

In the given figure series , figure A will be at the place of question mark.

22. (c)

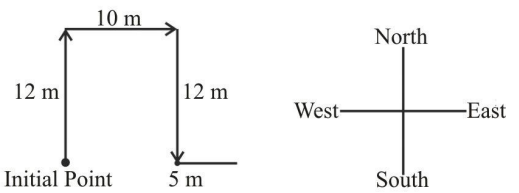
According to the question,



So, it is clear from the diagram that X's face is toward North direction and Y's face is toward South direction.

23. (a)

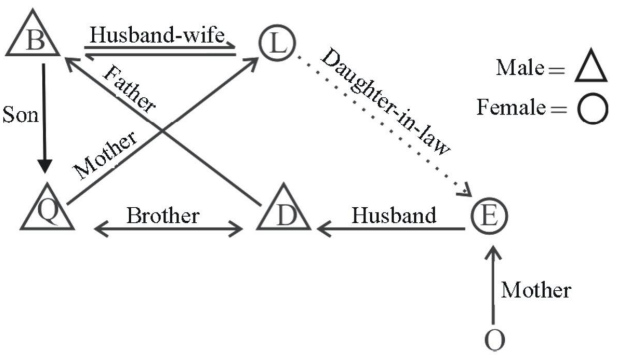
Ganesh's travelling path is as follows:



Hence, Ganesh is 15 m, East away from initial point.

24. (c)

According to the question,



Hence, it is clear from the blood relation diagram that E is the daughter-in-law of L.

25. (d)

Given,

$$42 \div 4 + 2 - 3 \times 5 = 29$$

On solving by interchanging ÷ and + from option (d),

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26. (b)
The period of third generation computer was from 1965-1975. In this generation computers was used integrated circuit (IC). Some example of third generation computer are IBM-370, IBM-360, PDP-II, UNIVAC 1108, Honeywell-6000 etc.

27. (b)
Monitor, Projector and Speaker are softcopy output device, whereas plotter is a hardcopy output device.

Softcopy– Softcopy is a virtual copy. It refers to the digital document file or electronic version of a document that is not printed on paper. In softcopy the output presents in the computer or other output device like Speaker, Monitor etc.

Example– E-books, Pdf notes, Audio/Video etc.

Hard copy– Hard copy refers to the electronic or digital documents which is printed on paper or other material. We can say it is a physical copy because we can touch it.

Example– News paper, Book, Printed documents.

28.(a)
Monitor is a peripheral output device that gives information to the user in the form of a display. The devices that are externally connected to the CPU are called peripheral devices such as monitor, keyboard, mouse, printer scanner, BCR etc.

29. (d)
Resolution is the image quality displayed on a monitor resolution is measured by number of pixels horizontal by pixels vertically. When resolution increases, image become crisper due to a higher pixel density because pixels would pass by.

30. (c)
The sequential format in magnetic tape refers to the way data is stored and retrieved on the tape in a linear or sequential manner. In this format, data is written and read sequentially, from the beginning of the tape to the end or vice versa. Therefore sequential format is the major defect of magnetic tape.

31. (a)
In magnetic tape only one side of the ribbon is used for storing data. It is sequential memory which contains thin plastic ribbon to store data and coated by magnetic oxide. So the data read write speed is slower. DRAM works on sequential order like A, B, C, D is data, we have to go through BC to go from A randomly in optical disk.

32.(b)
In the context of computes, time taken to receive data from a storage device or to obtain data from a peripheral unit is known as access time.

33. (a)
Bluetooth is a wireless technology that allows devices to connect and work together.

It uses short-range radio waves to exchange data between devices over short distance. Inventor of Bluetooth is jaap Haartsen. Ethernet is a family of computer networking technology that uses cables to connect deices to the internet.

34. (c)
Data communication is a process in which digital data and analog are exchanged between two or more computers. Messages can contain text, number, picture, audio, video etc. Hence statement (ii) is true.

35. (a)
SMTP (Simple Mail Transfer Protocol) is an application that is used to send, receive outgoing e-mails between sender and receiver. When an e-mail is sent, it uses the SMTP protocol. This protocol specifies the exchange of e-mail.

36. (d)
The size option of Page setup is used to select the page size for the document in MS Word 365.

37. (d)
In Microsoft Word 365, when deleting a row or column in a table, the "Delete Cell" pop-up window offers three valid options.

1. Shift cells left
2. Shift cells up
3. Delete entire row or delete entire column

The "Shift cells right" option is not a valid option in this pop-up window when deleting a row or column in a table.

38. (c)
The zoom feature in MS Word 365 changes the on-screen font size without affecting any other features.

39. (d)
Host to Host layer is the layer just above the internetwork, which is responsible for end to end data integrity. The two most important protocols operating at this layer are Transmission Control Protocol (TCP) and User Datagram Protocol (UDP).

40. (b)
The TCP/IP (Transmission Control Protocol/
Internet Protocol) model follows a horizontal approach and has 5 layers.

- Physical Layer • Link Layer or Network Access Layer
- Network Layer • Transport Layer
- Application Layer

41. (d)
Packet switching is a method of transferring data by dividing it into multiple parts called packets.

42. (d)
In Google Chrome Ctrl + W shortcut is used to close the currently active window. Ctrl + T shortcut key is used to open a new tab in Google Chrome.

43. (c)
Google Search primarily uses an algorithm called "Page Rank" to rank websites its search engine results. Page Rank was one of the early and foundational algorithms developed by Larry Page and Sergey Brin, the founders of Google.

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44. (d)

A web browser is a software application used to access and display websites on the internet. It allows users to interact with web pages, view text, images, videos, and other contents. Popular web browsers include Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari.

45. (b)

Scaling is used to shrink or grow to a particular character in specified size.

46. (d)

The number is called composite number. which is formed more than two factors.

Hence, $209 = 11 \times 19$

$203 = 7 \times 29$

$161 = 7 \times 23$

But, 109 cannot be expressed in the form of factors. So it is not composite.

47. (b)

$= 2550 - [510 - \{270 - (90 - 80 + 70)\}]$

$= 2550 - [510 - \{270 - 80\}]$

$= 2550 - [510 - 190]$

$= 2550 - 320$

$= 2230$

48. (d)

$\frac{6}{27} \div \frac{27}{30} \div \frac{20}{81}$

$= \frac{6}{27} \times \frac{30}{27} \times \frac{81}{20} = \frac{6 \times 3 \times 3}{27 \times 2} = \frac{6}{3 \times 2} = 1$

49. (a)

Let numerator $= x-2$

denominator $= x$

According to the question,

$\frac{(x-2)-2}{x+2} = \frac{1}{3}$

$\frac{x-4}{x+2} = \frac{1}{3}$

$3(x - 4) = (x + 2)$

$3x - 12 = x + 2$

$2x = 14$

$x = 7$

Original fraction $= \frac{x-2}{x} = \frac{7-2}{7} = \frac{5}{7}$

50. (d)

HCF of 51 and 85

$51 = 3 \times 17$

$85 = 5 \times 17$

HCF = 17

According to the question,

$17 = 51\text{ m} - 85$

$17 + 85 = 51\text{ m}$

$102 = 51\text{ m}$

$\boxed{m = 2}$

51. (a)

So, on finding the HCF by division method,

$360\overline{)450}\,(1$
$\quad 360$
$\quad 90\overline{)360}\,(4$
$\qquad 360$
$\qquad \times\times\times$

So, the HCF is 90.

52. (a)

Charan	:	Rajat
5x	:	4x

According to the question,

$\frac{5x + 3000}{4x + 3000} = \frac{6}{5}$

$25x + 15000 = 24x + 18000$

$25x - 24x = 18000 - 15000$

$x = 3000$

Salary of Charan $= 5x = 5 \times 3000$

$=$ ₹ 15000

53. (d)

Given,

75% of 480 + x % of 540 = 603

$480 \times \frac{75}{100} + 540 \times \frac{x}{100} = 603$

$540 \times \frac{x}{100} = 603 - 480 \times \frac{3}{4}$

$540 \times \frac{x}{100} = 603 - 360$

$540 \times \frac{x}{100} = 243$

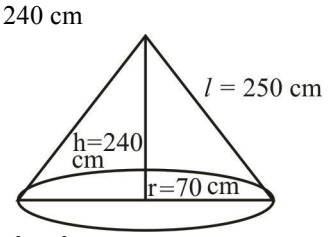
$x = \frac{243 \times 100}{540}$, $\boxed{x = 45}$

54. (d)

Given,

radius (r) = 70 cm

height (h) = 240 cm



Then, $l^2 = h^2 + r^2$

$= (240)^2 + (70)^2$

$l = \sqrt{62500}$

$l = 250$ cm

Total surface area of cone $= \pi r(l + r)$

$= \frac{22}{7} \times 70(250 + 70)$

$= \frac{22}{7} \times 70 \times 320$

$= 70400\text{ cm}^2$

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55. (c)

Work done by A in 1 day $= \frac{1}{24}$ part

Work done by A in 21 days $= \frac{21}{24} = \frac{7}{8}$ part

Remaining work $= 1 - \frac{7}{8} = \frac{1}{8}$

$\therefore$ Time taken by 'B' to complete the total work $= 5 \times 8 =$ 40 days

B's one day work $= \frac{1}{40}$ part

Work done by A and B in one day $= \frac{1}{24} + \frac{1}{40}$

$= \frac{5+3}{120} = \frac{8}{120} = \frac{1}{15}$ part

Hence, the time taken by A and B to complete the work

$= \frac{1}{\frac{1}{15}} = 15$ days.

56. (c)

Given that -

Speed of first
Person = 15 m/s
Speed of second person = 35 m/s

Let speed of the train = X m/s
and length of the train = Lm.
According to the question,

(X – 15) = L/20
L = 20X – 300..... (i)
(X – 35) = L/40
L = 40X – 1400 ..... (ii)

eq. (i) = eq. (ii)

20X – 300 = 40X– 1400
20X = 1100
X = 55 m/s

On putting the value of X in eq. (i)

L = 20 × 55 – 300
L = 1100 – 300
L = 800 m

57. (b)

Let Amount = A
According to the question,

$A_2 - A_1 = 4544$

$$\Rightarrow P\left(1+\frac{R_2}{100}\right)^{t_2} - P\left(1+\frac{R_2}{100}\right)^{t_1} = 4544$$

$$\Rightarrow P\left(1+\frac{20}{100}\right)^{4} - P\left(1+\frac{40}{100}\right)^{2} = 4544$$

$$\Rightarrow P\left(\frac{6}{5}\right)^{4} - P\left(\frac{7}{5}\right)^{2} = 4544$$

$$\Rightarrow \frac{1296P}{625} - \frac{49P}{25} = 4544$$

$$\Rightarrow \frac{1296P - 1225P}{625} = 4544$$

$$\Rightarrow 71P = 4544 \times 625$$

$$\therefore P = \frac{4544 \times 625}{71}$$

Hence, P = ₹ 40000

58. (c)

Let, cost price of 1 gram of article = ₹1
$\therefore$ CP of 1000g = ₹1000
And, CP of 950g of article = ₹950
According to the question,

SP of article $= \frac{1000 \times 115}{100} =$ ₹1150

Required Profit % $= \frac{(1150-950)}{950} \times 100$

$= \frac{200}{950} \times 100 \Rightarrow \frac{400}{19}$

$\Rightarrow 21\frac{1}{19}\%$

59. (b)

$$\frac{6}{x} - \frac{2}{x-1} - \frac{1}{x-2} = 0$$

$$\frac{6(x-1)(x-2) - 2x(x-2) - 1x(x-1)}{x(x-1)(x-2)} = 0$$

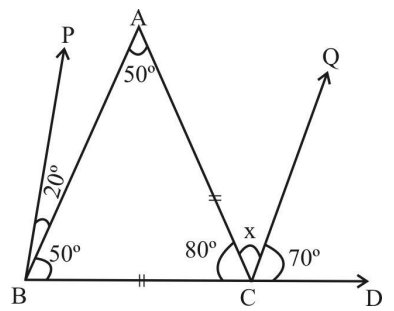
$$\frac{6\left(x^2 - 2x - x + 2\right) - 2x^2 + 4x - x^2 + x}{x\left(x^2 - 2x - x + 2\right)} = 0$$

$$\frac{6x^2 - 18x + 12 - 2x^2 + 4x - x^2 + x}{x^3 - 3x^2 + 2x} = 0$$

$3x^2 - 13x + 12 = 0$
$3x^2 - 9x - 4x + 12 = 0$
$3x(x-3) - 4(x-3) = 0$
$(3x-4)(x-3) = 0$

roots $= \frac{4}{3}, 3$

60. (c)



Given that, BP || CQ and

AC = BC
$\angle$ PBC = $\angle$ QCD = 70°
$\angle$ PBA + $\angle$ ABC = 70°

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$\angle ABC = 70° - 20° = 50°$

$\therefore \quad \angle BAC = 50°$

$\angle BCA = 180° - 2\times 50° = 80°$

$\angle BCA + \angle ACQ + \angle QCD = 180°$

$80° + x + 70° = 180°$

$x = 30°$

61. (b)

As per question,

$c - a = k$ ...(i)

$d - b = k$ ...(ii)

on subtracting

$c - a - d + b = 0$

$b + c = a + d$ ...(iii)

$\because$ mean $= 25$

$$\frac{a+b+c+d}{4} = 25$$

$a + (b + c) + d = 100$

$a + d + a + d = 100$ [from equation (iii)]

$a + d = 50$ ...(iv)

but $d - a = 20$

$d = 20 + a$

$\therefore \quad a + 20 + a = 50$

$2a = 30$

$a = 15$

62. (d)

Given,

$$\sqrt{54} + \sqrt{150} = a$$

$$\sqrt{2\times3\times3\times3} + \sqrt{2\times3\times5\times5} = a$$

$$3\sqrt{6} + 5\sqrt{6} = a$$

$$8\sqrt{6} = a$$

$$\boxed{\sqrt{6} = \frac{a}{8}} \quad ...(i)$$

According to the question,

$$\sqrt{96} + \sqrt{216} = ?$$

$$\sqrt{2\times2\times2\times2\times2\times3} + \sqrt{2\times2\times2\times3\times3\times3}$$

$$4\sqrt{6} + 6\sqrt{6}$$

$\Rightarrow \quad 10\sqrt{6}$ ...(ii)

From equation (i) and (ii),

$$\Rightarrow \quad \frac{a}{8}\times10 \quad \Rightarrow \frac{5a}{4} = 1.25a$$

63. (d)

Let the present age of Suraj is x years and present age of Neeraj is $\frac{x}{2}$ years.

According to the question,

$$5\left(\frac{x}{2} - 8\right) = (x+5)$$

$$\Rightarrow \quad \frac{5x}{2} - 40 = x + 5$$

$$\Rightarrow \quad \frac{5x}{2} - x = 5 + 40$$

$$\Rightarrow \quad \frac{3x}{2} = 45$$

$\Rightarrow \quad x = 30$ years

Age of Suraj before 2 years = 30 – 2 = 28 years

Age of Neeraj before 2 years = 15 – 2 = 13 years

64. (b)

Filled part of tank by first pump in 1 hour $= \frac{1}{15}$ part

Filled part of tank by second pump in 1 hour $= \frac{1}{20}$ part

Filled part of tank by third pump in 1 hour $= \frac{1}{30}$ part

Pre-filled part of the tank $= \frac{1}{5}$ (given)

Remaining part $= 1 - \frac{1}{5} = \frac{4}{5}$

Let it will take x hours to fill the tank.

According to the question,

$$\frac{4}{15} + \frac{x}{20} + \frac{6}{30} = \frac{4}{5}$$

$$\frac{16+3x+12}{60} = \frac{4}{5}$$

$28 + 3x = 48$

$3x = 20$

$x = \frac{20}{3}$ or 6 hour 40 minutes

Hence required time = 8 am + 6 hour 40 minutes = 2:40 pm

65. (a)

$a : b = (3 : 4) \times 3$

$d : b = (4 : 3) \times 4$

$a : b : d$

$9 : 12 : 16$

Hence, $a : d = 9 : 16$

66. (a)

Fundamental quantities in SI system and their units

Physical Quantity	Name of unit	Symbol o unit
Mass	Kilogram	kg
Length	Meter	m
Time	Second	S
Temperature	kelvin	K
Luminous intensity	Candela	Cd
Electric current	Ampere	A
Amount of substance	Mole	Mol

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67. (b)
The density of water is highest at 4°C and the volume is least. The volume of water increase when is heated or cooled at a temperature higher or lower than 4°C. Thus, volume of given amount of water decrease between 0°C and 4°C while it increase above 4°C.

68. (a) :
A car accelerating for two seconds would cover 4 time distance of a car accelerating for only one second.

69 (a) :
1 Horse power (H.P.) = 746 Watt
≅ 0.75 Killowatt

70. (d)
The density of water is maximum at 4°C and volume of a given sample of water is minimum at this temperature. But when the water cooled from 4ºC to 0ºC, its volume increases due to **Anomalous expansion** of water.

71. (d)
Inductor- The coil that stores magnetic energy in a magnetic field is called an inductor.
The magnetic potential energy stored in an inductor is given by magnetic potential energy (U) = $\frac{1}{2}LI^2$

72. (b)
The resistance of the conductor in the electrolytic cell decrease with an increase in temperature

73. (b)
Resistors contribute to active power in electrical circuits. The power which is actually consumed in an AC or DC circuit is known as active power

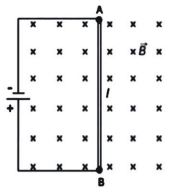
74. (b)
Let us consider a very long straight wire carrying current I- The magnetic flux density 'B' at a perpendicular distance 'r' from the wire is given by-

$$B = \frac{\mu_0 I}{2\pi r}$$

Where μ_0 = Absolute permeability of air
$= 4\pi \times 10^{-7}$H/m.

75. (c)
Wattmeter cannot be designed on the principle of moving iron device.
According to the working principle, there are three types of wattmeters -
(i) Electrodynamometer type wattmeter
(ii) Electrostatic type wattmeter
(iii) Induction type wattmeter
⇒ Moving iron instrument is used to measure current and voltage.

76. (a)



According to question-
V = 3V
Resistance (R) = 3Ω
Current flow in conductor $I = \frac{V}{R} = \frac{3}{3} = 1A$

77. (b)
Potential remains constant inside a conducting sphere.
• The electric field inside the conducting sphere is zero. So the work done is zero.
• If V_a is the internal potential and V_b is the surface potential-
then

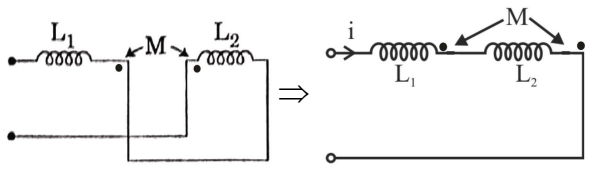
$$V_b - V_a = 0$$

$$\boxed{V_b = V_a}$$

Hence the potential remains constant inside the conducting sphere.

78. (c)
When a current-carrying conductor is placed perpendicular to a magnetic field. It tends to move perpendicular to the field as well as itself. When a current-carrying wire is placed in a magnetic field then a force is applied by magnetic field on the wire. This force is called the magnetic force.

79. (c)



The effective inductance of two coil with self inductance L_1, L_2 and mutual inductance M (as connected shown in figure) will be- L_1+L_2+2M.

80. (a)
All conducting materials have a resistivity of less than $10^{-3}\Omega$–m
• The electrical resistivity of particular conductor material is a measure of how strongly the material opposes the flow of electric current through it.

81 . (d)
When a varying potential applied to the proper axis of a crystal there is a change in dimension of the crystal. It is known as Piezo-electric effect.
Ex. - $BaTiO_3$, Quartz, Rochelle salt.

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82. (b)

We know that

$$\text{Energy gap } (E_g) = \frac{1.24}{\lambda(\mu m)}$$

Given,

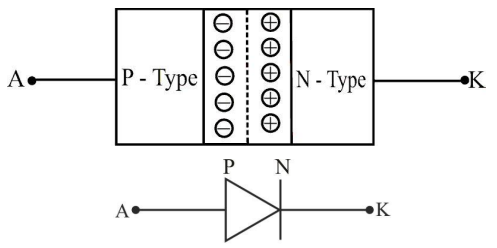
$$\lambda = 1000nm = 1000\times10^{-9} = 1\times10^{-6} m = 1\mu m$$

$$E_g = \frac{1.24}{1\mu m} = 1.24eV$$

83. (c)

If a p-type and n-type material are joined in such a way that single crystal structure is obtained at the junction then P-N junction diode is formed.

The arrow in the schematic symbol of a diode point to the p-type material which is called the anode.



84. (a)

A BJT is in inverse active mode if when E-B junction is reverse biased and C-B junction is forward biased.

Mode	J_{BE}	J_{BC}	Application
Saturation	Forward bias	Forward bias	On Switch
Cut-off	Reverse bias	Reverse bias	Off Switch
Active	Forward bias	Reverse bias	Amplifier
Reverse Active	Reverse bias	Forward bias	Attenuator

85. (a)

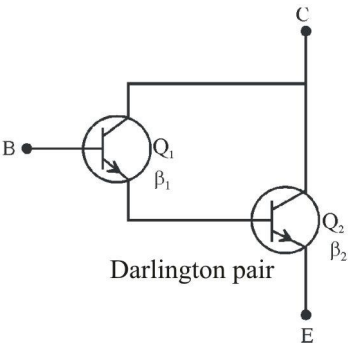
N-type semiconductor in P-well manufacturing processs and substrate in making p-channel MOSFET. In this substrate, the high concentration heavily doped two p-regions are created by diffusion. In this, one part acts as a source and the other part acts as a drain. The distance between source and drain is about 20μm. A thin dielectric layer of silicon dioxide is applied on the surface of this substrate, which also has two p regions.

86. (d)

The given circuit is a positive clamper. A circuit that represents the positive peak of a signal at a desired DC level is called a clamping circuit. In this the output waveform is shifted in the positive direction by the positive reference voltage.

87. (a)

Darlington pairing is mainly used for impedance matching.



$$\beta = \beta_1 . \beta_2$$
$$= \beta_1^2 \qquad \text{When } (\beta_1=\beta_2)$$

Application-

(i) Its current gain is high.

(ii) This is called β amplifier.

88. (a)

Thermal runway is not possible in FET because when the temperature of FET increase then the mobility of FET decreases. The energy dissipated in FETs is reduced so there is no free of excessive temperature rise or thermal run-away.

$$\mu \propto \frac{1}{T}$$

89. (d)

A relaxation oscillator is one producer non-sinusoidal output.

In electronics a relaxation oscillator is a nonlinear electronic oscillator circuit that produces a nonsinusoidal repetitive output signal such as a triangle wave a square wave.

90. (a)

Ideal operational amplifier characteristics-

Characteristics	Ideally	Pratically
Open loop gain	∞	10^6
Slew rate	∞	80 V/μs
PSRR	0	
R_i	∞	1MΩ
R_0	0	10Ω to 100Ω
CMRR	∞	120 dB(10^6)
Offset Voltage	0	2mV
Offset Current	0	20nA
Bandwidth	∞	1 MHz

91. (a)

A monostable multivibrator can be used to generate pulse. whereas astable multivibrator is also used to generate square wave.

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92 . (b)

Repeatability and Reproducibility are related to precision of the instrument.

Repeatability - It is the characteristics of precise instrument (Precise ↑ repeatability ↑)

It describes the closeness of output reading with the conductor same location, same observer, same instrument, same procedures but repetition over a short time period.

Reproducibility - It is also the characteristics of precise instrument. (Precise ↑ reproducibility ↑)

93. (b)

A moving coil permanent magnet instrument can be used as flux meter by eliminating the control springs. The flux meter is based on Faraday's law. In flux meter induced voltage will be equal to the rate of change of flux.

94. (a)

In moving iron instruments the deflecting torque,

$$\boxed{T_d = \frac{1}{2} I^2 \frac{dL}{d\theta}} \qquad \{I = \text{rms current}\}$$

Where, I = Operating current

L = Self inductance

θ = Deflection angle

$$\boxed{T_d \propto I^2}$$

- It has non-uniform scale.
- Moving iron type instruments can be used for both AC and DC measurements.

95. (b)

A digital voltmeters which has the ability of measuring accurately in the presence of noise is integrating DVM.

- They are convert analog signals into digital voltage. They are also display the voltage to be measured in the form of discrete numbers in place of pointer deflection.
- Digital voltmeters are used for the measurement of AC as well as DC voltage and also to measure physical quantities such as temperature, pressure, stress through the of appropriate transducer and signal conditioning circuit.
- Input range of DVM is 1Volt to 1000V.

96. (c)

Dummy strain gauge is used along with measuring strain gauge to compensate for the change caused by temperature variation.

- A dummy strain gauge is used in a quarter bridge strain gauge circuit to compensate for changes in temperature and lead wire resistance.
- The dummy gauge is wind into a Wheatstone bridge on an adjacent arm to active gauge.

97.(b)

$13 \times 16^3 + 11 \times 16 + 2$

$= 13 \times 4096 + 11 \times 16 + 2$

$= (2^3+2^2+1)\times 2^{12} + (2^3+2+1)\times 2^4 + 2$

$= (2^3+2^2+2^0)\times 2^{12} + (2^3+2^1+2^0)\times 2^4 + 2^1$

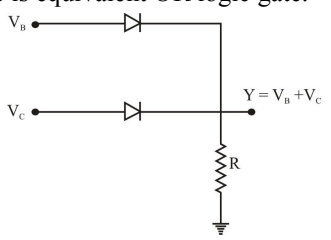
$= 2^{15}+2^{14}+2^{12}+2^7+2^5+2^4+2^1$

On converting to binary number each term has only one, the number will be in the form of 1.

So the number of one digit is 7.

98. (a)

Given figure is equivalent OR logic gate.



Truth table of OR gate

Inputs		Output
A	B	Y = A+B
0	0	0
0	1	1
1	0	1
1	1	1

99. (b)

Synchronous data transmission using demultiplexers in receiver and security monitoring system. Not done in the form of anti clock demultiplexers in the system.

De-multiplexer is used for parallel information and generation of ALU circuit.

- 1-line to 8-line demultiplexer consists of eight AND gates, all of them connected to a single line data input.
- It takes single input and distributes it over several outputs.
- It takes one input data source and selectively distributes in to 1-of-N output channels just like a multi-position switch

100. (b)

Given that-

Decimal equivalent of binary = $(10101101)_2 = (173)_{10}$

Output of analog

$$= \frac{V}{2^n - 1} \times \text{Decimal equivalent of binary number}$$

$$= \frac{5}{2^8 - 1} \times 173$$

$$= \frac{865}{255} = 3.392\text{V}$$

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PRACTICE SET - 12

1. 'NAVIC' is another name for:
(a) A scheme by the Central Government for fisherman development
(b) The independent regional navigation satellite system developed by India
(c) The polar satellite launch vehicle of India
(d) A training programme for Indian maritime pilots

2. In volleyball, spike is also known with the name of ?
(a) Open (b) Protection
(c) Drop (d) Smash

3. The Indian martial art, Kalaripayattu originated from which state of India?
(a) Karnataka (b) Andhra Pradesh
(c) Kerala (d) Tamil Nadu

4. Who propounded the homeopathic principle of 'Like Cures Like'?
(a) Hippocrates
(b) Samuel Hahnemann
(c) Samuel Cockburn
(d) George Vithnoulkes

5. Which multiplier theory states that the economy will flourish the more the government spends?
(a) Earning Multiplier
(b) Keynesian Multiplier
(c) Investment Multiplier
(d) Fiscal Multiplier

6. Which of the following Articles of the Constitution of India has Part XX that deals with the powers of the Parliament to amend the Constitution and its procedures?
(a) Article 393 (b) Article 368
(c) Article 395 (d) Article 367

7. Pampas, Steppes, Savanna and Prairies are all names of famous:
(a) waterfalls (b) cyclones
(c) lakes in America (d) grasslands

8. Which of the following is /are advantage (s) of building dams?
i) Stores water for irrigation
ii) No equitable distribution of water
iii) Stores water for generating electricity
iv) Canals from dams help in transferring water to great distances
v) Benefits only to a few people
(a) Only v (b) Only ii
(c) ii and v (d) i, iii and iv

9. At which Sikh Guru's invitation did the Sufi saint Hazrat Mian Mir lay the foundation stone of Golden Temple (Harmandir Sahib) in Amritsar?
(a) Shri Guru Har Govind ji
(b) Shri Guru Arjun Dev ji
(c) Shri Guru Har Rai ji
(d) Shri Guru Tegh Bahadur ji

10. The kingdom of Awadh was formally annexed by the British in the year____.
(a) 1856 (b) 1805
(c) 1801 (d) 1897

11. In each of the number-pairs, the second number is obtained by performing a certain mathematical operation on the first number. Three of the following pairs follow the same pattern and thus form a group. Select the number-pair that does NOT belong to that group.
(a) 21 : 420 (b) 15 : 208
(c) 17 : 272 (d) 25 : 600

12. Study the pattern given below carefully and select the letter which can come in the place of question mark (?) in it.
(D)(F)(J)(P)(?)
(a) W (b) X
(c) U (d) V

13. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.
Statements:
Some mangoes are oranges.
All oranges are grapes.
Conclusions:
I. All grapes are oranges.
II. All mangoes are grapes.
(a) Only conclusion I follows
(b) Only conclusion II follows
(c) Neither conclusion I nor II follows
(d) Both conclusions I and II follow

14. What is the colour of the granite in the kitchen?
Statements:
1. The colour of the granite is the colour of the wall.
2. The colour of the granite is very bright.
(a) Neither 1 nor 2 is sufficient to answer the given question
(b) Both 1 and 2 are sufficient to answer the given question
(c) Only 1 is sufficient while 2 alone is not sufficient to answer the given question
(d) Only 2 is sufficient while 1 alone is not sufficient to answer the given question

15. A statement is given followed by two arguments. Decide which of the argument(s) is/are strong with respect to the statement question.
Statement:
Introduction of multiplication tables in the syllabus for class 2 is not advisable.

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Arguments:

(1) Children in class 2 are too young to understand the mathematical concept.

(2) Burdening young children with such complex concepts may create fear of the subject.

(a) Both arguments (1) and (2) are not strong
(b) Only argument (1) is strong
(c) Only arguments (2) is strong
(d) Both arguments (1) and (2) are strong

16. A question is given, followed by two arguments. Decide which of the arguments is/are strong with respect to the question.

Question:

Should the sale and use of tobacco be completely banned in India?

Arguments:

I. Yes. Tobacco causes oral cancer and other diseases.

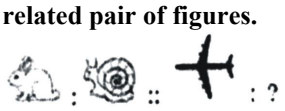
II. No. Millions of workers will lose their jobs.

(a) Only argument (II) is strong
(b) Both, (I) and (II) is strong
(c) Only argument (I) is strong
(d) neither (I) nor (II) is strong

17. If a cube of 3"×3"×3" is painted on all sides and then cut into 27 smaller cubes of 1"×1"×1", then how many such smaller cubes will be there that are painted only on two sides?

(a) 16 (b) 4
(c) 12 (d) 8

18. Select the missing figure based on the given related pair of figures.



(a)
(c)
(b)
(d)

19. In this question, a group of numbers/symbols is coded using letters as per the table given below and the condition which follow. The correct combination of codes following the conditions is your answer.

Number/ Symbols	2	@	9	5	$	&	3	%	#	7	+	4	8	6
Code	T	F	A	J	L	E	W	Q	D	P	R	B	U	S

Conditions:

(i) If the first elements is a symbol and the last is a number, the codes for these two (the first and the last elements) are to be interchanged.

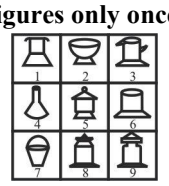
(ii) If the first element is an odd number and the last is an even numbers, the first and the last elements are to be coded as ©

(iii) If both the second and the third elements are perfect squares, the third element is to be coded as the code for the second element.

Question : + # 7 & 6

(a) DEPSR (b) RDPRS
(c) SDPER (d) PERDS

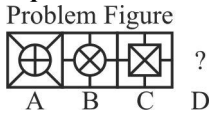
20. If three groups can be formed using the given figures only once the these groups will be ____.



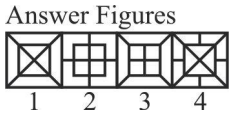
(a) (1, 4, 7), (2, 3, 6) and (5, 9, 8)
(b) (1, 4, 7), (2, 9, 6) and (5, 3, 8)
(c) (1, 4, 7), (5, 3, 6) and (2, 9, 8)
(d) (2, 4, 7), (1, 3, 6) and (5, 9, 8)

21. Choose the correct figure which will replace the question mark.

Problem Figure



Answer Figures



(a) 4 (b) 1
(c) 3 (d) 2

22. A stand at the entrance of the mall waiting for his friend to come. He is facing east. After that turns his head to the right to see that his friend has arrived. In which direction is he expecting his friend to come?

(a) West (b) South
(c) North (d) East

23. Starting from point M, Harish walks 18 m towards 'South'. He turned to the 'Left' and walked 25 m. He then turned to the 'Left' and walked 25 m. He again turned to the 'Left' and walked 18 m. He again turned to the 'Left' and walked 35 m to reach point P. How far and in which direction is Harish from point M?

(a) 35 m, west
(b) 28.86 m, south-east
(c) 28.86 m, south-west
(d) 28.86 m, north-east

24. 'P + Q' means 'P is the daughter of Q'
'P × Q' means 'P is the son of Q'
'P – Q' means 'P is the wife of Q'
Which of the following options is correct for the given expression?
'A + B – C × D'

(a) C is the wife of D
(b) B is the son of D
(c) B is the daughter of D
(d) A is the daughter of D's Son

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25. If "–" and "+" signs as well as "x" and "÷" are interchanged, then which of the value is 27 –15 ÷ 84 × 6 + 13 ?
(a) 43 (b) 260
(c) –170 (d) 224

26. The most important advantage of an Integrated Circuit is its……..
(a) easy replacement in case of circuit failure
(b) extremely high reliability
(c) reduced cost
(d) low power consumption

27. Which output device draws pictures on a paper based on the commands given from a computer using a pen?
(a) Scanner (b) Monitor
(c) Inkjet printer (d) Drum plotter

28. Which of the following is NOT an output device?
(a) Plotter (b) Printer
(c) Monitor (d) Touch screen

29. Printing-device resolutions are measured in
(a) Dots per inch (b) Bits per inch
(c) Pictures per inch (d) Images per inch

30. Which of the following is not a secondary storage device?
(a) Flash Drive (b) Pen Drive
(c) Compact Disc (d) DRAM

31. Which is not a type of secondary memory?
(a) Solid State Drive
(b) Hard Disk
(c) Random Access Memory (RAM)
(d) USB Pen Drive

32. Secondary memory is also known as?
(a) External memory (b) Cache memory
(c) Internal memory (d) primary memory

33. A TCP is a ____ protocol, while UDP is a ___ protocol.
(a) Connection - oriented - connection - less
(b) Application - layer connection - oriented
(c) Connection - less connection - oriented
(d) Connection - less application - layer

34. In which layer of the Internet architecture do various protocols included for building Internet services?
(a) Application (b) TCP
(c) IP (d) Physical

35. Which layer of internet architecture includes protocols that provide services like SMTP and FTP?
(a) Data link (b) IP
(c) Application (d) TCP

36. Which of the following options is used to set the layout option of a page in MS word 365?
(a) Review (b) Design
(c) Page Setup (d) Draw

37. Which of the following statements is true regarding print preview in MS - Word 365?
(a) Word combines print and preview in single window
(b) By clicking file > Print on the right side you will see the print button and configurable settings
(c) In the paragraph group of the Home tab, we can select option like printing only certain pages, changing the page orientation etc
(d) On clicking file > print on the left you will see a preview of you presentation

38. How many options are available in the alignment group to align text in a table in MS word 365?
(a) 6 (b) 3
(c) 7 (d) 9

39. Which of the following switching technology is used by the internet?
(a) Telephone Switching (b) Packet Switching
(c) Circuit Switching (d) Telex Switching

40. A small text file created by a website that is stored in the user's computer temporarily for that session is called _____
(a) bug (b) cache
(c) cookie (d) malware

41. IP serves as a focal point for the internet protocol architecture, it defines a common method for exchanging _____ between a wide collection of networks.
(a) message (b) Packet
(c) packet (d) Information

42. Which of the following options is correct about opening a Google Chrome browser in Incognito mode?
(a) It saves neither the browsing history nor the data entered in the personal account.
(b) It saves only the cookies in the personal account but neither the browsing history nor the data entered.
(c) It saves the browsing history and the data entered in the personal account./
(d) It saves only the browsing history in the personal account but not the data entered.

43. Which of the following is NOT a well-known web browser?
(a) Microsoft Edge (b) Jungle Safari
(c) Google Chrome (d) Mozilla Firefox

44. A new Incognito window in Google Chrome can be opened with the ——— command.
(a) Ctrl + T (b) Alt + T
(c) Ctrl + N (d) Ctrl + Shift + N

45. Which of the following is not a security level?
(a) Calculation (b) Worksheet Level
(c) Cell Protection (d) File Protection

46. Pragya invited male and females to her birthday party in the ratio of 7 : 6. If the number of males in the party were 56, then the total number of guests attending the party were?
(a) 48 (b) 104
(c) 108 (d) 112

47. $56 \div \frac{1}{3}\left\{15+12-\left(9+6-\overline{5+7}\right)\right\} = ?$
(a) 9 (b) 8
(c) 12 (d) 7

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48. Which of the fractions below given is NOT equal to $\frac{9}{17}$?

(a) $\frac{108}{221}$ (b) $\frac{27}{51}$
(c) $\frac{63}{119}$ (d) $\frac{153}{289}$

49. If the numerator of a fraction is decreased by 80% and the denominator of the fraction is decreased by 60%, then the resultant fraction is $\frac{5}{6}$. What is the original fraction?

(a) $\frac{7}{3}$ (b) $\frac{3}{5}$
(c) $\frac{5}{3}$ (d) $\frac{6}{5}$

50. HCF of $2^4 \times 3^4 \times 5^3 \times 7^2$ and $2^2 \times 3^6 \times 5^5$ is:

(a) $2^2 \times 3^4 \times 5^3$ (b) $2^3 \times 3^5 \times 5^4 \times 7$
(c) $2^6 \times 3^{10} \times 5^8 \times 7^2$ (d) $2^2 \times 3^2 \times 5^3 \times 7^2$

51. What is the length of the side of the largest square tile, which is used for constructing the floor of tile of 13.92m length and 5.22m breadth.

(a) 58 cm (b) 1 m 16 cm
(c) 1 m 74 cm (d) 87 cm

52. A number is divided in the ratio of 9 : 5 when 8 is added to each number, the ratio becomes 5 : 3 which will be the largest number among the two?

(a) 80 (b) 72
(c) 69 (d) 81

53. The price of petrol has been increased by 10% in the new budget. The passenger of a motor vehicle can reduce the consumption to how many %, so that his total expenditure on petrol remains the same?

(a) 10% (b) $9\frac{1}{11}\%$
(c) 11% (d) $11\frac{1}{9}\%$

54. A tent as such that its lower part is like a cylinder of 24 m height having 126 m diameter. Its apex is cone shaped with a base of the same diameter of 126 m and is 80 m slant height. Its canvas is 8 m wide. Calculate the length of canvas required to construct the tent.

(a) 3296 m (b) 3020 m
(c) 3168 m (d) 3190 m

55. A and B can complete a work in 40 days and 60 days respectively. They work together for some days and B leaves the job. If A completes the rest of the work in 10 days, find for how many days B worked.

(a) 15 days (b) 14 days
(c) 18 days (d) 16 days

56. A train over takes two people who are moving with speed of 2 km/h and 4 km/hr respectively, of the train moving in the same direction and the train passes them in 9 and 10 seconds respectively. Find the length and speed of the train.

(a) 22 km/hr, 50 metre (b) 22 km/hr, 80 metre
(c) 32 km/hr, 50 metre (d) 32 km/hr, 80 metre

57. An amount of ₹16400 is borrowed and is to be repaid in 2 years in equal annual installments at the rate of 5% compound interest. Find the amount of annual payment.

(a) ₹ 7590 (b) ₹ 7495
(c) ₹ 7600 (d) ₹ 8820

58. A dealer buys 200 quintals of wheat at ₹1,200 per quintal. He spends ₹10,000 on transportation and storage. If he sells the wheat at ₹13 per kg, then the profit percentage of the dealer is:

(a) 1% (b) 3%
(c) 2% (d) 4%

59. If a and b are the roots of equation $3x^2 - 5x + 2 = 0$ then find the value of (a/b)+(b/a).

(a) 13/9 (b) 13/6
(c) 13/2 (d) 9/13

60. In a rhombus ABCD, if ∠ACB = 40º, then ∠ADB = ?

(a) 50º (b) 70º
(c) 60º (d) 45º

61. What will be the median, mode and mean of the given numbers?
9, 5, 8, 9, 9, 7, 8, 9, 8

(a) 9, 9, 9 (b) 9, 8, 9
(c) 8, 9, 8 (d) 8, 9, 9

62. If $\sqrt{x^2 + y^2} = 25$ and $y = 2x$ then find the value of x.

(a) 5 (b) 25
(c) $\sqrt{125}$ (d) $\sqrt{5}$

63. A man says to his son seven years ago that I was 7 times of your age and after three years, I will be three times of your age. Find their age.

(a) 42, 12 (b) 52, 12
(c) 40, 14 (d) 20, 42

64. Starting from the inlet pipe in the reservoir, an inlet pipe and an outlet pipe take an hour to fill and empty the reservoir. The inlet pipe takes 11.25 hours to fill the empty reservoir and the outlet pipe can empty the filled reservoir completely in 22.5 hours. How much time will be taken to fill the reservoir?

(a) 44 hours
(b) 45 hours
(c) 43 hours 50 minutes
(d) 42 hours 45 minutes

65. If the income of A is 15% more than of B and the income of B is 20% less than that of C, then the income of A, B and C respectively are in the ratio:

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(a) 23 : 20 : 25 (b) 25 : 23 : 20
(c) 20 : 23 : 25 (d) 23 : 25 : 20

66. Farad per meter is the unit of———.
(a) Permeability
(b) Electric conductance
(c) Permittivity
(d) Watt per steradian

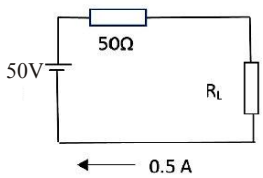
67. If an object has a mass of 100 kg on Earth, what would be its mass on the Moon?
(a) 980 kg (b) 100 kg
(c) 0 kg (d) 16.7 kg

68. A car starts from rest with a constant acceleration of $3m/s^2$. Find the distance covered by this car in 10s.
(a) 250m (b) 100m
(c) 200m (d) 150m

69. How much work required to be done to increase the speed of a ball of mass 0.4 kg from 1 m/s to 3m/s?
(a) 1.6J (b) 1.2J
(c) 0.8J (d) 0.4J

70. A steel rod with the thermal conductivity of 50.2 W/(m-K) has an area of cross-section 0.02 m^2 and length 15 cm. If the two ends of the rod are maintained at a temperature difference of 300^0C, the rate of heat flow through the rod is : 50.2 W
(a) 4.0 kJ/s (b) 1.0 kJ/s
(c) 3.0 kJ/s (d) 2.0 kJ/s

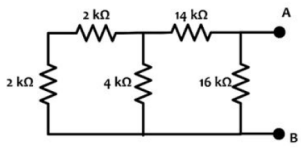
71. Power dissipated in R_L is



(a) 1W (b) 50W
(c) 0.5W (d) 12.5W

72. Twelve wires each having resistance r are connected to form a skeleton cube. Find the equivalent resistance between the two diagonally opposite corners of the cube.
(a) 5r (b) $\frac{2}{3}r$
(c) $\frac{5}{6}r$ (d) r

73. A multi-meter in resistance measurement mode is used in the given circuit across terminals A and B. Which of the following is the best setting to display the measured value on a 3-digit screen?



(a) 10 kΩ (b) 10 MΩ
(c) 1 kΩ (d) 1 Ω

74. If both the number of turns and core length of an inductive coil are doubled, then its self inductance will be
(a) halved (b) doubled
(c) quadrupled (d) unaffected

75. The minimum number of wattmeter(s) required to measure 3-phase 3-wire balanced or unbalnced power is:
(a) 4 (b) 1 (c) 2 (d) 3

76. Ria needs to calculate the number of turns that a solenoid should have, in order to induce a voltage of 50 V provided that the magnetic flux in its cavity changes from 70 mWb to 20 mWb per time 0.20 s. What will be her answer?
(a) 200 (b) 20
(c) 50 (d) 2

77. If the distance between two charged bodies is made half, the force between them becomes
(a) One fourth (b) Double
(c) Half (d) None of the above

78. 2 coils having self-inductance of 10mH and 15mH have an effective inductance of 40mH when they are connected in series aiding. What will be the equivalent inductance when they are connected in series opposition?
(a) 20mH (b) 25mH
(c) 5mH (d) 10mH

79. A coil would behave as-
(a) An inductor at high frequencies
(b) A capacitor at very low frequencies
(c) A resistor at high frequencies
(d) A capacitor at very high frequencies

80. A conductor material has a free-electron density of 10^{25} electrons per m^3, When a voltage is applied, a constant drift velocity of 1.4×10^{-3} m/s. If the cross-sectional area of the material is 1 cm^2, calculate the magnitude of the current. Electronic charge is 1.6×10^{-19} coulomb.
(a) 0.224 A (b) 0.2 A
(c) 0.25 A (d) 0.1 A

81. Basic composition of Mica is given by:
(a) $H_2Al_3(SiO_4)_3$ (b) $KH_2Al_3(SiO_4)_3$
(c) $KH_2Al_3O_4$ (d) $KH_2(SiO_4)_3$

82. N–type semiconductors are formed by adding:
(a) Divalent impurities to pure semiconductor
(b) Trivalent impurities to pure semiconductor
(c) Tetravalent impurities to pure semiconductor
(d) Pentavalent impurities to pure semiconductor

83. Avalanche breakdown occurs at a reverse bias voltage of :
(a) 2 – 4 V (b) 4 – 6 V
(c) 6 – 8 V (d) 8 – 10 V

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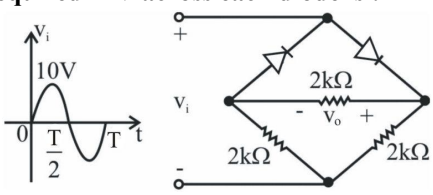
84. The stability factor (S) for common emitter circuit is given by _____ (treating base current constant)
(a) $S = \alpha + \beta$ (b) $S = 1 + \beta$
(c) $S = 1 - \beta$ (d) $S = 2 + \beta$

85. Which of the following statements is INCORRECT?
(a) Similar to the MOSFET, the IGBT has a low impedance gate.
(b) Similar to the MOSFET, the IGBT has a high impedance gate.
(c) Like the BJT, the IGBT has a small on- state voltage.
(d) Similar to the GTO, the IGBT can be designed to block negative voltage.

86. When the transformer is not center tapped, the required PIV across each diode is :



(a) 10 V (b) 20 V
(c) 5 V (d) 0.636 V

87. What is the value of collector current (I_C) for β_{dc} = 150 and base current (I_B) = 30 μA ?
(a) 5 A (b) 4.5 mA
(c) 50 mA (d) 6 A

88. When n-channel depletion type MOSFET are used in enhanced mode–
(a) The gate will be positive
(b) The gate will be negative
(c) The gate will be ground level
(d) The gate will be undetermined

89. An oscillator which generates sine wave oscillations is called_
(a) Damped wave oscillator
(b) Relaxation oscillator
(c) Feedback oscillator
(d) Harmonic oscillator

90. Slew rate is defined by.
(a) di/dt (max) (b) dv/dt (max)
(c) di/dt(min) (d) dv/dt(min)

91. Which of the following multi vibrator is also called as Eccles-Jordan circuit in early days?
(a) Bistable multivibrator
(b) Monostable multivibrator
(c) Astable multivibrator
(d) All of these

92. A (0-200) V voltmeter has an accuracy of 0.75% of full scale reading. If voltage measured is 100 V, the error is
(a) 3% (b) 2%
(c) 1.5% (d) .75%

93. A PMMC meter has an internal resistance 200Ω and the current required for its full scale deflection is 50μA. The meter is capable of measuring on its own a maximum voltage of :
(a) 50μV (b) 10μV
(c) 5mV (d) 10 mV

94. Potentiometer is basically a..... Instrument–
(a) Digital (b) Deflection type
(c) Null type (d) Recording

95. The _____ aquadag coating on the inner surface of a CRT-based CRO acts as a _____.
(a) non-conducting; high-voltage electrode
(b) conducting; high-voltage electrode
(c) conducting; low-voltage electrode
(d) non-conducting; low-voltage electrode

96. Identify the name of instrument shown in figure.

(a) Dial gauge type displacement Transducer
(b) High Sensitive acceleration Transducer
(c) Cavity type pressure Transducers
(d) Flux meter

97. If $(101)_n$ = 65, where n represents the base of the respective number system, then the value of n is–
(a) 2 (b) 4
(c) 8 (d) 16

98. The NOR - NOR realization is equivalent to …….
(a) NOT-AND realization
(b) AND-OR realization
(c) OR-NOT realization
(d) OR-AND realization

99. What will be next state in a JK flipflop if clock = 0, J = 0, K = 1? (Q_n and Q_{n+1} are present and next states, respectively)
(a) Q_n (b) Q' n
(c) 1 (d) 0

100. In dual slope type of ADCs, an input hold time is____
(a) Almost zero
(b) Higher than that of flash type ADCs
(c) Longest
(d) All of the above

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SOLUTION : PRACTICE SET- 12

ANSWER KEY

1. (b)	11. (b)	21. (c)	31. (c)	41. (b)	51. (c)	61. (c)	71. (d)	81. (b)	91. (a)
2. (d)	12. (b)	22. (b)	32. (a)	42. (a)	52. (b)	62. (c)	72. (c)	82. (d)	92. (c)
3. (c)	13. (c)	23. (b)	33. (a)	43. (b)	53. (b)	63. (a)	73. (a)	83. (d)	93. (d)
4. (b)	14. (a)	24. (d)	34. (a)	44. (d)	54. (c)	64. (d)	74. (b)	84. (b)	94. (c)
5. (b)	15. (d)	25. (d)	35. (c)	45. (a)	55. (c)	65. (a)	75. (c)	85. (a)	95. (b)
6. (b)	16. (b)	26. (b)	36. (c)	46. (b)	56. (a)	66. (c)	76. (a)	86. (c)	96. (a)
7. (d)	17. (c)	27. (d)	37. (a)	47. (d)	57. (d)	67. (b)	77. (d)	87. (b)	97.(c)
8. (d)	18. (a)	28. (d)	38. (d)	48. (a)	58. (d)	68. (d)	78. (d)	88. (a)	98. (d)
9. (b)	19. (c)	29. (a)	39. (b)	49. (c)	59. (b)	69. (a)	79. (d)	89. (d)	99. (a)
10. (a)	20. (a)	30. (d)	40. (c)	50. (a)	60. (a)	70. (d)	80. (a)	90. (b)	100. (b)

SOLUTION

1. (b)
Indian Regional Navigation Satellite System (IRNSS) is a regional navigation system developed by the Indian Space Research Organization (ISRO) which is totally under control by Government of India. The Prime Minister of India Shri Narendra Modi has named it NAVIC dedicated to fishermen of India. It's purpose is to give accurate location information to its user in part of the country and upto a distance of 1500 km from the Indian border.

2. (d)
In Volleyball Spiking is the off play where a player slams the ball sharply down-wards over the net & into the opposite court, making it difficult for the opposing team to recover the ball. In Volleyball, spike in also known with the name Smash.

3. (c)
Kalaripayattu is an ancient martial art indigenous to Kerala. The word 'Kalari' first appears in the Tamil sangam literature to describe both a battle field and combat arena.

4. (b)
Christian Friedrich Samuel Hahnemann was a German physician, best known for creating the pseudoscientific system of alternative medicine called homeopathy. He propounded the homeopathic principle of 'Like Cures Like.

5. (b)
Kynesian Multiplier theory states that the economy will flourish the more the government spends. This theory was propounded by British economist John Maynard Keynes in 1936. The multiplier effect refers to the theory that government spending intended to stimulate the economy causes increase in private spending that further stimulates the economy.

6. (b)
Article 368 under part XX of the Indian Constitution deals with the powers of the parliament to amend the constitution and its procedures. According to the procedures laid in this, Parliament can amend the constitution by adding new provisions or by removing or by changing the given provisions, structure of the constitution.

7. (d)

Famous Grasslands	Location
Pampas	South America
Steppes	Central Asia and Eastern Europe
Savanna	Africa
Prairies	North America

8. (d)
Dams and reservoirs are constructed to store surplus water during wet periods, which can be used for irrigating arid lands. One of the major benefits of dams and reservoirs are where water flows can be regulated as per agricultural requirements of the various regions over the year.
Reservoir-based hydroelectric projects provide much needed peaking power to the grid. Hydropower is a renewable source of energy.
Canals from dams help in transferring water from reservoir to greater distance which facilitates equitable distribution of water.

9. (b)
Guru Ram Das Ji was gifted the land for Harmandir Sahib by Mughal Emperor Akbar. The 5th Guru Sri Arjun Dev ji brick lined the structure and began construction of the Golden Temple Complex in December of 1588. In Sikh history, Sufi saint Mian Mir Mohammed Muayyinul Islam, laid the foundation stone of Harmandir Sahib.

10. (a)
On 7th February 1856, Lord Dalhousie Annexed Wajid Ali Shah's kingdom 'Awadh' on the account of alleged internal misrule.
The Doctrine of lapse was an annexation policy followed widely by Lord Dalhousie when he was India's Governor-General from 1848 to 1856.

States Annexed by Doctrine of Lapse	Year of Annexation
Satara	1848
Jaitpur	1849
Sambhalpur	1849

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Baghat	1850
Udaipur	1852
Jhansi	1853
Nagpur	1854

11. (b)

From the given options,

(a) 21 : 420

$\Rightarrow \quad 21^2 - 21 \Rightarrow 441 - 21 = 420$

(b) 15 : 208

$\Rightarrow \quad 15^2 - 15 \Rightarrow 225 - 15 = 210 \neq 208$

(c) 17 : 272

$\Rightarrow \quad 17^2 - 17 \Rightarrow 289 - 17 = 272$

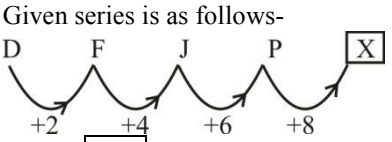
(d) 25 : 600

$\Rightarrow \quad 25^2 - 25 \Rightarrow 625 - 25 = 600$

Hence, option (b) is different from others.

12. (b)

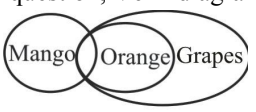
Given series is as follows-



Hence, $\boxed{? = X}$

13. (c)

According to the question, Venn diagram is as follows,



Conclusion:-

(I) (×)

(II) (×)

Hence, Neither conclusion I nor II follows.

14. (a)

From statement-1, The color of granite is the color of wall

The color of the wall is not known by this statement 2- The color of granite is very bright/Shiny. This only shows that granite is shiny.

Hence from both statements we cannot detect the color of granite.

15. (d)

According to statement both arguments (1) and (2) are strong.

16. (b)

According to the assumption, it is clear that arguments I and II follows.

17. (c)

Two surface coloured $= 12\,(n - 2)$

$n = 3$

Then, two surface painted $= 12\,(3 - 2)$

$= 12 \times 1$

$= 12$

18. (a)

Just as, Rabbit and Snail is creature (living) in the same way Aeroplane and Bullock cart is the means of transport. So, option (a) is correct.

19. (c)

Given, + # 7 & 6

Number/ Symbols	2	@	9	5	$	&	3	%	#	7	+	4	8	6
Code	T	F	A	J	L	E	W	Q	D	P	R	B	U	S

⇒ Given code is following the condition (i) so first and last element will be interchanged.

+ # 7 & 6 ⇒ 6 # 7 & +

↓ ↓ ↓ ↓ ↓ (Code)

S D P E R

Hence, option (c) is correct.

20. (a)

A total of three group of three picture can be formed by using them from the pictures given in the above question or using pictures only once. These groups will be :

(1) Picture (1, 4, 7)

(2) Picture (2, 3, 6)

(3) Picture (5, 9, 8)

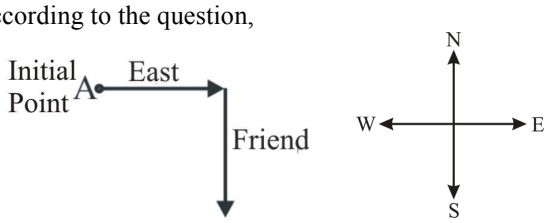
Hence, option (a) is correct.

21. (c)

The given figure completes figure A has + sign in the middle, B Shape has x sign, similarly C figure has an x sign, D shape should have a + sign in the middle and the side pole should be attached to the corner denoted in figure 3.

22. (b)

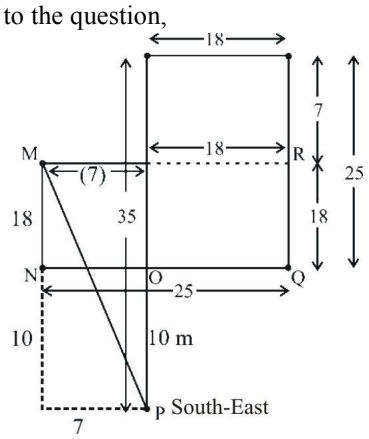
According to the question,



Initially he stand facing towards East and turns his head to the right to look at his friend. So, it is clear that his friend is coming from the South direction.

23. (b)

According to the question,



Distance of Harish from point M to P $= \sqrt{28^2 + 7^2}$

$= \sqrt{833} = 28.86$ m (South-East)

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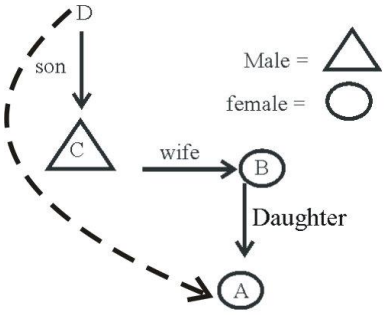
24. (d)
According to the question,



Hence, it is clear from blood relation diagram that A is the daughter of D's son.

25. (d)
Given,

$$27-15 \div 84 \times 6 + 13$$

On interchanging the mathematical symbols,

$\Rightarrow$ $27 + 15 \times 84 \div 6 - 13$

$\Rightarrow$ $27 + 15 \times 14 - 13$

$\Rightarrow$ $27 + 210 - 13$

$\Rightarrow$ $237 - 13$

$\Rightarrow$ 224

26. (b)
An Integrated Circuit (IC) is based entirely on electronics in which the active and passive components are built on a silicon crystal chip. Components in ICs are made together and there are no soldering joints, hence it has high reliability. Jack Kilby and Robert Noyce invented Integrated Circuit (IC).

27. (d)
Drum plotter is a graphic output device that draws lines or image with a continuously moving pen on a sheet of paper rolled around a rotating drum that moves the paper in a direction perpendicular to the motion of the pen. The plotters are divided into the following four categories on the basis of their working Drum plotter, Flatbed, Inkjet and Electrostatic etc.

28. (d)
Plotter, Printer and Monitor are output devices whereas Touch screen is an input device.

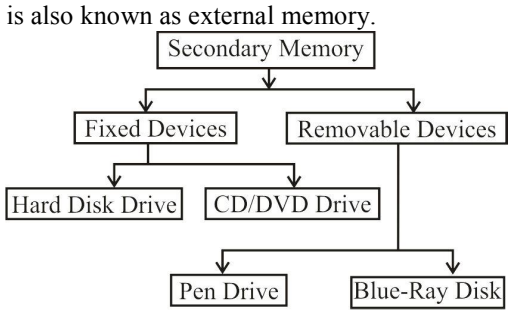
29. (a)
Printing devices resolutions are measured in Dot Per Inch, resolution is the image quality produced by a printer.
Digital image or video display resolution is measured in Pixels Per Inch (PPI).

30. (d)
DRAM (Dynamic Random Access Memory) is a primary memory or primary storage device while other option (Flash drive, Pen drive, CDs) are example of secondary storage device.

31. (c)
RAM (Random Access Memory) is a primary memory while SSD (Solid State Drive), Hard Disk, USB Pen Drive etc. are example of secondary memory.

32. (a)
Secondary memory is non-volatile memory it retains data when power is switch off. We can use secondary memory to store large amount of data, audio, video and multimedia files.

- It store data for long term or permanently. It is cheaper as compared to primary memory.
- It is also known as external memory.



33. (a)
A TCP is connection - oriented protocol while UDP is connectionless protocol.
TCP is reliable for maintaining a connection between sender and receiver UDP is connection less and due this it is unreliable to transfer data.

34. (a)
The Internet architecture is a meta-network that refers to a group of thousands of separate networks interacting with a common protocol. It is the third application layer which includes various protocols for building Internet services such as email (SMTP), file transfer (FTP), transfer of hypermedia pages, transfer of distributed databases (World Wide Web) etc.

35. (c)
Application layer is the 7th layer of the OSI model. This layer uses protocols like HTTP, FTP, SMTP and NFS etc.

36. (c)
Page setup options are used to set the layout and print options of a page in MS word 365. To use the page setup dialog box, click the page layout tab, then click dialog box launcher in the page setup group.

37. (a)
In MS word 365, when Ctrl + P shortcut key is used to print a document, word combines print and preview in a single window.

38. (d)
9 options are available in the alignment group to align text in a table in MS 365.

39. (b)
Packet switching technology is used by the Internet. Packet switching is a method of transferring data in the form of packets across different networks. In order to transfer files over the network in a fast and efficient manner and reduce transmission latency, data is divided into smaller pieces of variable length, called packets.

40. (c)
A cookie is information that a website puts on a user's computer. Cookies store limited information from a web browser session on a given website that can be retrieved in the future. They are also sometimes referred to as browser cookies, web cookies or internet cookies.

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41. (b)
IP serves as the focal point for the architecture, it defines a common method for exchanging packets among a wide collection of networks. Above IP there can be arbitrarily many transport protocols, each offering a different channel abstraction to application programs.

42. (a)
Google Chrome's Incognito mode is a private browsing feature that allows users to browse the web without their browsing history, cookies, or site data being saved. It also doesn't store the data entered in the personal account.

43. (b)
Microsoft Edge, Google Chrome and Mozilla Firefox are web browsers while Jungle Safari is not web browsers.

44. (d)
The shortcut key to open in Linux is incognito Ctrl + Shift + N. It is windows and uses the new incognito window of Google Chrome. It is used for browsing. Your browser history, cookies and data forms sides or forms are not saved on your device this means that your activity is stored in your chrome browser history.

45. (a)
We can protect, file, Worksheet & cell also but calculation is meant for to calculate.

46. (b)
Let number of males = 7x
and, number of female = 6x
According to the question-

$$7x = 56$$
$$x = 8$$

$\therefore$ Total number of guests $= 7x + 6x$
$= 13x$
$= 13 \times 8$
$= 104$

47. (d) From question

$$56 \div \frac{1}{3}\left\{15+12-\left(9+6-\overline{5+7}\right)\right\}$$
$$= 56 \div \frac{1}{3}\{15+12-(15-12)\}$$
$$= 56 \div \frac{1}{3}\{15+12-3\}$$
$$= 56 \div \frac{1}{3}\{24\}$$
$$= 56 \div 8$$
$$= \frac{56}{8} = 7$$

48. (a)

Given: $\frac{9}{17}$

$$\frac{9\times3}{17\times3} = \frac{27}{51}$$
$$\frac{9\times7}{17\times7} = \frac{63}{119}$$
$$\frac{9\times17}{17\times17} = \frac{153}{289}$$

Hence $\frac{108}{221}$ will not equivalent fraction of $\frac{9}{17}$.

49. (c)
Let original fraction is $\frac{x}{y}$
According to the question,

$$\frac{x\times\frac{20}{100}}{y\times\frac{40}{100}} = \frac{5}{6}$$
$$\frac{x}{2\times y} = \frac{5}{6}$$
$$\frac{x}{y} = \frac{5}{3}$$

Hence original fraction $= \frac{x}{y} = \frac{5}{3}$

50. (a)
On finding the HCF of
$(2^4\times3^4\times5^3\times7^2)$ and $(2^2\times3^6\times5^5)$
HCF = $2^2\times3^4\times5^3$

51. (c)
The side of the largest square tile = HCF of 13.92m and 5.22m,
On finding the HCF by division method,

```
522)1392 (2
    1044
     348)522 (1
         348
         174)348 (2
             348
             ×××
```

So, the HCF is 174.
Hence, the length of the side = 174cm = 1m 74cm,

52. (b)
Let the number is 9x and 5x respectively.
According to the question,

$$\frac{9x+8}{5x+8} = \frac{5}{3}$$
$$27x + 24 = 25x + 40$$
$$2x = 40 - 24$$
$$2x = 16$$
$$x = 8$$

So, the largest number $= 9 \times 8 = 72$

53. (b)
Formula- for such cases,

$$\text{Decrease}\,\% = \left(\frac{x}{100+x}\right)\times100$$

Given- Growth = 10%
So, decrease % in 10% consumption,

$$= \left(\frac{10}{100+10}\right)\times100$$
$$= \frac{1}{11}\times100 = 9\frac{1}{11}\%$$

54. (c)
We know that, $r = \frac{D}{2} = \frac{126}{2} = 63\text{m}.$

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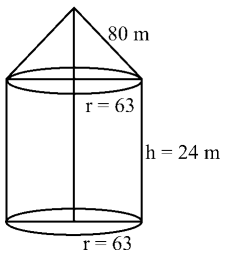

Curved surface of tent $= 2\pi rh + \pi rl$

$= \pi r(2h + l)$

$= \frac{22}{7} \times 63(2 \times 24 + 80)$

$= 198\ (48 + 80)$

$= 198\ (128)$

$= 25344\ m^2$

Area of canvas $= (l \times b) = 25344$

$l \times 8 = 25344$

$\therefore l = \frac{25344}{8}$

Length of required canvas $= 3168$ m

55. (c)

A's 1 day work $= \frac{1}{40}$ part

B's 1 day work $= \frac{1}{60}$ part

Let-

B leave the work after working x days, then the work done by B in x days $= \frac{x}{60}$ part

And work done by A in $(x + 10)$ days $= \frac{x+10}{40}$ part

Now,

$\frac{x}{60} + \frac{(x+10)}{40} = 1$

$\frac{2x + 3(x+10)}{120} = 1$

$2x + 3x = 120 - 30$

$5x = 90$

$x = 18$

Hence, B worked for 18 days.

56. (a)

Let the length of train $= x$ m.

and speed $=$ y m./sec.

Speed of first person $= 2 \times \frac{5}{18} = \frac{5}{9}$ m./sec.

Speed of second person $= 4 \times \frac{5}{18} = \frac{10}{9}$ m./sec.

Speed of train relative to first person $= \left(y - \frac{5}{9}\right)$ m./sec.

Speed of train relative to second person

$= \left(y - \frac{10}{9}\right)$ m./sec.

$y - \frac{5}{9} = \frac{x}{9}$, $\quad y - \frac{10}{9} = \frac{x}{10}$

$y = \frac{x+5}{9}$ -----(i)

$y = \frac{x}{10} + \frac{10}{9} = \frac{9x+100}{90}$ ----- (ii)

$\frac{x+5}{9} = \frac{9x+100}{90}$ {from equation (i) & (ii)}

$10x + 50 = 9x + 100$

$x = 50$ m.

and speed $= \frac{50+5}{9} = \frac{55}{9}$ m./sec.

$= \frac{55}{9} \times \frac{18}{5} = 22$ km./hr.

57. (d)

Let installment = ₹x

Total amount = installment $\left[\frac{1}{\left(1+\frac{r}{100}\right)^1} + \frac{1}{\left(1+\frac{r}{100}\right)^2}\right]$

$16,400 = x\left[\frac{1}{\left(1+\frac{5}{100}\right)^1} + \frac{1}{\left(1+\frac{5}{100}\right)^2}\right]$

$16,400 = x\left[\frac{1}{\frac{21}{20}} + \frac{1}{\left(\frac{21}{20}\right)^2}\right] = x\left[\frac{20}{21} + \frac{400}{441}\right]$

$16,400 = x\left[\frac{420+400}{441}\right]$

$16400 = x \times \frac{820}{441}$

$x = 20 \times 441 =$ ₹ 8820

58. (d)

$\because$ Cost price of wheat

$= 1200 \times 200 + 10000 =$ ₹ 2,50,000

$\because$ Total selling price at ₹13 per kg.

$= 13 \times 200 \times 100 =$ ₹ 2,60,000

Profit % $= \frac{260000 - 250000}{250000} \times 100$

$= \frac{10000}{250000} \times 100 = 4\%$

59. (b)

Comparing equation $Ax^2 + Bx + C = 0$ from equation $3x^2 - 5x + 2 = 0$

A = 3, B = -5, C = 2

Sum of roots $(a + b) = \frac{-B}{A} = \frac{-(-5)}{3} = \frac{5}{3}$

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Multiplication of roots (ab) $= \frac{C}{A} = \frac{2}{3}$

$$\frac{a}{b}+\frac{b}{a} = \frac{a^2+b^2}{ab}$$

$$= \frac{a^2+b^2+2ab-2ab}{ab}$$

$$= \frac{(a+b)^2-2ab}{ab}$$

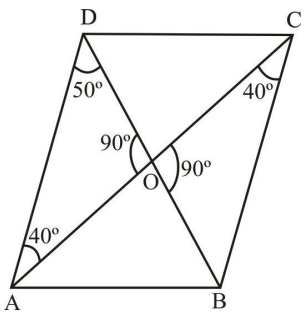
$$= \frac{\left(\frac{5}{3}\right)^2 - 2\times\frac{2}{3}}{\frac{2}{3}}$$

$$= \frac{\frac{25}{9}-\frac{4}{3}}{\frac{2}{3}}$$

$$= \frac{\frac{25-12}{9}}{\frac{2}{3}}$$

$$= \frac{13}{9}\times\frac{3}{2} = \frac{13}{6}$$

60. (a)



The diagonals of rhombus bisect each other at right angle (90°).

$\angle AOD = 90°$

$\angle ACB = \angle DAO = 40°$ [Transversal line AC cuts AD|| BC]

In ΔDAO

$\angle AOD + \angle OAD + \angle ADO = 180^0$

$90^0 + 40^0 + \angle ADO = 180^0$

$\angle ADO = 180^0 - 130^0$

$\boxed{\angle ADB = 50^0}$ $\{\because \angle ADO = \angle ADB\}$

61. (c)

Arranging the numbers in ascending order-

5, 7, 8, 8, 8, 9, 9, 9, 9

$\because$ terms number = 9 (odd)

$\therefore$ median $= \left(\frac{n+1}{2}\right)$ th term

$= \frac{9+1}{2} = 5^{th}$ term $= 8$

mode $= 9$ (the highest frequent number)

mean $= \frac{5+7+8+8+8+9+9+9+9}{9}$

$= \frac{72}{9} = 8$

62. (c)

$\sqrt{x^2+y^2} = 25$,$y = 2x$

$\sqrt{x^2+y^2} = 25$ ..... (i)

On squaring equation (i),

$x^2 + y^2 = 625$

$x^2 + (2x)^2 = 625$ $(\because y = 2x)$

$x^2 + 4x^2 = 625$

$5x^2 = 625$

$x^2 = 125$

$x = \sqrt{125}$

63. (a)

Let the age of father is y years and age of son is x years.

According to the first conditon,

$7(x - 7) = (y - 7)$

$7x - 49 = y - 7$

$7x - y = 42$ .....(i)

According to the second conditon,

$3(x + 3) = (y + 3)$

$3x + 9 = y + 3$

$3x - y = -6$ .....(ii)

From equation (i) and (ii),

$7x - y = 42$

$3x - y = -6$

$- \quad + \quad +$

$4x \quad = 48$

$x = 12$

From equation (i),

$7x - y = 42$

$7 \times 12 - y = 42$

$84 - 42 = y$

$y = 42$

Therefore, age of father = 42 years

And age of son = 12 years

64. (d)

Filled part of the tank by inlet pipe in 1 hour $= \frac{1}{11.25}$ part

Emptied part of the tank by outlet pipe in 1 hour $= \frac{1}{22.5}$ part

Filled part by both pipes in 2 hours

$= \frac{1}{11.25} - \frac{1}{22.5} = \frac{2-1}{22.5}$

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$$= \frac{1}{22.5}$$

Fill part of the tank by both pipes in 2 × 21 hours

$$= \frac{1}{22.5} \times 21$$

Water filled in 42 hours $= \frac{42}{45}$ part

Remaining part of tank $= 1 - \frac{42}{45} = \frac{3}{45}$

Time taken to fill the $\frac{3}{45}$ part by inlet pipe

$$= \frac{3}{45} \times 11.25 = \frac{3}{4} \text{ hours}$$

$$= \frac{3}{4} \times 60 = 45 \text{ minute}$$

Total time = 42 hour 45 minutes

65. (a)

According to the question,

$$A = B \times \frac{115}{100}$$

$$\frac{A}{B} = \frac{23}{20}$$

$$B = C \times \frac{80}{100}$$

$$\frac{B}{C} = \frac{20}{25}$$

Hence, A : B : C = 23 : 20 : 25

66. (c)

Farad per meter is the unit of permitivity

- Electric conductance → Siemen (s)
- Permeability → Henry/ meter

67. (b)

If an object has a mass of 100 kg on earth, then its mass on the moon is 100 kg i.e. remains same.

Weight = mass × gravity

$\boxed{W = mg}$

68. (d)

a= 3m/s^2

t = 10s

S = ?

$$S = ut + \frac{1}{2}at^2$$

$$S = 0 \times 10 + \frac{1}{2} \times 3 \times 10^2$$

$$S = \frac{1}{2} \times 300$$

S= 150m

Total distance covered by the car is 150 m.

69. (a)

Let the mass of ball (M) = 0.4kg

Work (W) = Change in kinetic energy (ΔKE)

$$= \frac{1}{2}m\left(v_2^2 - v_1^2\right)$$

$$= \frac{1}{2} \times (0.4) \times \left(3^2 - 1^2\right)$$

So, W = 1.6 J

70. (d)

Thermal conductivity (K) = 50.2 W/(m-K)

Length of rod (l) = 15 cm = 0.15 m

Area of cross-section of rod (A) = 0.02 m^2

Temperature difference betweens $(\theta_1 - \theta_2)$ = 300°C

Rate of flow of heat (Q) $\frac{KA(\theta_1 - \theta_2)}{l}$

$$= \frac{50.2 \times 0.02 \times 300}{0.15}$$

= 2008 J/s

= 2 kJ/second

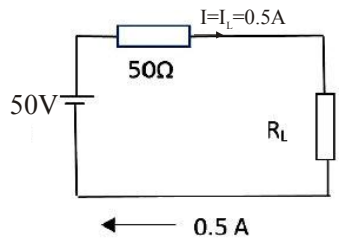
71. (d)

Given that-

V_s = 50V

I = I_L = 0.5A

R_s = 50Ω



$V_L = V_s - 25$

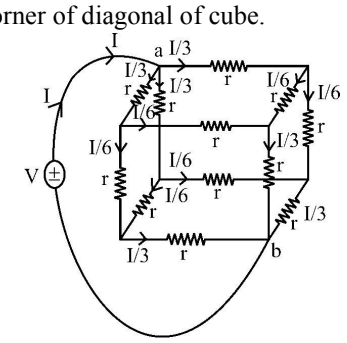
$V_L = 50 - 25 = 25V$

$P_L = V_L I_L$

= 25×0.5 = 12.5Ω

72. (c)

Let, Current (I) flow when V volt supply is given on the diagonal. By dividing current (I) we find out the value of current in different each branch. KVL apply at opposite corner of diagonal of cube.



$$V - \frac{I.r}{3} - \frac{I.r}{6} - \frac{I.r}{3} = 0$$

$$V - r\left[\frac{I}{3} + \frac{I}{6} + \frac{I}{3}\right] = 0$$

$$V - r\left[\frac{2I + I + 2I}{6}\right] = 0$$

$$V - \frac{5I.r}{6} = 0$$

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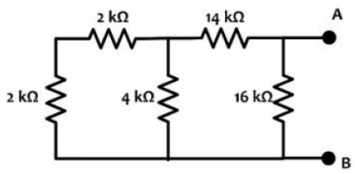
or $\frac{V}{I} = \frac{5}{6} r$ ohm

$R_{eq} = \frac{5}{6} r$ ohm

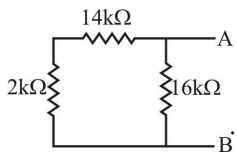
73. (a)



$(2 + 2) \parallel 4 = 4 \parallel 4$

$= \frac{4 \times 4}{4 + 4}$

$= 2k\Omega$



$(2 + 14) \parallel 16 \Rightarrow 16 \parallel 16$

$= \frac{16 \times 16}{16 + 16} = 8\ k\Omega$

10 kΩ is the best setting for 8kΩ resistance.

74. (b)

$\because$ Self inductance of coil

$$L = \frac{N^2}{\frac{1}{\mu_o \mu_r} \cdot \frac{\ell}{A}} \Rightarrow L \propto \frac{N^2}{\ell} \qquad (A = \text{constant})$$

$$\Rightarrow \frac{L_1}{L_2} = \left(\frac{N_1}{N_2}\right)^2 \left(\frac{\ell_2}{\ell_1}\right)$$

$\because \quad \ell_1 = \ell, \qquad \ell_2 = 2\ell$

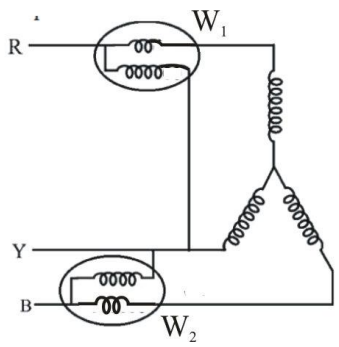
$N_1 = N, \qquad N_2 = 2N$

$$\frac{L_1}{L_2} = \left(\frac{N}{2N}\right)^2 \left(\frac{2\ell}{\ell}\right) = \frac{1}{2} \Rightarrow L_2 = 2L_1$$

If both the number of turns and core length of an inductive coil are doubled, then its self inductance will be doubled.

75. (c)

The minimum number of wattmeter (s) required to measure 3-phase 3 wire balanced or unbalanced power is 2.



76. (a)

Given, e = 50V

N = ?

Flux $d\phi = 70 - 20 = 50$ mWb

$= 50 \times 10^{-3}$ Wb

Time dt = 0.20 sec

$\because \quad e = \frac{-Nd\phi}{dt}$

$\therefore \quad N = \frac{e \times dt}{d\phi}$

$= \frac{50 \times 0.20}{50 \times 10^{-3}}$

$N = 200$

77. (d)

Force between the two charge proportional to the product of the charge and inversely proportional to the square of distance between them

$$F = \frac{1}{4\pi\varepsilon_0} \frac{q_1 q_2}{r^2}$$

where, $\frac{1}{4\pi\varepsilon_0} = K$

$\therefore \quad F = K.\frac{q_1 q_2}{r^2}$

Given that, $r' = \frac{r}{2}$

$$F' = K.\frac{q_1 q_2}{\left(\frac{r}{2}\right)^2}$$

$$F' = 4K.\frac{q_1 q_2}{r^2}$$

$F' = 4F$

So, the force between them become 4 times of initial value.

78. (d)

Given

$L_1 = 10$ mH $\qquad L_{eff} = 40$mH

$L_2 = 15$ mH

When connected in series aiding

$L_{eff} = L_1 + L_2 + 2M$

$40 = 10 + 15 + 2M$

$2M = 15$

$\boxed{M = 7.5\text{mH}}$

When connected in series opposition

$L'_{eq} = L_1 + L_2 - 2M$

$= 10 + 15 - 2 \times 7.5 = 10 + 15 - 15$

$\boxed{L_{eq} = 10\text{mH}}$

79. (d)

A coil would behave as a capacitor at very high frequencies.

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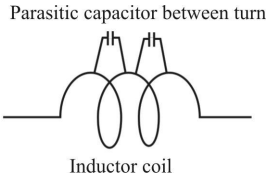


80. (a)

Given that,

Free-electron density (n) = 10^{25} per m^3

Charge on electron (e) = 1.6×10^{-19} Coulomb

Cross section area (A) = 1 cm^2 = 1×10^{-4} m^2

Drift velocity (V_d) = 1.4×10^{-3} m/s

$I = neAV_d$

$= 10^{25} \times 1.6 \times 10^{-19} \times 1 \times 10^{-4} \times 1.4 \times 10^{-3}$

$\boxed{I = 0.224 \text{ A}}$

81. (b)

(i) Basic composition of mica is $KH_2Al_3(SiO_4)_3$.

(ii) Mica is a complex silicate compound.

(iii) Alkaline substance like potassium, silica and alumina are also found in it.

(iv) Mica is conductor of heat and insulator of electricity. Due to its high thermal resistance mica is used as an insulator in various electronic devices.

82. (d)

An N-type semiconductor is formed when a small amount of pentavalent impurity is added to a pure germanium or silicon crystal. The addition of pentavalent impurity produces a large no. of free electrons in the host crystal. To explain the formation of N-type semiconductor let us introduce a pentavalent impurity atom into the lattice of pure silicon.

83. (d)

Avalanche breakdown occurs at a reverse bias voltage of 8-10V. The number of charge carrier in the P-N junction diode increase cumulatively and the junction breaks this effect is called the avalanche effect and this breakdown of junction is called avalanche breakdown.

84. (b)

The stability factor (S) for common emitter circuit is given by

$\boxed{S = 1 + \beta}$ (I_B= constant)

Stabilization is the process that makes the Q-point independent of changes in temperature and transistor parameters.

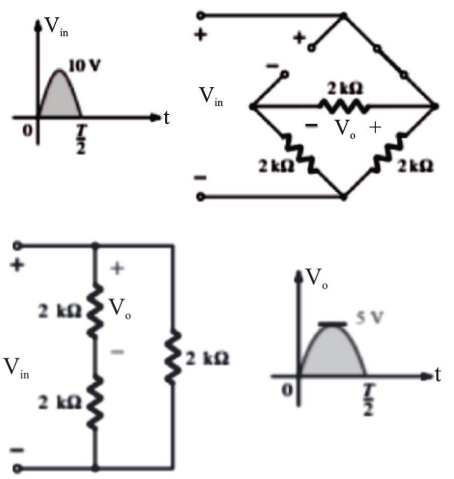
Hence, I_C will be unstable when S is very large.

85. (a)

IGBT and MOSFET are two different types of transistors used in electronics industry.

Sr.	BJT	MOSFET	IGBT
1.	Bipolar device	Unipolar device	Bipolar device
2.	Low on-state voltage drop	High on-state voltage drop	Low on-state voltage drop
3.	Low on-state conduction power loss	High on-state conduction power loss	Low on-state conduction power loss
4.	High switching power loss	Low switching power loss	Low switching power loss
5.	Low input impedance	High input impedance	High input impedance
6.	Current control device	Voltage control device	Voltage control device.
7.	Usage UPS charging battery	SMPS	Inverter, chopper
8.	Negative temperature coefficient of resistance	Positive temperature coefficient of resistance	Positive temperature coefficient of resistance

86. (c)



$$V_o = \frac{1}{2} V_i$$

$$V_{o(max)} = \frac{1}{2} V_{i(max)}$$

$$= \frac{1}{2}(10V) = 5V$$

$$PIV = V_{o(max)}$$

$$= 5V$$

87. (b)

Given,

$\beta_{dc} = 150$

Base current (I_B) = 30μA

$\because I_C = \beta_{dC} I_B$

$I_C = 150 \times 30 \times 10^{-6}$

$I_C = 4500 \times 10^{-6}$

$I_C = 4.5 \times 10^{-3}$

$I_C = 4.5$ mA

88. (a)

When n-channel depletion type MOSFET are used in enhanced mode then the gate will be positive. At zero bias operation, this MOSFET operates in depletion mode at negative values of V_{GS} and in enhancement mode at positive V_{GS}.

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89. (d)
Sinusoidal or harmonic oscillator are oscillators that generate an output using a sine waveform.
The total phase shift around the loop in a sinusoidal oscillator is either 0º or 360º.
- Sinusoidal oscillator-

(i) RC phase shift oscillator
(ii) Wien bridge oscillator
(iii) Hartley oscillator
(iv) Crystal oscillator
(v) Clapp oscillator
(vi) Colpitts oscillator.

90. (b)
Slew rate - The maximum rate of change of an op-amp's output voltage.

$$\text{Slew rate} = \left(\frac{dv}{dt}\right)_{max} \text{ volts/}\mu\text{s}$$

Generally, slew rate typical value is 80 V/µs and ideally infinite.

$$\boxed{\left|\frac{dV_0}{dt}\right|_{max} = V_m.2\pi f = \text{slew rate}}$$

91. (a)
Bistable multivibrator is also called as Eccles-Jordan circuit in early days.

92. (c)

$$\text{Error} = 200 \times \frac{0.75}{100} = 1.50$$

$$\text{limiting error } \% = \frac{1.5}{100} \times 100 = 1.5\%$$

93. (d)
Given,
Internal resistance, $R_i = 200\ \Omega$
Full scale deflection $= 50\mu A$
$V = IR = 200 \times 50 \times 10^{-6}$
$V = 10000 \times 10^{-6}$
$V = 10$ mV
The meter is capable of measuring maximum voltage = 10 mV.

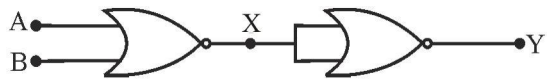
94. (c)
Potentiometer is basically a null type instrument.
Null type instrument - An instrument in which zero or null indication determines the magnitude of measured quantity such type of instrument is called a null type instrument. Sensitivity and accuracy are high of null type instrument and it is not suitable for dynamic measurement.
Potentiometers - A potentiometer is very simple and cheap form of transducers. It converts linear or rotational displacement into a voltage.

95. (b)
A conductive aquadag coating applied to the inside of the glass envelope of cathode ray tubes, serves as a high-voltage electrode. The coating covers the inside walls of the "bell" of the CRT tube from just inside the neck and stops just inside the neck and stops just short of the screen.

96. (a)
Identified name of instrument shown in figure is dial gauge type displacement transducer.
A displacement transducer is a dial gauge with a strain sensing element 3 integrated bridge circuit.
It is used for accurate measurement of very small linear distances.

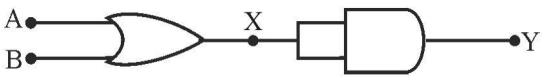
97.(c)
$(101)_n = 1 \times n^2 + 0 \times n^1 + 1 \times n^0 = 65$
$1 + n^2 = 65$
$n^2 = 64$
$n = 8$

98. (d)
NOR-NOR realization -



$X = \overline{A+B}$ $\boxed{Y = A+B}$

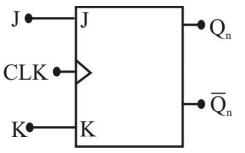
OR-AND realization -



$X = A+B$ $\boxed{Y = A+B}$

Both output are same, So the NOR-NOR realization is equivalent to the OR-AND realization.

99. (a)



$Q_{(n+1)} = J\overline{Q}_n + \overline{K}Q_n$

CLOCK	J	K	$Q_{(n+1)}$	State
0	0	0	Q_n	Hold State
0	0	1	Q_n	Hold State
0	1	0	Q_n	Hold State
0	1	1	Q_n	Hold State

CLOCK	J	K	$Q_{(n+1)}$	State
1	0	0	Q_n	Hold State
1	0	1	0	Reset State
1	1	0	1	Set State
1	1	1	$\overline{Q}_n$	Toggle State

100. (b)
In Dual slope type of ADCs, an input hold time is higher than that of flash type ADCs and accuracy high resolution in the form of dual slope ADC.
Response time for flash type ADC - T_{CLK}
Dual slope type ADC - $(2^{n+1})\ T_{CLK}$

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PRACTICE SET - 13

1. A satellite orbiting around the equator 3600 kilometers above the center of the earth is called as–
(a) Polar (b) Synchronous
(c) Mediterranean (d) Elliptical

2. With which of the following sports is the term 'double fault' associated?
(a) Tennis (b) Bridge
(c) Baseball (d) Golf

3. ..... is the traditional martial art of Manipur.
(a) Bihu (b) Thang-Ta
(c) Bagurumbo (d) Rauf

4. The Tibetan Buddhist monk who unified Bhutan as a Nation?
(a) Ygyen Wangchuck
(b) Ngawang Namgyal
(c) Ngawang Gyaltsen
(d) Jigme Wangchuck

5. SENSEX is an index of Bombay Stock Exchange's top _____ companies.
(a) 50 (b) 100
(c) 30 (d) 40

6. Which constitutional amendment, known as 'Mini Constitution', gave effect to the recommendations of Swaran Singh.
(a) 42nd constitutional amendment
(b) 43rd constitutional amendment
(c) 41st constitutional amendment
(d) 44th constitutional amendment

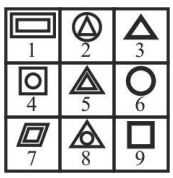
7. Which canal connects the Pacific Ocean and the Atlantic Ocean?
(a) Corinth Canal (b) Kiel Canal
(c) Panama Canal (d) Suez Canal

8. On which river is Idukki Dam built?
(a) Mahanadi (b) Krishna
(c) Ghataprabha (d) Periyar

9. Qila Mubarak monument is situated in _____.
(a) Haryana (b) Rajasthan
(c) Uttar Pradesh (d) Punjab

10. Who described the kingdom of Awadh as 'A cherry that will drop into our mouth one day'?
(a) Waren Hastings (b) Lord Wellesley
(c) Lord Dalhousie (d) Lord Curzon

11. If three groups can be formed using each of the given figures only once, then these groups will be _____.



(a) (1, 5, 8), (2, 4, 7) and (3, 6, 9)
(b) (1, 5, 7), (2, 4, 9) and (3, 6, 8)
(c) (1, 5, 7), (2, 6, 8) and (3, 4, 9)
(d) (1, 5, 7), (2, 4, 8) and (3, 6, 9)

12. Select the number from among the given options that can replace the question mark (?) in the following table.

5	4	3
6	5	4
7	6	5
384	245	?

(a) 144 (b) 269
(c) 249 (d) 244

13. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts. decide which of the given conclusions logically follow (s) from the statements.
Statements:
Some dogs are donkeys.
No donkey is a horse.
Conclusions:
I. Some dogs are not horse.
II. Some horses are dogs
(a) Only conclusion II follows.
(b) Both conclusions I and II follow.
(c) Either conclusion I or II follows.
(d) Only conclusion I follow.

14. Given below is a 'main statement' followed by four subsidiary statement.
From the given options, choose the ordered pair of subsidiary statements, where the first statement implies the second and the two statements are logically consistent with the main statement.
Main Statement:
You can drive over 60 km/h only on the national highways.
Subsidiary Statements :–
A. You are on the national highways.
B. You cannot drive over 60 km/h.
C. You can drive over 60 km/h.
D. You are not on the national highway.
(a) DB (b) DA
(c) CD (d) AB

15. Argument: During an election, the opposition party said, "look at the rise in price the last five years".
Assumptions:
1. This time, give a chance to our party for power.
2. Prices will still rise if you choose the same party to be in power

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(a) Both 1 and 2 are implicit
(b) Only assumption 2 is implicit
(c) Neither 1 nor 2 is implicit
(d) Only assumption 1 is implicit

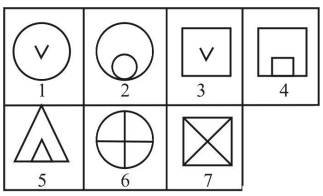
16. A question is given followed by two statements labelled I and II, Identify which of the statements is/are sufficient to answer the question.
Question:
How is Damini related to Bhola?
Statements:
I. Tika has only one son, Bhola and only one daughter Kamala.
II. Damini is Roma's son's wife. Kamala is the only daughter of Roma. Meghan is the daughter of Bhola.
(a) Statement I alone is sufficient, while Statement II alone is not sufficient to answer the question.
(b) Both Statements I and II together are sufficient to answer the question.
(c) Statement II alone is sufficient, while Statement I alone is not sufficient to answer the question.
(d) Statements I and II together are not sufficient to answer the question.

17. Consider the following statements and decide which of them is/are correct.
(1) Every prime is odd
(2) Product of any two prime numbers is odd
(a) 1 and 2 (b) Neither 1 nor 2
(c) 1 alone (d) 2 alone

18. Select the option that is related to the third expression in the same way as the second expression is related to the first expression.
L × V : 12 × 22 :: Q × Z : ?
(a) 18 × 10 (b) 12 × 14
(c) 17 × 26 (d) 11 × 15

19. The word ORANGE has been coded using 4 different codes.
Code 1 : PSBOHF
Code 2 : NQZMFD
Code 3 : QTCPIG
Code 4 : PTDRLK
Which of the given codes is used to write the word FISH or GKVL?
(a) Code 2 (b) Code 1
(c) Code 4 (d) Code 3

20. Use each of the following figures only once to form three groups. The three groups thus formed are.



(a) (1, 7), (2, 5, 4), (6, 3)
(b) (1, 3), (2, 5, 4), (6, 7)
(c) (1, 3), (2, 6, 4), (5, 7)
(d) (7, 3), (2, 5, 4), (6, 1)

21. Select the number from among the given options that can replace the questions mark (?) in the following table.

28	**63**	**94**
8	**18**	**?**
6	**9**	**13**

(a) 69 (b) 48
(c) 76 (d) 75

22. If Radha is sitting to the south of Krishna and Rahul is sitting to the east of Krishna, in which direction is Radha sitting with respect to Rahul?
(a) South-West (b) South- East
(c) North-East (d) North-West

23. Vijayan starts walking towards the 'South'. After walking 15 m, he turned to the 'Left' and walked 15 m. He again turned to the left and walked 15 m. How far and in which direction is he from his starting point?
(a) 30 m, east (b) 15 m, east
(c) 15 m, west (d) 15 m, south

24. 'X is the mother of Y' is represented by 'X < Y'
'X is the husband of Y' is represented by 'X > Y'
'X is the sister of Y' is represented by 'X @ Y'
'X is the son of Y' is represented by 'X $ Y'
Which of the following indicates the relationship 'R is the daughter of Q'?
(a) Q > K @ R $ H (b) R @ H > K < Q
(c) Q < K @ H $ R (d) R @ H $ K > Q

25. Select the combination of mathematical signs that when sequentially placed in the blanks of the given equation will balance the equation.
12_3_12_24
(a) ÷ + = (b) × = –
(c) × – = (d) × = ÷

26. Which computer generation replaced the IC (Integrated Circuit) with VLSI (Very Large Scale Integration) circuit?
(a) Fourth (b) First
(c) Second (d) Third

27. Which output device is used to transfer information from a computer to a picture on paper?
(a) Mouse (b) Plotter
(c) Touch panel (d) Punch card

28. Speech synthesizer is a part of _____.
(a) Arithmetic Logic Unit
(b) Output Unit
(c) Control Unit
(d) Memory Device

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29. A/an ___ is the smallest illuminated area on a computer screen.
(a) Layer (b) Angle
(c) Pixel (d) Canvas

30. Which of the following is used a secondary storage system in a computer?
(a) Floppy (b) EPROM
(c) ROM (d) RAM

31. Which memory represents the external storage device?
(a) Secondary Storage Device
(b) Cache Memory
(c) ROM
(d) Primary Memory

32. Which among the following is a Sequential Access Memory?
(a) Optic Disk
(b) Magnetic Disk
(c) Magnetic Drum
(d) Magnetic Tape

33. What is TCP/IP in nature?
(a) It is a kind of router hardware.
(b) It is a protocol
(c) It is a kind of router software
(d) It is an email service

34. The layers of the TCP/IP protocol are:
(a) transport layer and network layer
(b) application layer, data link layer, transport layer and network layer
(c) data link layer, and network layer
(d) application layer, data link layer, transport layer, network layer and hardware layer

35. Which of the following is a well - known protocol for data communication over the Internet?
(a) HTTP (b) SMTP
(c) SNMP (d) TCP/IP

36. Which of the following keyboard shortcuts is used to create a new blank document in MS - Word 365?
(a) Ctrl + N (b) Shift + N
(c) Esc + N (d) Alt + N

37. Which of the following can be used to select a particular word in a MS - Word document?
(a) Left click on the word twice
(b) Right click on the word once
(c) Left click on the word thrice
(d) Left click once on the word

38. The 'Ctrl + W' keyboard shortcut is used for which of the following purposes in MS- Word 365?
(a) To cut the selected content to the Clipboard and paste the contents of the clipboard
(b) To copy the selected content to the clipboard
(c) To paste the contents of the Clipboard
(d) To close a document

39. Hangouts is a communications platform that combines video calling, voice calling and text-based messaging into a single service. It is developed by:
(a) Oracle (b) Google
(c) IBM (d) Apple

40. Which of the following statements is INCORRECT about plug-ins?
(a) Adobe Flash is an example of an application that is available as a plug-in Adobe Flash
(b) They are applications intended for use in a web browser
(c) Plug-ins are similar to Active X controls
(d) Plug-ins can be executed outside of a web browser

41. Which among the following is/are NOT types of website hosting?
A. Shared hosting
B. Dedicated server
C. Grill hosting
(a) None of the given options
(b) Only B
(c) Only A
(d) Only C

42. Which of the following is not a component of a search engine?
(a) Web crawler
(b) Database
(c) Web server
(d) Serve interface

43. Which of the following is used to open a new tab on a browser?
(a) Ctrl + T (b) Ctrl + A
(c) Ctrl + W (d) Ctrl + Y

44. If you use a font that is not supported by a browser then the original text.
(a) Supported by browser, text will be displayed using 'Arial' font only.
(b) It will be displayed with a distinctive back ground
(c) It will be displayed in the default font
(d) It will not be displayed

45. Which of the following is NOT a benefit of cashless payments?
(a) Independent of digital devices
(b) All of these
(c) Convenience
(d) More secure

46. The sum of two numbers is 27 and the difference of their squares is 243. What is the difference between the numbers?
(a) 42 (b) 9
(c) 72 (d) 3

47. If T = (93 + 15) ÷(3 × 4) – 24 + 8, then what will be the value of T?
(a) –4 (b) –7
(c) –2 (d) –5

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48. What will be the value if you multiply $\frac{2}{11}$ by the reciprocal of $-\frac{5}{14}$?

(a) $\frac{28}{55}$ (b) $-\frac{28}{55}$
(c) $\frac{2}{3}$ (d) $-\frac{10}{153}$

49. If 2 is added to the square of a positive fraction the value $4\frac{1}{4}$ is obtained. Find the fraction.

(a) $2\frac{3}{4}$ (b) $1\frac{1}{4}$
(c) $2\frac{1}{4}$ (d) $1\frac{1}{2}$

50. Find the HCF of 2349, 2835 and 3078.

(a) 81 (b) 9
(c) 27 (d) 3

51. A, B and C begin together to move around a circular stadium and they complete their revolutions in 42s, 63s and 84s respectively. After how much time will they come together at the starting point?

(a) 152s (b) 252s
(c) 452s (d) 256s

52. What is the compound ratio of 45 : 75, 3 : 5, 51 : 68 and 256 : 81?

(a) $\frac{64}{75}$ (b) $\frac{32}{45}$
(c) $\frac{128}{75}$ (d) $\frac{75}{32}$

53. Suresh purchases two books of ₹ 1,200, he sells one on 20% profit and second on 16% loss. If the selling price of both books is same then, find the estimated cost price of books.

(a) ₹ 550 and ₹ 650 (b) ₹ 600 and ₹ 600
(c) ₹ 500 and ₹ 700 (d) ₹ 400 and ₹ 800

54. Find the surface area of a hemispherical bowl of thickness 'd' and internal radius 'r'.

(a) $\pi(4r^2 + 6rd + 3d^2)$ (b) $4\pi r^2 + 4\pi rd + 3d^2$
(c) $\pi(4r^2 + 3rd + d^2)$ (d) $4\pi r^2 + 6\pi rd + 3d^2$

55. A, B and C can finish a work separately in 8, 9 and 12 days respectively. C starts working alone and after one day B joins him. A also joins them even three days after the start of the work. In how many days the entire work will be finished?

(a) $3\frac{7}{29}$ (b) $3\frac{23}{29}$
(c) $4\frac{15}{23}$ (d) $1\frac{6}{23}$

56. A train crossed a 110 m long platform in 13.5 seconds and a 205 m long platform in 18.25 seconds. What was the speed of the train?

(a) 75 km/h (b) 72 km/h
(c) 69 km/h (d) 66 km/h

57. The amount on a sum of ₹2,400 at 5% per annum compound interest, compounded annually, in 2 years will be:

(a) ₹2,646 (b) ₹3,646
(c) ₹4,646 (d) ₹5,646

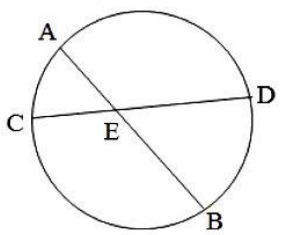
58. Sabiha purchased 240 cups for her shop at ₹8 each. During transportation, 24 cups got damaged, and she sold the remaining cups at ₹12 each. Find her overall percentage profit.

(a) 45% (b) 30%
(c) 40% (d) 35%

59. One of the roots of equation $x^2 - 24x + k = 0$ is x = 2 other value will be–

(a) x = 12 (b) x = –22
(c) x = 22 (d) x = –12

60.



In above circle, given m $\overline{AE}$ = 4 cm, m $\overline{BE}$ = 15 cm and m $\overline{CE}$ = 2.5 cm. What will be the value of m $\overline{DE}$?

(a) 16.5 cm (b) 20 cm
(c) 24 cm (d) 30 cm

61. The average of the results of 35 tests is 21. The average of the first 17 results is 19 and that of the last 17 is 22. What is the vlaue of the result of the 18th test?

(a) 42 (b) 36
(c) 38 (d) 34

62. Find the square root

$$\frac{((0.091)(0.11))}{((0.91)(1.331))}$$

(a) $\frac{1}{11}$ (b) $\frac{2}{11}$
(c) $\frac{4}{11}$ (d) $\frac{3}{11}$

63. The ratio of the ages of P and D is 3 : 4 while the ratio of the ages of D and A is 5:6. After 15 years from now, the ratio of the ages of P and D will be 4:5. What is the sum of the present age of all three?

(a) 180 years (b) 183 years
(c) 177 years (d) 175 years

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64. Two pipes, when working one at a time can fill a cistern in 2 hours and 3 hours, respectively while a third pipe can empty drain the cistern in 6 hours. All the three pipes were opened together when the cistern was $\frac{1}{6}$ filled. How long will it take for the cistern to be completely full ?
(a) 1 hour 15 minutes
(b) 1 hour 30 minutes
(c) 1 hour 20 minutes
(d) 1 hour

65. Seats for Mathematics, Physics and Chemistry in a school are in the ratio of 7:8:9. There is a proposal to increase the seats by 30%, 40% and 50% respectively. What will be the ratio of increased seats?
(a) 91 : 112: 135 (b) 135 : 112 : 91
(c) 35 : 37 :91 (d) 112 : 91: 135

66. Katal is the unit of_____.
(a) catalytic activity (b) stress
(c) capacitance (d) entropy

67. The actual weight of a person is determined by his:
(a) Mass and the acceleration due to gravity
(b) Mass
(c) Mass and width
(d) Mass and height

68. Which is the correct formula to find acceleration?
(a) $a = \frac{v-u}{t}$ (b) $a = u + vt$
(c) $a = \frac{v+u}{t}$ (d) $a = \frac{v+u}{2}$

69. If a box of mass 25 kg is pushed 15 m by a force of 'F' N, work done in the process is 480 J. Find F:
(a) 16 (b) 32
(c) 25 (d) 50

70. Watt/steradian is the unit of _____.
(a) electric conductance
(b) permittivity
(c) radiant intensity
(d) permeability

71. Current in 2Ω resistor fed by two 6V voltage sources in parallel, internal resistances of sources are 1Ω and 2Ω
(a) 4 A (b) 6 A
(c) 2.25 A (d) 3.75 A

72. Two bulbs marked "200 watt-200 volts" and "100 watt-200 volts" are joined in series to 200 volts supply. Power consumed in circuit is
(a) 300 watt (b) 33 watt
(c) 66.66 watt (d) 150 watt

73. The measure of ease with which magnetic flux can be admitted through a material or magnetic circuit is called_____.
(a) Magnetic flux (b) Reluctance
(c) Conductance (d) Permeance

74. The negative sign that occurs in the equation of induced EMF is a consequence of :
(a) Faraday's first law
(b) Lenz's law
(c) Cork screw rule
(d) Faraday's second law

75. In energy meter, if brake magnet is moved away from the spindle of the moving disc, the aluminium disc
(a) Will run fast
(b) No effect
(c) Will run slow
(d) will come to a stop

76. "Time-varying magnetic field will always produce an electric field".
The given statement is true for:
(a) Maxwell's third equation
(b) Maxwell's first equation
(c) Maxwell's second equation
(d) Maxwell's fourth equation

77. When two charges are separated a distance 'd' a part, there exists
(a) an electromotive force
(b) an electromagnetic force
(c) a magnetic force
(d) none of these

78. A charged particle of charge q is moving with a velocity v along the axis of a current carrying solenoid. The magnetic force on the particle is-
(a) qVB (b) 0
(c) qV^2B (d) None of these

79. To replace a faulty 10 millihenry choke, you could use :
(a) Two 20 millihenry chokes in series
(b) Two 5 millihenry chokes in series
(c) Two 30 millihenry chokes in parallel
(d) Two 0.5 millihenry chokes in parallel

80. Superconductors now a day found their application in various fields. This is due to the fact that they:
(a) generate regions free from magnetic field
(b) manufacture bubble memories
(c) generate electrostatic field
(d) generate very strong magnetic field

81. For temperature greater than 180°C in insulating materials, the insulation class is:
(a) Class C insulation
(b) Class A insulation
(c) Class E insulation
(d) Class B insulation

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82. Conduction electrons have more mobility than holes because they–
(a) Are lighter
(b) Have negative charge
(c) Need less energy to move them
(d) Experience collision frequency

83. What is the characteristic that ideal diode should have?
(a) Zero resistance in the forward as well as reverse bias
(b) Zero resistance in the forward bias and an infinitely large resistance in reverse bias
(c) Infinitely large resistance in reverse bias
(d) Infinitely large resistance in forward as well as reverse bias

84. Small signal operation of a transistor is that in which signal excursions are
(a) 5% around the Q point values
(b) 10% around the Q point values
(c) 1% around the Q point values
(d) 10-20% around the Q point values

85. The gain-bandwidth product, thermal stability and relation between input and output of an FET as compared to a BJT is respectively:
(a) High, low, linear
(b) Low, low, non-linear
(c) Low, high, linear
(d) Low, high, non-linear

86. What is the PIV across each diode of a bridge rectifier with a secondary voltage of 20V rms?
(a) 14.14 V (b) 20 V
(c) 28.28 V (d) 35 V

87. In case of BJT amplifier, bias stability is achieved by
(a) keeping the base current constant
(b) changing the base current in order to keep 'I_c' constant
(c) keeping the temperature constant
(d) keeping the I_E emitter current maximum

88. The ratio of electron and hole mobility in a MOSFET decides the :
(a) Aspect ratio of gate
(b) Propagation delay of gate
(c) Fan in of gate
(d) Speed of operation

89. State the gain of RC phase shift oscillator for obtaining sustained oscillation.
(a) $A = 1$ (b) $A \leq 29$
(c) $A \leq 1$ (d) $A \geq 29$

90. Match the following:

List-I	List-II
a. n- parameters	i. O/p voltage varies as the slope of i/p voltage
b. differentiator	ii. Noise division
c. half-wave rectifier	iii. Function of a Q point
d. integrator	iv. Series diode clipper

(a) a-iii, b-i, c-iv, d-ii
(b) a-ii,b-iii,c-iv,d-i
(c) a-i,b-iv,c-ii,d-iii
(d) a-iv, b-iii,c-i, d-ii

91. A certain regulator has a no-load voltage of 5V and a full-load output of 4.93V. What is the load regulation?
(a) 1.40% (b) 5.60%
(c) 4.20% (d) 2.80%

92. Permanent magnet moving coil is _____ to small current and free from hysteresis and ____ by external fields.
(a) insensitive; affected
(b) sensitive; not affected
(c) sensitive; affected
(d) insensitive; not affected

93. Scale of Moving Iron instruments is :
(a) Linear (b) Non uniform
(c) Exponential (d) Logarithmic

94. Which of the following uses wiper sliding contact?
(a) Diode (b) LED
(c) Potentiometer (d) Thermistor

95. Arrange in sequence the different parts of the cathode Ray tube (CRT) From beginning to end.
I. Accelerating anode
II. Horizontal deflection plate
III. Vertical deflection plate
IV. Focusing anode
V. Phosphorous screen
(a) I, IV, II, III and V (b) I, IV, III, II and V
(c) IV, I, II, III and V (d) IV, I, III, II and V

96. In transducers, the ability to withstand overloads is termed as_____.
(a) Ruggedness (b) Repeatability
(c) Accuracy (d) Reliability

97. Convert the gray code 1011 to corresponding binary number.
(a) 0100 (b) 1011
(c) 1010 (d) 1101

98. Minimum number of two input NAND gate for execution F= X.Y.A.B
(a) Will be 6 (b) Will be 3
(c) Will be 4 (d) Will be 5

99. What kind of operation occurs in a J - K flip flop when both inputs J and K are equal to 1?
(a) Preset operation (b) Reset operation
(c) Clear operation (d) Toggle operation

100. One 8-bit SAR type ADC is working with 1 MHz clock. The maximum conversion time of the ADC will be approx :
(a) 2 microseconds
(b) 8 microseconds
(c) 1000000microseconds
(d) 1 microsecond

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SOLUTION : PRACTICE SET- 13

ANSWER KEY

1. (b)	11. (d)	21. (d)	31. (a)	41. (d)	51. (b)	61. (c)	71. (c)	81. (a)	91. (a)
2. (a)	12. (a)	22. (a)	32.(d)	42. (c)	52. (a)	62. (a)	72. (c)	82. (c)	92. (b)
3. (b)	13. (d)	23. (b)	33. (b)	43. (a)	53. (c)	63. (c)	73. (d)	83. (b)	93. (b)
4. (b)	14. (a)	24. (d)	34. (d)	44. (c)	54. (a)	64. (a)	74. (b)	84. (a)	94. (c)
5. (c)	15. (a)	25. (c)	35. (d)	45. (a)	55. (c)	65. (a)	75.(c)	85. (d)	95. (d)
6. (a)	16. (b)	26. (a)	36. (a)	46. (b)	56. (b)	66. (a)	76. (a)	86. (c)	96. (a)
7. (c)	17. (b)	27. (b)	37. (a)	47. (b)	57. (a)	67. (a)	77. (a)	87. (a)	97. (d)
8. (d)	18. (c)	28.(b)	38. (d)	48. (b)	58. (d)	68. (a)	78. (b)	88. (a)	98. (a)
9. (d)	19. (c)	29. (c)	39. (b)	49. (d)	59. (c)	69. (b)	79. (b)	89. (d)	99. (d)
10. (c)	20. (b)	30. (a)	40. (d)	50. (a)	60. (c)	70. (c)	80. (d)	90. (a)	100. (b)

SOLUTION

1. (b)

When a satellite reaches exactly 42.164 kilometers from the center of the earth (about 36,000 km from earth's surface), it enters a sort of "sweetspot" in which its orbit matches earth's rotation. This special, high earth orbit is called geosynchronous.

2. (a)

In the given options double fault is associated with Tennis. Double faults nears hitting a faults on the second service.

3. (b)

Thang-Ta, the art of sword and spear is the traditional martial art of Manipur in the North-east India. It integrates various external weapons-the sword, dagger etc with the internal practice of physical control through soft movements coordinating with the rhythms of breathing. It is also known as Huyen langlon (method of safe-guarding) in Manipur.

4. (b)

Ngawang Namgyal (1594-1651) was the Tibetan Buddhist monk who unified Bhutan as a Nation. Bhutan was established on 17 December, 1907. Bhutan is one of the those few countries which has been independent throughout his history, never occupied or conquered.

5. (c)

BSE SENSEX, first compiled **in 1986** was calculated on a 'Market Capitalization Weighted' methodology of **30 component** stocks representing large well established and financially sound companies across key sectors. Since **September 1, 2003** S & P **BSE SENSEX** is being calculated on a **free float market capitalization**. SENSEX is a stock market index of 30 well-established and financially sound company.

6. (a)

42nd Amendment Act, 1976 is one of the most important amendments to the Indian Constitution. It was enacted by the Indian National Congress headed by Indira Gandhi then. Due to the large number of amendments this act has brought to the Indian Constitution, it is also known as 'Mini-Constitution'.

7. (c)

The Panama Canal is one of the most important canals in the western region and it provides a link between the Pacific and Atlantic oceans across the Isthmus of Panama, a narrow strip separating the Caribbean from the Pacific ocean.

Major Canals of the World:-

Suez Canal - It is an artificial sea-level waterway in Egypt, connecting the mediterranean sea to Red sea.

The Kiel Canal connects the North Sea (canal entrance at the mouth of the Elbe River estuary) to the Baltic Sea at the Kiel Fjord.

Corinth Canal (Greece) connects the central Mediterranean Sea (via the Gulf of Corinth) to the Aegean Sea (via the Saronic Gulf).

8. (d)

Idukki Dam is built on the Periyar river. The Periyar River is the longest river in the state of Kerala, with a total length of 244 km.

- Hirakud Dam → Mahanadi
- Lal Bahadur Shastri Dam → Krishna River (Almatti Dam)
- Nagarjuna Sagar Dam → Krishna River
- Tehri Dam → Bhagirathi River

9. (d)

Qila Mubarak is situated in Bhatinda (Punjab). It was constructed in 6th century. It is one of the oldest forts made up of bricks. The famous Raziya Sultan was imprisoned here by Altunia.

10. (c)

Lord Dalhousie described the kingdom of Awadh as 'A cherry that will drop into our mouth one day". He said this in 1851. In 1856, Awadh was formally annexed to the British Empire under the terms of the Doctrine of Lapse on the grounds of alleged internal misrule.

Lord Dalhousie (1848-1856): Opened the first Railway line from Bombay to Thane in 1853 AD, initiated the Doctrine of Lapse, established Postal system, Passed Widow Remarriage Bill.

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11. (d)

Group of given figures is as follows,

(1,5,7), (2,4,8) and (3,6,9)

Hence, option (d) is correct.

12. (a)

Given that :

From Column I,

$(5)^1 + (6)^2 + (7)^3 = 5 + 36 + 343$

$= 384$

Again, from Column II,

$(4)^1 + (5)^2 + (6)^3 = 4 + 25 + 216$

$= 245$

Same as,

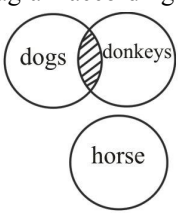
From Column III,

$(3)^1 + (4)^2 + (5)^3 = 3 + 16 + 125$

$= \boxed{144}$

13. (d)

Venn diagram according to statements is as follows,



Hence, only conclusion I follows.

14. (a)

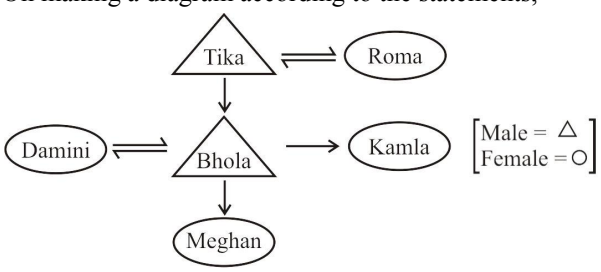
Out of the given pairs option (a) be the required answer. In which the given statement B is implicit in the statement D and both statement are logically related to the main statement.

15. (a)

In the given argument both assumption I and II are implicit.

16. (b)

On making a diagram according to the statements,



Hence, it is clear from above diagram that Damini is wife of Bhola.

17. (b)

♦ Every prime is not odd because 2 is prime and even number.

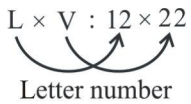
♦ Product of two prime number is not always a odd number

For example

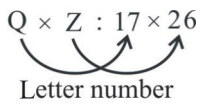
$2 \times 3 = 6$

18. (c)

Just as,



Same as,



So, ? = 17 × 26

19. (c)

Just as,

Word → F I S H

↓+1 ↓+2 ↓+3 ↓+4

Code 4 ← G K V L

On writing ORANGE in the given code language,

O R A N G E

+1↓ +2↓ +3↓ +4↓ +5↓ +6↓

P T D R L K

Hence, the word ORANGE has been written as PTDRLK via code 4.

20. (b)

According to the question, the appropriate group is as follows-

(1, 3), (2, 5, 4), (6, 7)

Hence, option (b) is correct.

21. (d)

Given that –

From Column I,

$28 + 8 = 36 = (6)^2$

Again, from Column II,

$63 + 18 = 81 = (9)^2$

Same as,

From Column III,

$94 + ? = (13)^2$

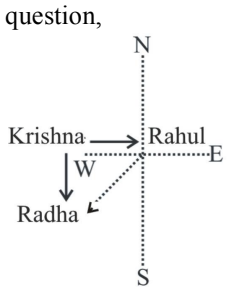
$94 + ? = 169$

$? = 169 - 94$

$? = 75$

22. (a)

According to the question,



It is clear that Radha is sitting in the south-west direction with respect to Rahul.

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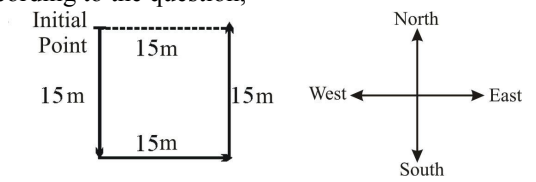
23. (b)

According to the question,

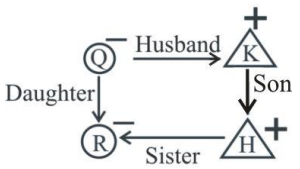


Hence, he is 15 meters east away from his initial point.

24. (d)

From option (d), R @ H $ K > Q

On drawing blood relation diagram,



Hence, it is clear from above that R is the daughter of Q.

25. (c)

On putting the signs from option (c),

(×, –, =)

$12 \times 3 - 12 = 24$

$36 - 12 = 24$

$24 = 24$

26. (a)

Fourth Generation computers were developed between 1976-1989 using VLSI which full form is Very Large Scale Integration. It is a circuit and this type of circuit has about 5000 transistors and more elements. The use of VLSI technology led to the creation of Microprocessors which reduced the size of the computer and increased capacity.

27. (b)

Plotter is an output device presenting hard copy like a printer. It is used to create high quality linegraph and picture. It is also used to transfer information from a computer to picture on paper.

28.(b)

A speech synthesizer is a computerized output device that accepts input, interprets data and produces audible language.

29. (c)

A pixel is a small dot that makes up a display or screen. It is also controllable part of a picture that is depicted on the screen. The word pixel is made up of picture (Pix) and element (Ex). Any screen is made like this by adding millions or millions of pixels per inch.

30. (a)

Floppy disk use in form of secondary storage system or medium. It can store electronic data, like a computer files. In early computers and not have CD-ROM drive or USB, Floppy disks were the only way to install a new program on a computer.

31. (a)

Secondary memory is non-volatile memory it retains data when power is switch off. We can use secondary memory to store large amount of data, audio, video and multimedia files.

- It store data for long term or permanently. It is cheaper as compared to primary memory.

32.(d)

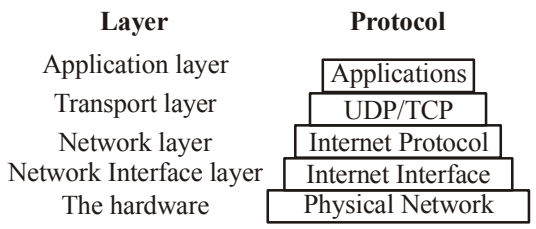
In magnetic tape only one side of the ribbon is used for storing data. It is sequential memory which contains thin plastic ribbon to store data and coated by magnetic oxide. So the data read write speed is slower. DRAM works on sequential order like A, B, C, D is data, we have to go through BC to go from A randomly in optical disk.

33. (b)

TCP/IP, stands for Transmission Control Protocol/Internet Protocol, is a suite of communication protocols that underlies the internet and most local area networks. It provides the foundation for data transmission and connectivity in modern computer networks.

34. (d)

The TCP/IP suite of protocol can be understood in terms of layers (or levels). This figure shows the layers of the TCP/IP protocol. The names of the layers above are application layer, Transport layer, network layer, Network interface layer and hardware. TCP/IP defines how information travels from sender to receiver.



The network interface layer is responsible for adding or removing any link layer protocol headers that are required for the message to reach its destination the network adapter device driver controls the network adapter card. A network interface is usually associated with a network adapter.

35. (d)

The full form of TCP/IP is Transmission Control Protocol/Internet Protocol. It is a set of rules and procedures that govern how the Internet works. Hyper Text Transfer Protocol (HTTP) is an application layer stateless protocol used for file transfer.

Simple Mail Transfer Protocol (SMTP) is used to send and receive e-mail. Simple Network Management (SNMP) is a popular protocol for network management

36. (a)

To quickly create a new blank file press Ctrl + N.

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37. (a)

- To select a single word quickly double - click that word.
- To select a line of text, place your cursor at the start of line and press shift + down arrow.

38. (d)

Use of keyboard shortcuts in MS -Word 365 -

Ctrl + W → Close the currently open document.

Ctrl + X → Cut selected text.

Ctrl + Y → Redo the last action performed.

Ctrl + Z → Undo last action.

Ctrl + C → To copy the selected content to the clipboard.

Ctrl + V → To paste the contents of the clipboard.

39. (b)

Hangout is a free video chatting and messaging app developed by Google. It is available on Android and iOS platforms. But it is currently replaced by Google chat.

40. (d)

Out of the above options, (d) is incorrect because Adobe Flash Plug-ins available as application can't be executed outside the web browser. Adobe Flash Player (formerly known as Macromedia Flash Player and Shock web Flash in Internet Explorer, Firefox and Google Chrome) Flash player can run from a web browser as a browser plug-in or an supported mobile devices.

41. (d)

Web Hosting is a service that allows an individual or organization to post their website or webpage on the internet.

Types of web hosting–

1. Shared Web Hosting
2. Dedicated Hosting
3. Virtual Private Server (VPS)
4. Cloud Web Hosting
5. Grid Hosting

42. (c)

Search engine has three components, web crawler, database, and search interface, hence web server is not a search engine. Web Crawler, a search engine uses multiple web crawlers to crawl through the World Wide Web and collect information. It is basically a software also known as a bot or spider.

43. (a)

Ctrl + T is used to open a new tab on a browser.

Ctrl+T − to open a new tab on the browser.

Ctrl+A − Select all the text at once.

Ctrl+C − Copy the selected text.

Ctrl+Y − To redo the undo text.

Ctrl+O − Open an already created.

Ctrl+S − To save the file.

44. (c)

If you use a font which is not supported by the browser, then the original page will be displayed in the default font self.

45. (a)

Cashless payments are not independent from digital devices.

46. (b)

let us the numbers be x and y respectively.

Given,

$x + y = 27$———(i)

$x^2 - y^2 = 243$

$(x-y)(x+y) = 243$_____(ii)

Putting value of (x + y) from eq^n (i) in eq (ii),

$(x-y) \times 27 = 243$

$(x-y) = \frac{243}{27} = 9$

So, difference between the numbers = $x-y = 9$

47. (b)

Given,

$T = (93 + 15) \div (3 \times 4) - 24 + 8$

$= (108) \div (12) - 24 + 8$

$= 108 \div 12 - 24 + 8$

$= 9 - 24 + 8$

$= 17 - 24$

$T = -7$

48. (b)

Reciprocal of $-\frac{5}{14} = -\frac{14}{5}$

$\therefore \quad \frac{2}{11} \times \left(-\frac{14}{5}\right) = -\frac{28}{55}$

49. (d)

Let the fraction is x.

According to the question,

$x^2 + 2 = 4\frac{1}{4}$

$x^2 + 2 = \frac{17}{4}$

$4x^2 + 8 = 17$

$4x^2 = 17 - 8$

$4x^2 = 9, \quad x^2 = \frac{9}{4}$

$x = \frac{3}{2} = 1\frac{1}{2}$

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50. (a)

On finding HCF by division method,

```
2835) 3078 (1
      2835
       243) 2835 (11
            243
             405
             243
             162) 243 (1
                  162
                   81) 162 (2
                       162
                        ××

81) 2349 (29
    162
     729
     729
     ×××
```

So, it is clear that the required HCF is 81.

51. (b)

Time taken by A, B and C to meet again at the starting point = LCM of 42, 63 and 84 = 252 seconds.

$42 = 2\times3\times7$

$63 = 3\times3\times7$

$84 = 2\times2\times3\times7$

LCM = 2 × 2 × 3 × 3 × 7

= 252s

52. (a)

45 : 75, 3 : 5, 51 : 68, 256 : 81

$$\text{Compound ratio} = \frac{\text{Product of 1}^{st}\text{ term}}{\text{Product of 2}^{nd}\text{ term}}$$

$$= \frac{45\times3\times51\times256}{75\times5\times68\times81} = \frac{3\times1\times51\times64}{5\times5\times17\times27}$$

$$= \frac{3\times3\times64}{5\times5\times27} = \frac{64}{75}$$

53. (c)

Let the cost price of one book be ₹ x

So, the cost price of other book = ₹ (1200 – x)

According to the question,

$$\frac{x\times120}{100} = (1200-x)\times\frac{84}{100}$$

$\Rightarrow$ 120 x + 84 x = 1200 × 84

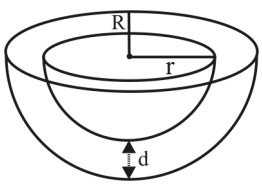
$\Rightarrow$ 204x = 1200 × 84

$\Rightarrow$ $x = \frac{1200\times84}{204}$

$\Rightarrow$ x = ₹494.11 ≈ ₹ 500

So, the cost price of other book = 1200 – 500 = ₹ 700

54. (a)



Internal radius of hemispherical bowl = r

Thickness (d) = R – r

External radius of hemispherical bowl = R = d + r

Surface area of hemispherical bowl

$= 2\pi R^2 + 2\pi r^2 + \pi(R^2 - r^2)$

$= 2\pi\{(d+r)^2\} + 2\pi r^2 + \pi\{(d+r)^2 - r^2\}$

$= 2\pi\{d^2+r^2+2dr\} + 2\pi r^2 + \pi\{d^2+r^2+2rd - r^2\}$

$= 2\pi d^2 + 2\pi r^2 + 4\pi rd + 2\pi r^2 + \pi d^2 + 2\pi rd$

$= 3\pi d^2 + 4\pi r^2 + 6\pi rd$

$= \pi(4r^2 + 6rd + 3d^2)$

55. (c)

Let C alone worked for x days

$$\frac{x-3}{8} + \frac{x-1}{9} + \frac{x}{12} = 1$$

$$\frac{9x-27+8x-8+6x}{72} = 1$$

23x – 35 = 72

23x = 72 + 35

23x = 107

$x = \frac{107}{23}$

$x = 4\frac{15}{23}$

Hence entire work will be finished in $4\frac{15}{23}$ days

56. (b)

Let the length of train = x m.

According to the question-

$$\frac{(110+x)10}{135} = \frac{(205+x)\times100}{1825}$$

$$\frac{(110+x)}{135} = \frac{(205+x)\times2}{365}$$

$$\frac{(110+x)}{27} = \frac{(205+x)\times2}{73}$$

8030 + 73x = 11070 + 54 x

73x–54x = 11070 – 8030

19x = 3040

$\boxed{x = 160}$

$$\text{Speed of train} = \frac{(110+160)\times10}{135} = \frac{270\times10}{135}$$

$$= 20\text{ m/s} = \frac{20\times18}{5} = 72\text{ km./hr.}$$

57. (a)

Given,

R = 5%

P = ₹ 2400

t = 2 years

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$\therefore \quad A = P\left(1+\frac{R}{100}\right)^2$

$= 2400\left(1+\frac{5}{100}\right)^2$

$= 2400\times\left(\frac{21}{20}\right)^2$

$= 2400\times\frac{441}{400}$

= ₹ 2,646

58. (d)

Cost price of 240 cups at the rate of ₹8 per cup

= 240 × 8 = ₹1920

∵ 24 cups were damaged

Remaining cups = 240 – 24 = 216

Selling price of 216 cups at the rate of ₹12 per cup

= 216 × 12

= ₹2592

$\because \quad \left(P\% = \frac{SP-CP}{CP}\times 100\right)$

Hence, Profit % = $\frac{2592-1920}{1920}\times 100\%$

$= \frac{67200}{1920} = 35\%$

59. (c)

$x^2 - 24x + k = 0$

One root x = 2 then putting the value of x in equation

$(2)^2 - 24 \times 2 + k = 0$

$4 - 48 + k = 0$

$k - 44 = 0$

$k = 44$

Substituting the value of k into the equation-

$x^2 - 24x + 44 = 0$

$x^2 - 22x - 2x + 44 = 0$

$x(x - 22) - 2(x - 22) = 0$

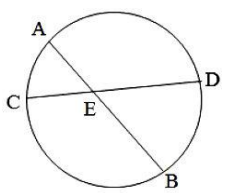
$(x - 2)(x - 22) = 0$

x = 2 and x = 22

(given)

So other root = 22

60. (c)



Given–

m $\overline{AE}$ = 4 cm.

m $\overline{BE}$ = 15 cm

m $\overline{CE}$ = 2.5 cm

m $\overline{DE}$ = ?

$\boxed{AE \times BE = CE \times DE}$

4 × 15 = 2.5 × DE

$DE = \frac{4\times 15}{2.5}$

DE = 24 cm.

61. (c)

Average of 35 tests = 21

Sum of 35 tests = 35×21 = 735

Average of 17 tests = 19

Sum of 17 tests = 17×19 = 323

Average of last 17 tests = 22

Sum of last 17 tests = 17×22 = 374

Value of 18th tests = 735 – 374 – 323 = 38

62. (a)

$x = \frac{0.091\times 0.11}{0.91\times 1.331} = \frac{91\times 11}{91\times 1331} = \frac{1}{121}$

$\sqrt{x} = \sqrt{\frac{1}{121}} = \frac{1}{11}$

63. (c)

P : D and D : A

3 : 4 5 : 6

P : D : A

3 : 4

5 : 6

P:D:A =15 : 20 : 24

Let the present age of P, D and A is 15x, 20x and 24x respectively.

After 15 years

Age of P = (15x + 15)

Age of D = (20x + 15)

According to the question,

$\frac{15x+15}{20x+15} = \frac{4}{5}$

75x + 75 = 80x + 60

5x = 15

$\boxed{x = 3}$

Sum of present age of all three people

= 15 × 3 + 20 × 3 + 24 × 3

= 45 + 60 + 72 = 177 years

64. (a)

Filled part of the cistern by all three pipes in 1 hour

$= \frac{1}{2}+\frac{1}{3}-\frac{1}{6}$

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$$= \frac{3+2-1}{6} = \frac{4}{6} = \frac{2}{3} \text{ part}$$

$\therefore$ Remaining part of cistern $= 1 - \frac{1}{6} = \frac{5}{6}$

$\therefore$ Time taken to fill remaining part of cistern $= \frac{\frac{5}{6}}{\frac{2}{3}}$

$$= \frac{5}{6} \times \frac{3}{2} = \frac{5}{4} = 1\frac{1}{4} \text{ hours}$$

Time taken to fill cistern to completely = 1 h 15 mins.

65. (a)

Ratio = 7 : 8 : 9

Increase = 30%, 40%, 50%

Let the ratio $\rightarrow$ 70 : 80 : 90

According to the question,

Number of seats in Mathematics $= \frac{70 \times 130}{100} = 91$

Number of seats in Physics $= \frac{80 \times 140}{100} = 112$

Number of seats in Chemistry $= 90 \times \frac{150}{100} = 135$

Ratio of increased seats = 91 : 112 : 135

66. (a)

Katal is the unit of catalytic activity. It is equivalent to 1 mole/second.

67. (a)

The actual weight of a person is:-

Weight = mass of object × gravity

$\boxed{W = mg}$

68. (a)

By first equation of motion

$v = u + at$

$v - u = at$

$a = \frac{v-u}{t}$

69. (b)

given,

Mass = 25 kg

displacement = 15 meter

work = 480 J

work = force × displacement

480 = F × 15

$F = \frac{480}{15} = 32N$

70. (c)

Radiant intensity- The radiant energy that is emitted by a source per unit time per unit solid angle.

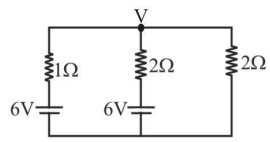
Watt/ steradian is the unit of 'radiant intensity.

Electrical conductivity:- Ability of materials to conduct electric current. The measurement is called ' Electrical conductivity' it is denoted by 'σ'.

Permeability :- permeability in the content of electromagnetism is the ability of magnetic lines of force to pass through a medium is called the magnetic permeability of the medium. It is denoted by 'μ'. The SI units of permeability is Henry/meter.

Permittivity:- Electrical permittivity is the content of electricity. It is the property of a substance which helps in general applying an electric field in that substance. But it tells the measure of 'resistance' displayed by that material.

71. (c):



At point V applying nodal-

$\frac{6-V}{1} + \frac{6-V}{2} = \frac{V}{2}$

$\frac{12-2V+6-V}{2} = \frac{V}{2}$

$18 - 3V = V$

$18 = 4V$

$V = \frac{18}{4} = 4.5V$

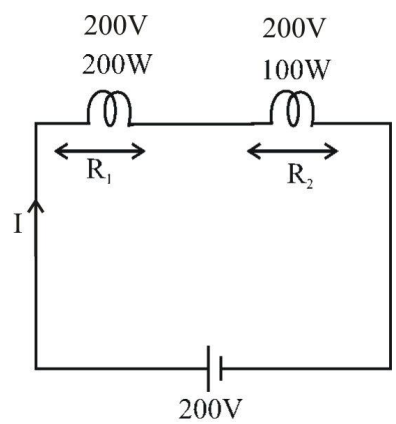
Current flow in 2Ω resistance

$I = \frac{V}{2} = \frac{4.5}{2} = 2.25A$

72. (c)

Given that - $P_1 = 200W$, $V_1 = 200V$,

$P_2 = 100$ W, $V_2 = 200V$



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For bulb (i)

$$R_1 = \frac{V_1^2}{P_1} = \frac{200 \times 200}{200} = 200\Omega$$

For bulb (ii)

$$R_2 = \frac{V_2^2}{P_2} = \frac{200 \times 200}{100} = 400\Omega$$

Total resistance (R_T) = 200+400 = 600Ω

Total current (I_T) = $\frac{200}{600} = \frac{1}{3}A$

Power loss for bulb (i)

$$P_{B_1} = I^2R_1 = \left(\frac{1}{3}\right)^2 \times 200 = \frac{200}{9}$$

And power loss for bulb (ii)

$$P_{B_2} = I^2R_1 = \left(\frac{1}{3}\right)^2 \times 400 = \frac{400}{9}$$

Total power loss = $P_{B_1} + P_{B2} = \frac{200}{9} + \frac{400}{9} = \frac{600}{9}$

= 66.66 W

73. (d)

Permeance - Permeance is defined as a measure of the ease with which magnetic flux can be admitted through a material or magnetic circuit. Permeance is directly proportional to the magnetic flux and it is denoted by the P.

$$P = \frac{1}{S} = \frac{\mu_0\mu_r a}{\ell}(Wb/AT)$$

74. (b)

The negative sign that occurs in the equation of induced EMF is a consequence of "Lenz's law" According to Lenz's law the direction of the electric current induced in a conductor by a changing magnetic field is such that the magnetic field created by the induced current opposes changes in the initial magnetic field.

$$\boxed{E = -N\frac{d\phi}{dt}}$$

75. (c)

Because of braking torque, it runs at steady state -

$$N \propto \frac{T_B}{d\phi_m^2} \Rightarrow N \propto \frac{1}{d}$$

⇒ To increase the speed of moving disc, permanent magnet is kept nearer to the spindle.

⇒ To decrease the speed of moving disc, permanent magnet is kept for away from the spindle.

76. (a)

According to Maxwell's third equation time varying magnetic field will always produce an electric field.

$$\oint \vec{E}.\vec{dl} = -\frac{d}{dt}\left(\int \vec{B}.\vec{dA}\right)$$

Ampere's law plus Maxwell's displacement current

$$\oint \vec{B}.\vec{dl} = \mu_0\left(I + \frac{d}{dt}\left(\varepsilon_0 \int \vec{E}.\vec{dA}\right)\right)$$

77. (a)

When two charges are separated a distance 'd' apart there exists an electromotive force. In case of a stationary charge, only the electric force act for the moving of charge then both electric and magnetic force are involved.

78. (b)

A charge particle 'q' moving with a velocity 'V' in a magnetic field B The magnetic force on charge particle is-

$$F = q\left(\vec{V} \times \vec{B}\right)$$

$$F = q\ VB \sin\theta$$

When charge q is moving with a velocity V along the axis of current carrying then magnetic force is zero.

F = qBV sin0º (sin 0º= 0)

[F = 0]

79. (b)

To replace a faulty 10 millihenry choke, you could use two 5 millihenry chokes in series.

80. (d)

Super conductor now a day found their application in various field. This is due to the fact that they generate very strong magnetic field.

Such substances or metal in which the value of resistivity decrease very rapidly at a certain temperature become zero. These substances or metal are called superconducting substances and this property is called superconductivity.

Superconductor generate high electromagnetic field so, they are used in magnetic resonance imagining and nuclear magnetic resonance.

81. (a)

Class C insulation material has temperature greater than 180ºC.

Insulation Class	Maximum temperature
Y	90ºC
A	105ºC
E	120ºC
B	130ºC
F	155ºC
H	180ºC
C	greater than 180ºC

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82 . (c)

Electron require low energy for mobility as they suffer low resistance during their motion as compared to holes.

$$\mu_d = \frac{V_d}{E} cm^2 / V - sec.$$

83. (b)

The ideal diode should have zero resistance in the forward bias and an infinitive large resistance in reverse bias.

Diode behaves as ON switch in the forward bias and OFF switch in the reverse bias.

84. (a)

Small signal operation of a transistor is that in which signal excursions are 5% around the Q point values. Small signal operation of a transistor means AC input is applied. Large signal has 20% excursion valid.

85. (d)

Difference between BJT and FET are tabulated following given as-

Parameter	BJT	FET
gain × bandwidth	High	Low
Input impedance	Low	High and non-linear
Thermal stability	Low	High

86. (c)

$$V_{rms} = 20V$$

$$V_{rms} = \frac{V_m}{\sqrt{2}}$$

$$20 = \frac{V_m}{\sqrt{2}}$$

$$V_m = 20 \times \sqrt{2} = 20 \times 1.414$$

$$V_m = 28.28 \text{ V}$$

$$PIV = V_m$$

$$= 28.28 \text{ V}$$

87. (a)

To obtain biasing stability in BJT amplifier, the base current is kept constant.

Operating point stabilization is very important to get distortion free output.

88. (a)

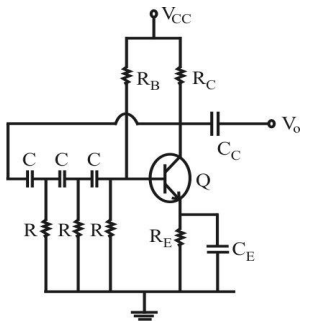
The ratio of electron and hole mobility in MOSFET tells the aspect ratio of the gate, where the aspect ratio is expressed as two numbers separated by a colour (x:y). Where X and Y do not represent the actual width and height, but the relationship between width and height.

89. (d)

The circuit of a phase shift oscillator. It consists of conventional single transistor amplifier and a RC phase shift network. The phase shift network consists of three sections R_1C_1, R_2C_2 and R_3C_3. At some particular frequency f_0 the phase shift in each RC section it 60º so that the total phase shift produced by the RC network is 180º

$$f_0 = \frac{1}{2\pi RC\sqrt{6}}$$

State the gain of RC phase shift oscillator for obtaining sustained oscillation A ≥ 29.



90. (a)

- n - parameters → Function of a Q point
- Differentiator → O/P voltage varies as the slope of I/P voltage.
- Half wave rectifier → describes diode clipper
- Integrator → Noise division

91. (a)

Given that,

$$V_{NL} = 50V$$

$$V_{FL} = 4.93V$$

$$\% \text{ Load Regulation} = \frac{V_{NL} - V_{FL}}{V_{FL}} \times 100$$

$$= \frac{5 - 4.93}{4.93} \times 100 = 1.40\%$$

92. (b)

Permanent magnet moving coil is sensitive to small current and free from hysteresis and not affected by external fields. The instruments which use the permanent for creating the stationary magnetic field between which the coil moves is known as the permanent magnet moving coil or PMMC instrument. It operates on the principle that the torque is exerted on the moving coil placed in the field of the permanent magnet.

93. (b)

Scale of moving iron instruments is non linear.

$$\boxed{T_d \propto I^2}$$

Moving iron instrument-There are two type of instruments -

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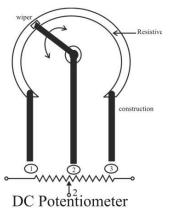
- ♦ Attraction type
- ♦ Repulsion type

Torque expression - $T_d = \frac{1}{2} I^2 \frac{dL}{d\theta}$

- MI instruments are used for AC and DC.
- Cheaper than PMMC instruments.
- Widely used in laborateries.
- Scale is a non linear $(\theta \propto I^2)$
- Moving iron instrument used to under severe over load condition.
- Temperature error is reduced by using manganin materials.

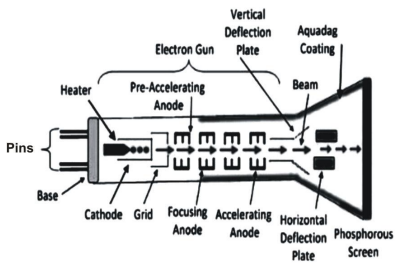
94. (c)

Wiper is used as a sliding contact in potentiometer.



DC Potentiometer

95. (d)



The correct sequence of CRT part-

(iv) Focusing anode

(i) Accelerating anode

(iii) Vertical deflection plate

(ii) horizontal deflection plate

(v) Phosphorous screen

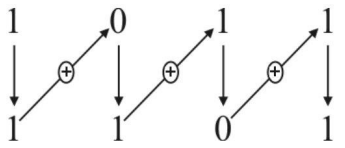
96. (a)

In transducer the ability to withstand overloads is termed as Ruggedness.

- **Repeatability-** It is the repetition of reading of an instrument taken over a period of time.
- **Accuracy-** It is the ability of the instrument to measure the accurate value. In other words, it is represents the closeness of the measured value to true value.
- **Reliability-** It is the ability of a product or system to perform its require functions, without failure for a specified time period and when used under specified conditions.

97. (d)

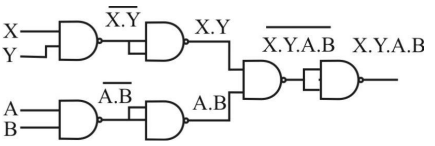
Representation of 1011 gray code in their binary number−



Gray code (1011) = 1101 binary code.

98. (a)

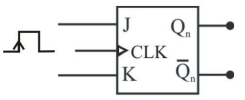
Minimum number of two input NAND gate for execution F= X.Y.A.B Will be 6.



99. (d)

In a J-K flip-flop when both input J and K are equal to 1, toggle operation will occurs.

J-K Flip-Flop Truth Table -



JK Flip-Flop

INPUTS			OUTPUT (Next State)	
J	**K**	CLK	$Q_{(t+1)}$	**Effect**
×	×	0	Q_t	No Change
0	0	↑	Q_t	No Change
0	1	↑	0	Reset
1	0	↑	1	Set
1	1	↑	$\overline{Q}_t$	Toggle

J-K flip-flop is called as universal flip-flop because this flip-flop like as D flip-flop, SR flip-flop, T flip-flop can be derived from it.

100. (b)

Given that, n = 8 bit, f_{clk} = 1 MHz

For n-bit SAR type ADC maximum conversion time = $n.T_{clk}$

$$T_{clk} = \frac{1}{f_{clk}}$$

$$T_{clk} = \frac{1}{1\times10^6} = 1\times10^{-6}$$

8-bit maximum conversion time $= 8 \times 1 \times 10^{-6}$

$= 8$ microseconds

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PRACTICE SET - 14

1. What is the main objective of the Indian space program?

1. Mass communication and education through satellite
2. Surveying and managing natural resources through remote sensing, technology, environmental testing and meteorological forecasting.
3. Development of indigenous satellite and satellite launch vehicle.

(a) Only 1 (b) Only 2
(c) 1 and 2 both (d) 1, 2 and 3

2. Which of the following is NOT one of the Grand Slam tournaments of tennis?

(a) French Open (b) Canadian Open
(c) Wimbledon (d) Australian Open

3. Khandvi is a dish of which Indian state?

(a) Karnataka (b) Gujarat
(c) Odisha (d) Maharashtra

4. Who built the rock garden of Chandigarh?

(a) Tara Chand (b) Nek Chand
(c) Himanshu Parekh (d) Kamal Sagar

5. Which of the following is the correct explanation of the term' Capital Receipts'?

(a) The receipts of the government which result in the reduction of financial liabilities
(b) The receipts that do not lead to a claim on the government
(c) The receipts of the grants given to state governments and other parties
(d) The receipts of the government which create liability or reduce financial assets

6. Which of the following is not true with regard to the Attorney General of India?

(a) He is not a member of cabinet
(b) He has a right of audience in all courts in India
(c) He has a right of vote in the Parliament
(d) He has a right to speak in the House of Parliament

7. The world's largest drainage basin is:

(a) Amazon Basin (b) Ganga Basin
(c) Nile Basin (d) Mississippi Basin

8. Jayakwadi Hydroelectric Project (phase-1) is built on which river?

(a) Indus (b) Cauvery
(c) Godavari (d) Ganga

9. ..... is an Islamic finance term referring to the obligation that an individual has to donate a certain proportion of wealth each year to charitable causes.

(a) Mudarabah (b) Ijarah
(c) Zakat (d) Musharakah

10. In 1798, who became the Governor-General and built a massive palace, Government House, for himself in Calcutta?

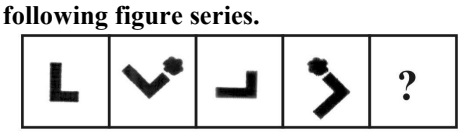
(a) Lord Clive (b) Lord Bentinck
(c) Lord Cornwallis (d) Lord Wellesley

11. Select the number from among the given options that can replace the question mark (?) in the following series.

9, 7, 28, 26, 65, 63, 126 124, ?

(a) 217 (b) 215
(c) 137 (d) 136

12. Select the option that will come next in the following figure series.



A B C D

(a) A (b) D
(c) B (d) C

13. Read the statement and conclusion carefully. Assuming that the information given in the statement is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion logically follows(s) from the statements :

Statements

All trees are forest

No forest is large

Conclusion :

I. No tree is large

II. All trees are large

(a) Either conclusion I or II follows
(b) Only conclusion I follows
(c) Neither conclusion I nor II follows
(d) Only conclusion II follows

14. Consider the following two events and select the correct option.

Event A : Meghna is going to get a prize and a medal today.

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Events B : Meghna won the race competition today.

(a) Event A is the principal and immediate cause and B is its effect
(b) Event A and B are effects of independent causes
(c) Event B is the principal and immediate cause and A is its effect.
(d) Event A is the effect but Event B is not its immediate and principal cause

15. Argument:

The Supreme Court has decided that all rapists should be hanged till death

Assumption:

1. Women will get protection

2. The cases of rape can be reduced

(a) Neither 1 nor 2 is implicit
(b) Only assumption 2 is implicit
(c) Only assumption 1 is implicit
(d) Both 1 and 2 are implicit

16. A question is given, followed by three statements labeled I, II and III. Identify which of the statements is are sufficient to answer the question.

Question:

How is P related to C

Statements:

I: H is the only brother of S and P.
II. P is the wife of L, who is the son-in law of D.
III. D is the mother of S and T is the son-in-law of C.

(a) Data in statements II and III together are sufficient to answer the question.
(b) Data in statements I, II and III together are sufficient to answer the question.
(c) Data in statements I alone is sufficient to answer the question.
(d) Data in statement I, II and III together are not sufficient to answer the question.

17. The ratio of the velocities of the hour hand and minute hand of a clock is:

(a) 5 : 1 (b) 1 : 1
(c) 1 : 12 (d) 12 : 1

18. Select the option that is related to the third term in the same way as the second term is related to the first term.

WAITER : 242923 :: JUMPER : ?

(a) 312923 (b) 302923
(c) 252923 (d) 312623

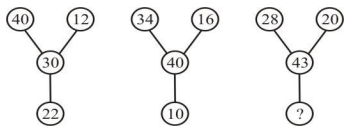
19. If 67 = 1764 and 93 =729, then which of the given options will be the value of 74 = ?

(a) 847 (b) 784
(c) 567 (d) 972

20. Rearrange the cluttered letters to form a meaningful word and find the odd one out.

(a) ACETREH (b) UETSTND
(c) YIBLRRA (d) KRTMAE

21. Study the given pattern carefully and select the number that can replace the question mark (?) in it.



(a) 11 (b) 5
(c) 9 (d) 7

22. A bank is to the east of a shop. A college is to the north-west of the Bank. A bus stop is to the north of the shop and to the west of the college. In which direction is the college with respect to the shop?

(a) North (b) North-west
(c) East (d) North-east

23. According to the time by Rekha's watch, it is quarter past 9 and the hour-hand is pointing to the west. In which of the given directions will the minute-hand point AFTER 75 minutes?

(a) East (b) North
(c) South (d) West

24. Indicating to a woman, a man said, "Her father is the only son of my father." How is the man related to the woman?

(a) Father (b) Grandfather
(c) Brother (d) Son

25. Correct the mathematical symbols from the given alternatives change the sign by choosing the combination and get a balanced equation- 25*5*35*20*2?

(a) = × ÷ + (b) + = × ÷
(c) ÷ + = × (d) × ÷ + =

26. Which of the following is a 4th generation Programming language?

(a) C (b) Basic
(c) SQL (d) Mercury

27. There are two types of plotters, whose name are–

(a) spiral and flatbed
(b) flatbed and cone
(c) drum and flatbed
(d) drum and spiral

28. What type of device are computer speakers or headphones?

(a) Software (b) Storage
(c) Input (d) Output

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29. Which printer cannot print more than one character simultaneously?
(a) Daisy wheel (b) Laser
(c) Dot matrix (d) Line

30. The secondary storage devices can only store data but they cannot perform……
(a) Arithmetic operations
(b) Logic operations
(c) Fetch operations
(d) All options are correct

31. A Storage system for small amount of data is?
(a) Magnetic Tape (b) Magnetic Card
(c) Punched Card (d) Optical Mark Reader

32. Which of the following is not related to secondary memory?
(a) Platter (b) Magnetic tape
(c) HDD (d) Magnetic disk

33. What is the network byte order used in TCP/IP?
(a) Middle Endian (b) Random
(c) Big Endian (d) Little Endian

34. Which among the following wireless standard is used in 4G network technology?
(a) GPRS (b) LTE
(c) VPN (d) WAP

35. Which of the following technologies is the oldest?
(a) NSFnet (b) ARPANET
(c) Interspace (d) Internet

36. Which group in the Layout Tab of the Table tools menu is used to add and delete table rows and columns in MS Word 365?
(a) Merge (b) Rows & Columns
(c) Cell Size (d) Draw

37. Which of the following options in MS Word 365 is used to save an open document under a different name to a different location?
(a) Layout-> Save (b) Home-> Save
(c) File-> Save as (d) View-> Save

38. Find out whether the given statements are true or false with reference to MS Word 365.
(i) Page size option is used to switch the page between portrait and landscape layout.
(ii) Bold, italic and regular are known as font styles.
(a) (i) False, (ii) True (b) (i) False (ii) False
(c) (i) True, (ii) True (d) (i) True, (ii) False

39. Which of the following is web browser software?
(a) Ubuntu (b) Linux
(c) Vivaldi (d) ChromeOS

40. Which of the following is NOT an internet browser?
(a) Panda (b) Safari
(c) Firefox (d) Chrome

41. Which of the following HTML tags specifies a container for an external (non-HTML) application?
(a) (b) <embed>
(c) <ins> (d) <nav>

42. The software that allows you to read web pages and surf the internet is called a—
(a) Web Crawler (b) Search Engine
(c) Web spider (d) Web Browser

43. Which of the following search engines is launched by Microsoft?
(a) Yandex (b) Bing
(c) Baidu (d) Google

44. Which among the following is a web browser developed by Microsoft?
(a) Firefox (b) Internet Explorer
(c) Windows Explorer (d) Netscape

45. Which among the following is used as an identifier of mobile money?
(a) MIMD (b) MISD
(c) MMID (d) MCID

46. Find the value of the denominator of $\frac{1}{(5+\sqrt{3})}$ in rational number.
(a) $\frac{(5-\sqrt{3})}{22}$ (b) $5+\frac{\sqrt{3}}{22}$
(c) $5-\frac{\sqrt{3}}{20}$ (d) $\frac{(5-\sqrt{3})}{20}$

47. $74 - [85 \div \{49 - (41 - 3^5 \div \overline{9\times 3})\}] = ?$
(a) 59 (b) 79
(c) 49 (d) 69

48. The difference of a fraction and its inverse is $\frac{9}{11}$. Then the difference of cubes of the fraction and its inverse will be:
(a) $-\frac{1331}{2538}$ (b) $-\frac{2538}{1331}$
(c) $\frac{3996}{1331}$ (d) $\frac{729}{1331}$

49. If a rod of length $208\frac{4}{5}$ is cut into equal pieces of length $23\frac{1}{5}$, then the total number of rods obtained is:

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(a) 5 (b) 7
(c) 8 (d) 9

50. Find the greatest length which can be used to measure exactly three cloth pieces of length 1.26 m, 1.98 m and 1.62 m respectively.
(a) 12 cm (b) 14 cm
(c) 16 cm (d) 18 cm

51. Find the largest 3-digit number that is completely divisible by 10, 8 and 12.
(a) 940 (b) 960
(c) 980 (d) 999

52. The value of coins of ₹ 1, 50 paise and 25 paise is ₹ 93.75 and the ratio of their number is 3:4:5. Find the no. of coins of each type.
(a) 42, 56, 70 (b) 45, 60, 75
(c) 40, 70, 75 (d) 46, 58, 75

53. The income of A is 25% less than the income of B whose income is 40% more than that of C. The income of C is 20% less than that of D. By what percent is the income of A more than the income of C?
(a) 8% (b) 5%
(c) 10% (d) 4%

54. The dimensions of a metallic cuboid are 50 cm × 40 cm × 32 cm. This cuboid is melted and recast into a cube. Find the surface area of the cube.
(a) 8,350 cm^2 (b) 7,150 cm^2
(c) 8,700 cm^2 (d) 9,600 cm^2

55. A and B can complete a piece of work in 20 days. B and C can complete it in 30 days. A is twice as good as C in completing the work. Find in how many days will B alone complete it.
(a) 60 days (b) 50 days
(c) 55 days (d) 65 days

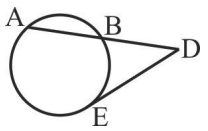
56. A train departs at 5 am from Patna and arrives Bhopal at 9 am second train departs at 6:30 am from Bhopal and arrives at 10:00 am at Patna. Both train meet at what time?
(a) 7:55 pm. (b) 7:55 am.
(c) 7:40 am. (d) 7:40 pm.

57. Khan lends an amount of ₹10,000 to Irfan at 10% per annum compound for 5 year, compounded annually. What is the compound interest accrued for the 4th year?
(a) ₹ 1,762 (b) ₹ 1,540
(c) ₹ 1,331 (d) ₹ 1,745

58. A man sold two bicycles at a total profit of 20%. If he had bought them for ₹ 3500 each and the first one sold them at a profit of 5%, then what is the profit % he should have from the second?
(a) 20% (b) 35%
(c) 25% (d) 30%

59. If $\left(x^2+\frac{1}{16x^2}\right)=\frac{19}{2}$ then find the value of $\left(2x-\frac{1}{2x}\right)$
(a) 6 (b) 12
(c) 32 (d) 41

60.



In the circle above chord $\overline{AB}$ is extended to meet the tangent $\overline{DE}$ at D. If $\overline{AB}$ = 12 cm and $\overline{DE}$ = 8 cm. Find the length of $\overline{BD}$.
(a) 6 cm (b) $\sqrt[4]{6}$ cm
(c) 5 cm (d) 4 cm

61. What is the value of median, mode and mean of the given following numbers?
9, 8, 3, 5, 1, 9, 8, 2, 9
(a) 9, 9, 6 (b) 9, 6, 9
(c) 8, 9, 6 (d) 8, 5, 6

62. If $\frac{x}{\sqrt{243}}=\frac{\sqrt{2187}}{x}$, and x is positive, then what is the value of x ?
(a) 29 (b) 27
(c) 23 (d) 21

63. Four years ago, the ratio of the age of Ram to that of Shyam was 13 : 9. Eight years from now, their ages will be in the ratio 4 : 3. The difference (in years) between their present ages is:
(a) 18 (b) 17
(c) 19 (d) 16

64. One of the two water filling pipe in a tank works 1.5 times more efficiently than the other. If these two pipes works with such a draining pipe which alone can empty the tank in 12 hours, then the empty tank can be filled in 28 hours. How much time will be taken by the less efficient pipe to fill the tank?
(a) 21 (b) 18
(c) 24 (d) 15

65. The salaries of A and B are in the ratio 3 : 4. On increasing the salaries of both A and B by ₹ 3000 each, the new ratio of their salaries becomes 18 : 23. Find the salary of A after the increase.
(a) ₹12,000 (b) ₹23,000
(c) ₹21,000 (d) ₹18,000

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66. One mile is approximately equivalent to _____ kilometers.
(a) 0.8 (b) 1.2
(c) 1.4 (d) 1.6

67. Among four substance M_1, M_2, M_3 and M_4 of different masses having the same volume. Which substance will have the least density If $M_2>M_3>M_1>M_4$ then.
(a) M_1 (b) M_3
(c) M_4 (d) M_2

68. If a ball is thrown up, which of the following does not change?
(a) Acceleration (b) Speed
(c) Potential energy (d) Distance

69. 1 J equivalent .
(a) 1 kg×1m (b) 1 HP×1m
(c) 1 N×1m (d) 1 N×1cm

70. Which has higher temperature between boiling water or and water vapor?
(a) Boiling of water (b) Vapour of water
(c) None of these
(d) Depends on heat supply

71. Which of the following is not an example of a liner element?
(a) Resistor (b) Thermistor
(c) Inductor (d) Capacitor

72. Calculate the equivalent resistance if two resistors of 50Ω connected in parallel with a series resistor of 25Ω.
(a) 50Ω (b) 12.5Ω
(c) 75Ω (d) 125Ω

73. A generator develops 200 Volts and has an internal resistance of 100 Ohms. Power delivered to the load of 100 Ohms is:
(a) 200 Watt (b) 150 Watt
(c) 100 Watt (d) 20 Watt

74. An inductance of 1 H is realized using air core with 100 turns. What will be the inductance if the number of turns are doubled ?
(a) 1 H (b) 0.5 H
(c) 2 H (d) None of these

75. Calculate the power factor for a 3 phase load measuring 2kW and 1kW by using 2 wattmeter method.
(a) 0.824 (b) 0.842
(c) 0.866 (d) 0.91

76. Maxwell's third equation is derived from_____.
(a) Gauss's law of magnetostatics
(b) Gauss's law of electrostatic
(c) Faraday's law of electromagnetic induction
(d) Ampere's circuital law

77. Electric field intensity between the plates of a parallel plate condenser is E. If a dielectric medium of dielectric constant ε is introduced between the plates, the electric field intensity will become
(a) εE (b) $\sqrt{\varepsilon E}$
(c) $\sqrt{\frac{E}{\varepsilon}}$ (d) $\frac{E}{\varepsilon}$

78. If the relative permittivity of the medium increases, the electric intensity at a point due to a given charge-
(a) Decreases (b) Increases
(c) Remains the same (d) None

79. The magnetic flux ϕ (in Weber) linked with a single turn coil at an instant of time t (in second) is given by $\phi(t) = 2t^2-20t + 40$. The induced EMF in the coil at the instant t = 2 seconds is
(a) 22V (b) 20V
(c) 12V (d) 10V

80. The transition temperature of superconductivity material titanium is :
(a) 1.17 K (b) 14 K
(c) 9.2 K (d) 0.49 K

81. Which of the following options is a thermosetting polymer?
(a) PVC (b) Nylon
(c) Teflon (d) Bakelite

82. If a donor type impurity is added to the semiconductor, then at a given temperature, the Fermi Level:
(a) Moves towards the center of the energy gap
(b) Moves towards the valence of the band
(c) Moves towards the conduction band
(d) Doesn't change

83. A power diode has lightly doped N type substrate sandwiched between heavily doped P and N regions :
(a) To increase reverse breakdown voltage
(b) To reduce ohmic loss under forward bias
(c) To decrease switching time of the power diode
(d) To improve transient behaviour of the diode

84. The circuit consisting of two transistors connected in series with a dc supply voltage is called
(a) Push pull
(b) Differential pair
(c) Stacked transistor
(d) Complementary symmetry

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85. Given : I_{DSS}=8 mA, V_{GS}= –1 V, V_p = – 4V, then the value of drain current for FET is :
(a) 4.5 mA (b) 32 mA
(c) 0.5 mA (d) 2 mA

86. Positive clipper can be easily converted into negative clipper by
(a) Simply reversing diode
(b) Changing the polarity of the reference voltage
(c) Both (a) and (b)
(d) None of these

87. The stabilization factor 'S_{ico}' of fixed bias circuit is-
(a) $S_{ico} = (1 + \beta)$ (b) $S_{ico} = 1$
(c) $S_{ico} = \beta$ (d) None

88. An FET is a better chopper than a BJT because it has
(a) Lower offset voltage
(b) Higher series ON resistance
(c) Lower input current
(d) Higher input impedance

89. FET phase-shift oscillator uses –
(a) Voltage Series feedback
(b) Voltage Shunt feedback
(c) Current Series feedback
(d) Current Shunt feedback

90. The function of buffer amplifier in transmitter is to provide
(a) Impedance matching
(b) Frequency stability of oscillator
(c) Amplifier of R.F. signal
(d) None of these

91. To increase the stability of output voltage of a stabilizer use
(a) Number of zener diodes in series
(b) Diode and transistor in push pull mode
(c) Darlington pair
(d) OP-amplifier

92. APMMC instrument is used as a voltmeter. How to connect a resistance with this instrument to increase its range?
(a) Low resistance in shunt
(b) Low resistance in series
(c) High resistance in series
(d) High resistance in shunt

93. A moving iron instrument gives correct reading when used at–
(a) low frequency
(b) high frequency
(c) only one frequency
(d) all frequencies to a certain value

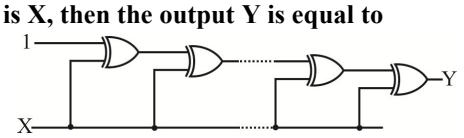
94. What is a Q meter for
(a) Meter for harmonic distortion measurement
(b) Power factor measurement
(c) quality factor measurement
(d) None of the above

95. The sine wave output of function generator is fed to both the horizontal (X) and vertical (Y) inputs of CRO. What will be the pattern on the cathode ray screen?
(a) Circle
(b) An ellipse
(c) Sinusoidal
(d) A straight line with 45^0 slope

96. The principle of operation of LVDT is based on the variation of
(a) Self inductance
(b) Mutual inductance
(c) Reluctance
(d) Permanence

97. Logic XOR operation of $(4AC0)_H$ and $(B53F)_H$ results -
(a) AACB (b) 0000
(c) FFFF (d) ABCD

98. If the input to the digital circuit shown in the figure, consisting of a cascade of 20 XOR-gates is X, then the output Y is equal to



(a) 0 (b) 1
(c) $\overline{X}$ (d) X

99. Which of the following is correct?
I. SISO has 1 data input
II. SIPO has 2 data inputs
III. PISO has 2 data inputs
(a) Only I (b) Only II and III
(c) Only III (d) Only I and III

100. The resolution of D/A converter is approximately 0.4% of its full-scale range. It is :
(a) A 8-bit converter
(b) A 10-bit converter
(c) A 12- bit converter
(d) A 16- bit converter

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SOLUTION : PRACTICE SET- 14

ANSWER KEY

1. (d)	11. (a)	21. (b)	31. (b)	41. (d)	51. (b)	61. (c)	71. (b)	81. (d)	91. (a)
2. (b)	12. (d)	22. (d)	32. (a)	42. (d)	52. (b)	62. (b)	72. (a)	82. (c)	92. (c)
3. (b)	13. (b)	23. (c)	33. (c)	43. (b)	53. (b)	63. (d)	73. (c)	83. (d)	93. (c)
4. (b)	14. (c)	24. (a)	34. (b)	44. (b)	54. (d)	64. (a)	74. (d)	84. (c)	94. (c)
5. (d)	15. (b)	25. (c)	35. (b)	45. (c)	55. (a)	65. (d)	75. (c)	85. (a)	95. (d)
6. (c)	16. (d)	26.(c)	36. (b)	46. (a)	56. (c)	66. (d)	76. (c)	86. (c)	96. (b)
7. (a)	17. (c)	27. (c)	37. (c)	47. (d)	57. (c)	67. (c)	77. (d)	87. (a)	97. (c)
8. (c)	18. (a)	28. (d)	38. (a)	48. (c)	58. (b)	68. (a)	78. (a)	88. (a)	98. (b)
9. (c)	19. (b)	29. (c)	39. (c)	49. (d)	59. (a)	69. (c)	79. (c)	89. (a)	99. (a)
10. (d)	20. (d)	30. (d)	40. (a)	50. (d)	60. (d)	70. (c)	80. (d)	90. (a)	100. (a)

SOLUTION

1. (d)

The main objective of the Indian space program is

(1) Mass communications and education through satellite.

(2) Surveying and managing natural resources through remote sensing, technology, environmental testing and meteorological forecasting.

(3) Development of indigenous satellite and satellite vehicle.

2. (b)

Canadian Open is not a Tennis Grand Slam tournament.

Tennis Grand Slams

Grand Slam	Duration	Court Type
Australian Open	Mid-January	Hard Court
French Open	May & June	Clay
Wimbledon Open	June-July	Grass
US Open	August-September	Hard Court

3. (b)

Khandvi is a dish of Gujarat. It is one of the much-loved Gujarat snack. It is also known as Patuli or Dahivadi and made with gram flour. Some other traditional recipes of Gujarat are: Dhokla, Aam Shrikhand, Methi Ka Thepla, Dal Dhokli, Fafda, Upma, Dabeli, Khaman Dhokla etc.

4. (b)

Nek Chand Saini was a self-taught Indian artist, known for building the rock garden of Chandigarh. He was awarded with Padmashri by Indian government in 1984. He died in 2015 of cancer.

5. (d)

All those receipts of Government which create liability or reduce financial assets are termed as **Capital receipts**. While all those receipts that do not lead to a claim on the Government is termed as **Revenue receipts**.

6. (c)

Statement (c) regarding the Attorney General of India is not true. The Attorney General of India is the law officer of the Government of India. According to Article 88 of the Indian Constitution, the Attorney General of India is neither a member of the Parliament nor a member of the Cabinet but he shall have the right to speak and participate in Parliament and he does not have the right to vote. He represents the Government of India in all matters in the court.

7. (a)

The Amazon basin, located in northern South America, was the largest drainage basin in the world. The Amazon River and its tributaries drain an area nearly seven million square kilometers. The river system originates in the Andes Mountain of Peru and travels through Ecuador, colombia, Venezuela, Bolivia and Brazil before emptying into the Atlantic Ocean.

8. (c)

Jayakwadi Hydropower project is a river valley project located on the Godavari river near Jayakwadi village in Aurangabad district of Maharashtra. A reservoir is formed behind the dam known as Nathsagar Reservoir. A 12 MW capacity power house has been installed on this dam. This dam is also known with the name of Paithan dam.

Projects	Place
Ratle Hydroelectric Power Plant	Jammu & Kashmir
Periyar Hydroelectric power project	Kerala
Mahi Bajaj Sagar Dam	Rajasthan
Matatila Project	Uttar Pradesh
Paithan Hydroelectric Project	Maharashtra

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9. (c)
Zakat, the third pillar of Islam, is a donation that Muslims regard as a mandatory act within their faith. Followers of Islam who have at least a minimum amount of wealth are required to give 2.5% of their liquid assets away to charity each year.

10. (d)
In 1798, Lord Welleseley became the Governor General. He built a massive Palace, called Government House for himself in Calcutta, a building that was expected to convey the authority of the British. Government house is now known as Raj Bhavan of Kolkata.

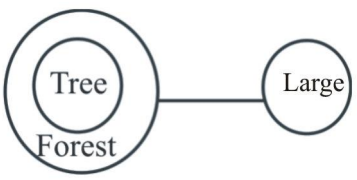
11. (a)
The given series is as follows-

9	7	28	26	65	63	126	124	$\boxed{217}$
↓	↓	↓	↓	↓	↓	↓	↓	↓
2^3+1	2^3-1	3^3+1	3^3-1	4^3+1	4^3-1	5^3+1	5^3-1	6^3+1

Hence option (a) is the right answer.

12. (d)
Answer figure 'C' will come at the place of question mark because figure is rotating clock-wise 45^0 Hence option 'd' is correct

13. (b)
The Venn diagram relation according to the statements is as follows –

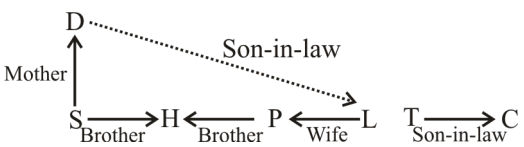


It is clear from the above Venn diagram that only conclusion I follows the statement logically.

14. (c)
Today, Meghna won the race competition so that she will get a prize and a medal.
Hence, Event B is the principal and immediate cause and Event A is its effect.

15. (b)
The Supreme Court has decided that all rapists should be hanged as to reduce the rape cases. Hence, only assumption II is implicit.

16. (d)
From statements I, II and III, we have-



Hence, Data in statement I, II and III together are not sufficient to answer the question.

17. (c)
♦ The hour niddle will rotate 1 time in 12 hours or travel a distance of $2\pi r$.
♦ The minute niddle will rotate 12 times in 12 hours or covers a distance of $12 \times 2\pi r$.
Let its velocities be V_1 and V_2 respectively, then,

$$V_1 = \frac{2\pi r}{12},\ V_2 = \frac{12\times 2\pi r}{12}$$

$$V_1 : V_2 = \frac{2\pi r}{12} : \frac{12\times 2\pi r}{12} \Rightarrow 1 : 12$$

18. (a)
Just as,

W	A	I	T	E	R
↓	↓	↓	↓	↓	↓
23+1		9+20		5+18	

= 242923

Same as,

J	U	M	P	E	R
↓	↓	↓	↓	↓	↓
10+21		13+16		5+18	

Therefore, ? = 312923

19. (b)
Just as,

$67 = (6\times7)^2 = 1764$

And,

$93 = (9\times3)^2 = 729$

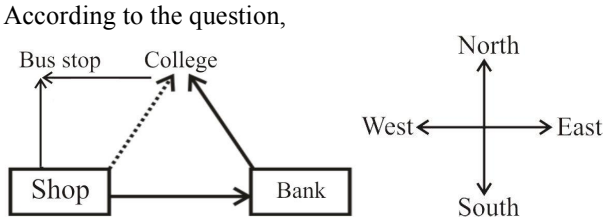
Same as,

$74 = (7\times4)^2 = 784$

20. (d)
On arranging the given words is as follows-
From option (a) ACETREH – TEACHER
From option (b) UETSTND – STUDENT
From option (c) YIBLRRA – LIBRARY
From option (d) KRTMAE – MARKET
It is clear that option (d) is different from other three, whereas all others are related to school.
Hence, option (d) is correct.

21. (b)
Just as,
From pattern - I → 40 – 22 + 12 = 30
From pattern - II → 34 – 10 + 16 = 40
Same as,
From pattern - III → 28 – ? + 20 = 43
48 – 43 = ?
? = 5

22. (d)
According to the question,



Hence, college is in the North-East direction with respect to shop.

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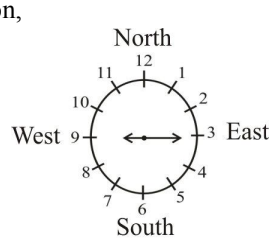
23. (c)

Starting position,

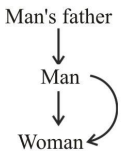


Second position-

Adding 75 minutes to 9:15, the minute hand at 10:30 will be in the South direction.

24. (a)

On drawing blood relation diagram according to the question,



Hence, the man is the father of women.

25. (c)

Given,

$25 * 5 * 35 * 20 * 2$

From option (c),

$25 \div 5 + 35 = 20 \times 2 \Rightarrow 40 = 40$

Left side = Right side

Hence, option (c) is correct.

26.(c)

Structured Query Language (SQL) is the fourth generation programming language used to manage relational database such as to store manipulate and retrieve data etc.

27. (c)

Plotter is a computer printer which is used to vector graphics. Mainly three types of plotters are:-

(i) Drum (ii) Flatbed (iii) Inkjet.

28. (d)

Computer speaker or headphone is an output device, which is used to convert electrical energy into sound energy.

29. (c)

Dot matrix printer is a slow impact printer that prints one character at a time.

30. (d)

Secondary storage device is also called auxiliary storage device. It is not part of internal computer. It is connected separately to the computer. These devices can only store data but cannot perform arithmetic operations, logical operations and fetch operations.

31. (b)

Magnetic card is used to store the required data in Credit Card, Debit Card and ATM card.

32. (a)

HDD, Magnetic tape and Magnetic disk are example of secondary memory while platter is output device.

33. (c)

The network addresses in a given network must all follow a consistent addressing convention. This convention know as network byte order, defines the bit-order of network addresses as they pass through the network. TCP/IP standard network byte order is big-Endian.

34. (b)

LTE (Long Term Evolution) wireless standard is used in 4G network technology. Which provides increased network capacity and speed for cell phones and other cellular devices as compared to 3G.

35. (b)

ARPANET is a wide area network invented by ARPA in 1969. This is an American Institution. APRANET was the word's first network in which TCP/IP model was used.

36. (b)

To add and delete table rows and columns in MS Word 365, the rows and columns group in the Layout tab of the table tools menu is used.

37. (c)

File save as option in MS - Word 365 is used to save an open document under a different name to a different location.

The shortcut key for save as option in MS -Word is F12.

38. (a)

In MS Word 365 page size option is used to change the paper size.

To switch the page between portrait and landscape layout.

(i) Click Page Layout → Page setup dialog box launcher.

(ii) In the page setup box, under orientation, click portrait or landscape.

(iii) Click the apply to box, and click selected text.

Bold, Italic and regular are known as font styles, hence statement (ii) is true.

39. (c)

The name of a freeware, cross-platform web browser with a built-in e-mail client is Vivaldi, while Ubuntu, Linux and ChromeOS are operating systems.

40. (a)

Panda is not an internet web browser. Several types of web browsers are:

1. Chrome
2. Opera
3. Safari
4. Mozilla Firefox
5. Internet Explorer

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41. (d)
The HTML tag <nav> specifies a container for an external (Non-HTML) application. It also defines a navigation bar that contains a set of menu or a menu of hyperlinks. This hyperlink is also called a navigation link.

42. (d)
Web browser is an application software with the help of which is able to access the necessary information on the world wide web.

43. (b)
Bing search engine is launched by Microsoft.

44. (b)
Internet explorer is a web browser developed by Microsoft whose first version was released in 1995. Mozilla released the first versions was Firefox in 2002. The Netscape web browser was first released in 1994 by Netscape communications.

45. (c)
MMID − MMID is short for Mobile Money Identifier. MMID is a 7 digit number allotted by your bank for receiving funds through IMPS. The bank will a lot MIMD when you register your mobile number and account number in which you wish to receive funds. If you have more than one account, you will get a separate MIMD for each account.

46. (a)
According to the question-

$$\frac{1}{\left(5+\sqrt{3}\right)}=\frac{\left(5-\sqrt{3}\right)}{\left(5+\sqrt{3}\right)\left(5-\sqrt{3}\right)}$$

$$=\frac{\left(5-\sqrt{3}\right)}{(5)^2-\left(\sqrt{3}\right)^2}$$

$$=\frac{\left(5-\sqrt{3}\right)}{25-3} \qquad =\frac{\left(5-\sqrt{3}\right)}{22}$$

47. (d)
From the given expression,

$74 - [85 \div \{49 - (41 - 3^5 \div \overline{9\times3})\}]$
$? = 74 - [85 \div \{49 - (41 - 3^5 \div 27)\}]$
$= 74 - [85 \div \{49 - (41 - 243 \div 27)\}]$
$= 74 - [85 \div \{49 - (41 - 9)\}]$
$= 74 - [85 \div \{49 - 32\}]$
$= 74 - [85 \div \{17\}]$
$= 74 - [85 \div 17]$
$= 74 - [5]$
$? = 74 - 5 = 69$

48. (c)
Let the fraction be $\frac{x}{1}$, then its inverse will be $\frac{1}{x}$,
According to the question,

$$\frac{x}{1}-\frac{1}{x}=\frac{9}{11}$$

$$\Rightarrow x-\frac{1}{x}=\frac{9}{11}$$

On cubing both side,

$$x^3-\frac{1}{x^3}=\left(\frac{9}{11}\right)^3+3\times\frac{9}{11} \qquad \left[a^3-b^3=(a-b)^3+3ab(a-b)\right]$$

$$=\frac{729}{1331}+\frac{27}{11}$$

$$=\frac{729+(27\times121)}{1331} \quad =\frac{729+3267}{1331}$$

$$\therefore x^3-\frac{1}{x^3}=\frac{3996}{1331}$$

49. (d)
Total length of the rod $=208\frac{4}{5}=\frac{1044}{5}$
According to the question,
The number of rods obtained $=\frac{\text{Total length of rod}}{\text{Length of one part}}$

$$=\frac{\frac{1044}{5}}{23\frac{1}{5}} \quad =\frac{\frac{1044}{5}}{\frac{116}{5}}$$

$$=\frac{1044}{5}\times\frac{5}{116} \quad =\frac{1044}{116} \quad =9$$

50. (d)
The required length = HCF of 126cm, 198cm and 162 cm.

```
126)198 (1          18)162 (9
    126                 162
     72)126(1           ×××
        72
        54)72(1
           54
           18)54(3
              54
              ××
```

So, the HCF = 18cm.
Hence, the greatest length = 18cm

51. (b)
LCM of 10, 12 and 8

2	10,	8,	12
2	5,	4,	6
2	5,	2,	3
3	5,	1,	3
5	5,	1,	1
	1,	1,	1

LCM = 2 ×2×2×3×5 = 120
The largest 3-digit number = 999

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According to the question-

$$\begin{array}{r} 8 \\ 120\overline{)999} \\ 960 \\ \hline 39 \end{array}$$

Hence, the required number = 999 – 39 = 960.

52. (b)

Let the number of coins of ₹1, 50 paise and 25 paise is 3x, 4x and 5x respectively

According to the question,

$$3x+\frac{4x}{2}+\frac{5x}{4}=93.75$$

$$\Rightarrow \frac{12x+8x+5x}{4}=93.75$$

$$25x=93.75\times 4$$

$$x=\frac{375}{25}\Rightarrow x=15$$

Number of coins of ₹ 1 =3×15=45

Number of coins of 50 paise =4×15=60

Number of coins of 25 paise =5×15=75

53. (b)

Let D's income be = ₹ 100

According to question,

Ratio of income

A		B		C		D
$112\times\frac{75}{100}$ = 84	:	$\frac{80\times 140}{100}$ = 112	:	80	:	100
21	:	28	:	20	:	25

$$\text{Required \%}=\frac{21-20}{20}\times 100=5\%$$

54. (d)

Volume of cuboid $= 50\times 40\times 32$

$= 64000\ cm^3$

According to the question,

Volume of cube = Volume of cuboid

$(side)^3 = a^3 = 64000\ cm^3$

$a = 40$ cm

∵ Surface area of cube $= 6a^2$

$= 6\times(40)^2$

$= 6\times 1600$

$= 9600\ cm^2$

55. (a)

One day work of A and B $=\frac{1}{20}$ part

One day work of B and C $=\frac{1}{30}$ part

Let-

A completes the work in x days.

Then, C will do the work in 2x days. (∵ A is twice as good as C.)

And B completes the work in y days.

Hence, $\frac{1}{x}+\frac{1}{y}=\frac{1}{20}$ (1)

And $\frac{1}{2x}+\frac{1}{y}=\frac{1}{30}$

$\frac{1}{y}=\frac{1}{30}-\frac{1}{2x}$ -----(2)

From equation (1) and (2),

$$\frac{1}{x}+\frac{1}{30}-\frac{1}{2x}=\frac{1}{20}$$

$$\frac{1}{x}-\frac{1}{2x}=\frac{1}{20}-\frac{1}{30}$$

$$\frac{1}{2x}=\frac{3-2}{60}$$

$$x=30$$

By putting the value of x in equation (1),

$$\frac{1}{30}+\frac{1}{y}=\frac{1}{20}$$

$$\frac{1}{y}=\frac{1}{20}-\frac{1}{30}$$

$$\frac{1}{y}=\frac{1}{60}$$

$$\boxed{y=60\,\text{days}}$$

Hence, B alone will complete the work = y days

= 60 days.

56. (c)

Let the total distance = x km.

Speed of train running from Patna $=\frac{x}{4}$ km/h

Distance travelled in 1:30 hours $=\frac{x}{4}\times\frac{3}{2}=\frac{3x}{8}$ km

Remaining Distance $= x-\frac{3x}{8}=\frac{5x}{8}$ km

To cover the remaining distance–

Relative speed $=\frac{2x}{7}+\frac{x}{4}=\frac{15x}{28}$ km/hr

Time to meet $=\dfrac{\frac{5x}{8}}{\frac{15x}{28}}=\frac{5\times 28}{15\times 8}=\frac{7}{6}$ hours

Hence time to meet = 6:30 + 1: 10 = 7: 40 am

57. (c)

Given,

Principal (P) = ₹10000

Time (T) = 5 years

Rate (R) = 10%

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$\therefore A = P\left(1+\frac{R}{100}\right)^T$

According to the question,

CI for 4th year

$$=10000\left[\left(1+\frac{10}{100}\right)^4-\left(1+\frac{10}{100}\right)^3\right]$$

$$=10000\left[\left(\frac{11}{10}\right)^4-\left(\frac{11}{10}\right)^3\right]$$

$$=10000\left[\left(\frac{11}{10}\right)^3\times\left(\frac{11}{10}-1\right)\right]$$

$$=10000\left[\frac{1331}{1000}\times\frac{1}{10}\right]$$

$=₹1331$

58. (b)

Total cost price = 3500 + 3500 = ₹ 7000

Selling price at a profit of 20% $=7000\times\frac{120}{100}=₹\ 8400$

Selling price of first bicycle at a profit of 5%

$$=3500\times\frac{105}{100}$$

$S.P._I = ₹3675$

Hence, the selling price of second bicycle = 8400 – 3675 = ₹4725

Profit = 4725 – 3500

= ₹ 1225

Profit % $=\frac{1225}{3500}\times100$

Profit % = 35%

59. (a)

$x^2+\frac{1}{16x^2}=\frac{19}{2}$

$\Rightarrow 4x^2+\frac{1}{4x^2}=\frac{19}{2}\times4$ (Multiply by 4 in both side)

$\Rightarrow (2x)^2+\frac{1}{(2x)^2}=38$ .....(i)

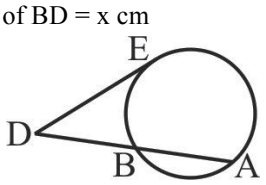
$\because \left(2x-\frac{1}{2x}\right)^2=(2x)^2+\frac{1}{(2x)^2}-2$

$= 38 - 2 = 36$

$\Rightarrow 2x-\frac{1}{2x}=\sqrt{36}=6$

60. (d)

Suppose length of BD = x cm



formula-$(DE)^2$ = DB × DA

$(8)^2 = x \times (x + 12)$

$\Rightarrow 64 = x^2 + 12x$

$\Rightarrow x^2 + 12x - 64 = 0$

$\Rightarrow x^2 + (16 - 4)x - 64 = 0$

$\Rightarrow x^2 + 16x - 4x - 64 = 0$

$\Rightarrow x(x + 16) - 4(x + 16) = 0$

$\Rightarrow (x + 16)(x - 4) = 0$

$\Rightarrow x = -16$ (invalid)

$\Rightarrow x = 4$ cm.

So, DB = 4 cm.

61. (c)

Arranaging the number in ascending oreder-

1, 2, 3, 5, 8, 8, 9, 9, 9

n = 9 (odd)

Median $=\left(\frac{n+1}{2}\right)^{th}$ term $=\left(\frac{9+1}{2}\right)^{th}$ term

$= 5^{th}$ term = 8

Mean $=\frac{\text{sum of all numbers}}{\text{Total numbers}}$

$=\frac{9+8+3+5+1+9+8+2+9}{9}=\frac{54}{9}=6$

Mode = 9 (Most frequent)

Hence median, mode and mean is 8, 9, 6.

62. (b)

Given,

$\frac{x}{\sqrt{243}}=\frac{\sqrt{2187}}{x}$

$\Rightarrow \frac{x}{\sqrt{9\times9\times3}}=\frac{\sqrt{3\times9\times9\times9}}{x}$

$\Rightarrow \frac{x}{9\sqrt{3}}=\frac{27\sqrt{3}}{x}$

$\Rightarrow x^2 = 27 \times 9 \times \sqrt{3}\times\sqrt{3}$

$x=\sqrt{27\times27}=27$

Hence, the value of x is 27.

63. (d)

Let four years ago, the age of Ram and Shyam be 13x and 9x years respectively.

According to the question,

$\frac{13x+4+8}{9x+4+8}=\frac{4}{3}$

$\frac{13x+12}{9x+12}=\frac{4}{3}$

39x + 36 = 36x + 48

3x = 48 – 36

$x=\frac{12}{3}$

x = 4

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Difference of their present ages = (13x + 4) – (9x + 4)
= 4x = 4×4 = 16 years

64. (a)

Let working efficiency of filling pipe A = 1
then, the working efficiency of second Pipe B = 1.5
A : B = 1 : 1.5 = 10 : 15 = 2 : 3
the ratio of times of A and B will be inversely proportional to their efficiencies.
hence ratio of times = 3 : 2
hence the time of A is 3x and time of B is 2x.
According to the question-

$$\Rightarrow \quad \frac{1}{2x}+\frac{1}{3x}-\frac{1}{12} = \frac{1}{28}$$

$$\Rightarrow \quad \frac{5}{6x} = \frac{1}{28}+\frac{1}{12}$$

$$\Rightarrow \quad \frac{5}{6x} = \frac{12+28}{28\times 12}$$

$$\Rightarrow \quad \frac{5}{x} = \frac{40}{56} \qquad \boxed{x = 7}$$

time taken to fill the tank with less efficient pipe = 3x
= 3 × 7 = 21 hours

65. (d)

Let the salaries of A and B are 3x and 4x respectively.
According to the question

$$\frac{3x+3000}{4x+3000} = \frac{18}{23}$$

⇒ 69x + 69000 = 72x + 54000
⇒ 3x = 15000
⇒ x = 5000
The salary of A after the increase = 5000 × 3 + 3000
= ₹18000

66. (d)

1 mile = 1.69344 Kilometers
Hence, option (d) is correct.

67. (c)

By formula, density = $\frac{\text{mass}}{\text{volume}}$

According to the ques, given that $M_2>M_3>M_1>M_4$ and volume is constant and by the formula M_4 has least density

68. (a)

When a ball is thrown upwards, its path, is parabolic, in such a situation its speed, potential energy and distance change but acceleration remains unchanged. The value of this acceleration is always equal to g (acceleration due to gravity).

69. (c)

If a force 1 Newton is applied on an object and it is displaced by 1 meter in the direction of force, then the work done by the force on the object will be 1 joule.

W= F×S
W = N–m
= Joule

In S.I system it is called absolute unit of work.

70. (c)

Temperature of boiling water and water vapor the temperature is constant (100°C) and heat is given to boiling water is spent in its state change (water to vapour) this heat does not change the temperature. That's why it is called latent heat.

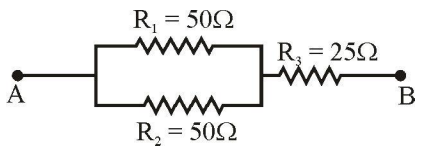
71. (b)

A thermistor is a temperature-sensitive resistor and also called NTC resistor. The characteristic of the thermistor is non-linear.

72. (a)

Given that-

$R_1 = 50\ \Omega$, $R_2 = 50\ \Omega$, $R_3 = 25\ \Omega$



∵ R_1 and R_2 connected in parallel
So, total resistance $R = R_1 || R_2$

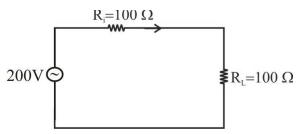
$$\frac{1}{R} = \frac{1}{R_1}+\frac{1}{R_2}$$

$$\frac{1}{R} = \frac{1}{50}+\frac{1}{50}$$

$R = 25\Omega$

Then, R and R_3 are connected in series-
Now,
Total Resistance $R_T = R + R_3$
$R_T = 25 + 25$
$\boxed{R_T = 50\Omega}$

73. (c)



Power dissipated in load resistance-

$$P_L = I^2 R_L$$

$$\because \quad I = \frac{V}{R_i + R_L} = \frac{200}{100+100} = 1A$$

∴ Dissipated Power $(P_L) = (1)^2 \times 100$

$$P_L = 100W$$

74. (d)

Given-

$N_1 = 100$, $N_2 = 200$
$L_1 = 1H$, $L_2 = ?$

$$L \propto N^2 \frac{A}{\ell}$$

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$L \propto N^2$ Where,

$N \rightarrow$ Number of turns

$\frac{L_1}{L_2} = \frac{N_1^2}{N_2^2}$ $A \rightarrow$ Area,

$\Rightarrow \frac{1}{L_2} = \frac{(100)^2}{(200)^2}$ $\ell \rightarrow$ Length

$\frac{1}{L_2} = \frac{1}{4}$

$\Rightarrow L_2 = 4H$

75. (c)

Given, W_1=2kW , W_2= 1kW

We know that,

$\tan\phi = \sqrt{3}\frac{(W_1 - W_2)}{W_1 + W_2}$

$\tan\phi = \sqrt{3}\frac{(2-1)}{2+1}$

$\tan\phi = \frac{1}{\sqrt{3}}$

Then, $\phi = 30^0$

Hence, $\cos\phi = \cos 30^o = \frac{\sqrt{3}}{2}$

$\cos\phi = 0.866$

76. (c)

Maxwell's third equation is derived from faraday's law of electromagnetic induction.

According to this when a close path are placed in different magnetic field. There are N-turn of operation of the coil. So each coil induces an alternative electromotive force.

It is given by Lenz's law-

$$\boxed{\nabla \times E = \frac{-\partial B}{dt}}$$

77. (d)

Electric field intensity between the plates of a parallel plate condenser is E,

$E \propto \frac{1}{\varepsilon_0}$

$\frac{E_1}{E_2} = \frac{\varepsilon_0 \varepsilon}{\varepsilon_0}$

$\frac{E}{E_2} = \varepsilon$ $[E_1 = E]$

$$\boxed{E_2 = \frac{E}{\varepsilon}}$$

78. (a)

Electric field intensity at a point in any medium due to charge (Q)-

$$\left[E = \frac{1}{\varepsilon_r}\right]$$

If, the relative permittivity of the medium increases the electric intensity at a point due to a given charge decrease.

79. (c)

Given

$\phi(t) = 2t^2 - 20t + 40$

Induced emf $e = -N\frac{d\phi(t)}{dt}$

$N = 1$

$e = -\frac{d\phi(t)}{dt}$

$e = -\frac{d}{dt}(2t^2 - 20t + 40)$

$e = -4t + 20$

$t = 2$ sec (Given)

$e = -4 \times 2 + 20$

$\boxed{e = 12 \text{volt}}$

80. (d)

Titanium is superconducting material when cooled below its critical temperature of 0.49K.

81. (d)

Bakelite is an example of a thermosetting Polymer. A thermosetting plastic is a Polymer that hard irreversibly when heated. It is a rigid type of plastic that is highly resistant to heat after it has cured during the compression molding process. Thermosetting Plastic are generally strong than thermo plastic material.

82. (c)

In an N-type of semiconductor, as the donor concentration increases, the fermi level moves towards the conduction band or the Fermi level moves away from the center of energy gap and the conductivity increases.

83. (d)

A power diode has lightly doped N type substrate sandwiched between heavily doped P and N region to improve transient behavior of the diode low frequency and low current conduction of power diode is like a good switch but high frequency and high current conduction is transient free.

84. (c)

The circuit consisting of two transistors connected in series with a dc supply voltage is called stacked transistor or stacked V^+.

85. (a)

Given-

$I_{DSS} = 8$ mA, $V_{GS} = -1$ V, $V_p = -4$V

$\because$ We know that-

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$$I_{DS} = I_{DSS}\left(1-\frac{V_{GS}}{V_P}\right)^2$$

$$I_{DS} = 8\left(1-\frac{1}{4}\right)^2 = 8\times\left(\frac{3}{4}\right)^2$$

$$\boxed{I_{DS} = 4.5mA}$$

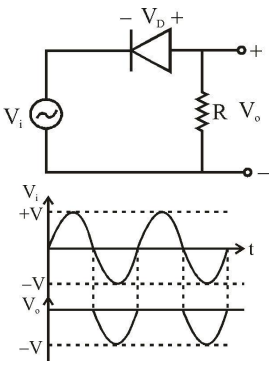
86. (c)

Positive clipper can be easily converted into negative clipper by both simply reversing diode and changing the polarity of the reference voltage.

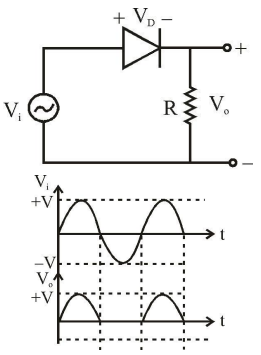
Clipper circuit-

A clipper circuit clips off or removes a portion from an A.C. signal without distorting or changing the remaining part of the waveform.

A clipper limits the voltage from rising above or below a certain point. A clipper is made of a diode and resistor. A clipper is also known as clipping circuit, voltage limiter and slicer etc.



Negative Clipper-



87. (a)

The stabilization factor 'S_{ico}' of fixed bias circuit is S_{ico}= (1+β) where β = common emitter current gain.

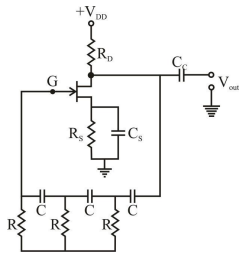
88. (a)

Field effect transistor (FET) is a transistor which uses electric field to control the conducting channel and exhibits no offset voltage at zero drain current. Hence it makes an excellent signal chopper. generally it has better thermal stability than BJT. So FET is a better chopper than BJT because FET has less offset voltage.

89. (a)

FET phase-shift oscillator uses voltage series feedback.

- The phase shift oscillator is a linear electric circuit that produces a sine wave output.
- It consists of an inverting amplifier element such as a transistor or op-amp with its output feedback to its input through a phase shift network consisting of resistance and capacitors in a ladder network.
- The feedback network shifts the phase of the amplifier output by 180º at the oscillation frequency to give positive feedback.



90. (a)

The function of buffer amplifier in transmitter is to provide impedance matching.

The advantage of voltage follower -

- Unity transmission gain.
- It has a high impedance of input.
- It has a low impedance of output.
- It removes loading impact.

91. (a)

To increases the stability of output voltage of a stabilizer use number of zener diode in series.

- A zener diode is also known as a breakdown diode, is a heavily doped semiconductor device that is designed to act in reverse bias diode.
- Zener diode is commonly used as a voltage regulator to maintain a constant DC output voltage.

92. (c)

A PMMC instrument is used as a voltmeter for extending the range of voltmeter a high values resistance connected in series with the voltmeter.

$$\boxed{M = \frac{V}{V_m}}$$

$$\boxed{R_s = R_m(M-1)}$$

93. (c)

A moving iron instrument gives correct reading when used at only one frequency.

- Moving iron instrument measure both ac and dc.
- It has non-uniform scale.
- Moving iron used to under severe over load conditions.

In M.I. type instrument-

For Ammeter-

to minimize error at high frequency in MI ammeter an inductive shunt resistance is connected in parallel with meter.

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$$\tau_{sh} = \frac{L_{sh}}{R_{sh}} = \frac{L_m}{R_m}$$

For voltmeter-

A capacitor is connected in parallel with series multiplier (R_s)

$$C = 0.41\frac{L_m}{R_s^2}$$

i.e. in case of MI type voltmeter, error due to frequency will be zero.

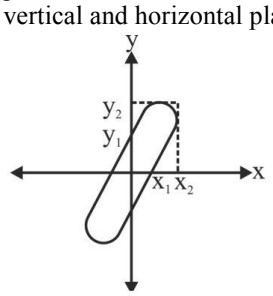
- In moving iron instruments controlling torque is provided by spring.

94.(c)

Q meter is an instrument that is designed to measure the value of quality factor directly and it is useful in measuring the characteristics of coils and capacitor. Q meter work on the principle of series resonance.

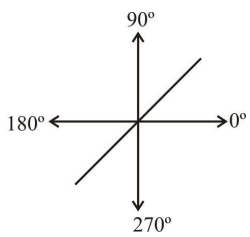
95. (d)

Lissajous Pattern is also used for finding the phase angle difference between the two input signals applied to vertical and horizontal plate.



$$\phi = \sin^{-1}\left(\frac{x_1}{x_2}\right) \text{ or } \sin^{-1}\left(\frac{y_1}{y_2}\right)$$

$$\text{or phase angle} = (360^\circ - \phi)$$



96. (b)

The principle of operation of LVDT is based on the variation of mutual inductance.

- Very high range for measurement of the displacement (12.5 mm to 250 mm)
- No frictional losses
- Low power consumption
- Rugged and simple construction

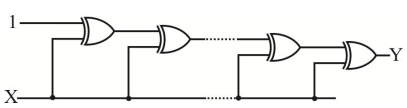
97. (c)

$$(4AC0)H \oplus (B53F)H$$

0100,	1010,	1100,	0000
1011,	0101,	0011,	1111
1111,	1111,	1111,	1111

So, XOR operation - (4AC0)H & (B53F)H =(FFFF)H

98. (b)



Truth table of XOR gate

Input		Output
A	B	A⊕B
0	0	0
0	1	1
1	0	1
1	1	0

When one of the input to an XOR gate is 1, then the output is simply the inverted value of the other input.

From the above given figure -

The output of the first XOR gate will be

$$1 \oplus X = \bar{1}.X + 1.\bar{X}$$
$$= 0 + \bar{X}$$
$$= \bar{X}$$

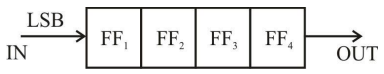
The output of second XOR gate will be -

$$\bar{X} \oplus X = \bar{\bar{X}}.X + \bar{X}.\bar{X}$$
$$= X + \bar{X}$$
$$= 1$$

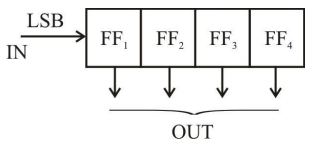
For 20 such XOR gates in cascade, the final output will be 1.

99. (a)

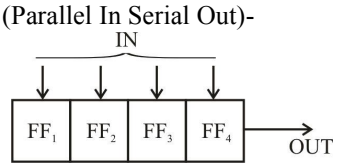
SISO (Serial In Serial Out)-



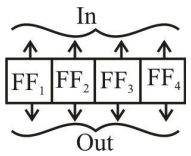
- SIPO (Serial In Parallel Out)-



- PISO (Parallel In Serial Out)-



- PIPO (Parallel In Parallel Out)-



Hence, it is clear that SISO has 1 data input.

100. (a)

$$\%\text{Resolution} = \frac{1}{2^n - 1} \times 100$$

$$0.4 = \frac{1}{2^n - 1} \times 100$$

$$2^n - 1 = \frac{100}{0.4} \Rightarrow 2^n = 251$$

$$n \simeq 8\,\text{bit}$$

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PRACTICE SET - 15

1. Kalpana Chawla, the first woman of Indian origin went to space on ____ spacecraft?
(a) Columbia (b) Challenger
(c) Atlantis (d) Adventure

2. What is the boxing field called?
(a) Court (b) Ring
(c) Track (d) Diamond

3. Chainsoo is a famous food preparation of the state of _____.
(a) Uttarakhand (b) Arunachal Pradesh
(c) Maharashtra (d) Telangana

4. Who among the following stated the newspaper, 'Sambad Kaumudi'?
(a) Sisir Kumar Ghosh
(b) Ishwar Chandra Vidyasagar
(c) Rash Bihari Bose
(d) Raja Ram Mohan Roy

5. When is the primary deficit zero in the Government of India budget?
(a) When the fiscal deficit is equal to the revenue deficit
(b) When the fiscal deficit is equal to the interest payment
(c) When the net interest payments is equal to the revenue deficit
(d) When the revenue deficit is zero

6. A political party can be recognized as a national party if it secures ____ of the valid votes in any four states in general or state assembly elections and in addition it wins 4 Lok Sabha seats from any state or states.
(a) 9% (b) 8 %
(c) 7 % (d) 6 %

7. Which of the following rivers passes through from most countries?
(a) Denube (b) Ganges
(c) Brahmaputra (d) Rhine

8. The 'Mango Showers' phenomenon in India is related to which season?
(a) Summer (b) Rainy
(c) Winter (d) Autumn

9. In which language did the famous medieval literary genius Guru Basava compile his famuos literary works?
(a) Hindi (b) Tamil
(c) Kannada (d) Telugu

10. Indian Railway had contributed to the freedom struggle of India by bringing people of diverse cultures together'.
Who has the above statement?
(a) Subhash Chandra Bose
(b) Jawahar lal Nehru
(c) John Mathai
(d) Mahatma Gandhi

11. Select the combination of letters that when sequentially placed in the blanks of the given series will complete the series.
A_ _BD_CEB_ _CEB_
(a) CDAEAD (b) CEADAD
(c) CADADE (d) CDADEA

12. Select the alphanumeric-cluster form among the given options that can replace the question mark (?) in the following series.
F6, H12, J18, L24, ?
(a) N12 (b) N30
(c) M12 (d) M30

13. Read the given statement and conclusions carefully. Assuming that the information given in the statements is true even if it appears to be at variance with commonly known facts, decide which of the given conclusion logically follows from the statements.
Statements:
Some boys are handsome
No, handsome is employed
No, graduate is boy
Conclusions:
I. Some handsome are not graduates
II. No, employed is a boy
(a) Only conclusion II follows
(b) Neither conclusion I nor conclusion II follows
(c) Both conclusions I and II follows
(d) Only conclusion I follows

14. A question is given followed by two arguments. Decide which of the arguments is/are strong with respect to the question.
Question:
Does assigning class monitors harbour the feeling of jealousy among students?
Arguments:
(i) Yes, all class monitors start to behave arrogantly.
(ii) No, it teaches them equity by providing every student a chance to learn team spirit under a leader.
(a) Only argument (ii) is strong.
(b) Both the arguments are strong.
(c) None of the arguments are strong.
(d) Only argument (i) is strong.

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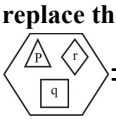
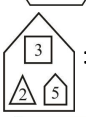
15. Argument: All the faculty members are instructed to reach the college by 9.00 A.M.
Assumptions:
1. Some faculty members do not come on time.
2. Faculty members will follow all the instructions in the notice.
(a) Both 1 and 2 are implicit
(b) Only assumption 1 is implicit
(c) Only assumption 2 is implicit
(d) Neither 1 nor 2 is implicit

16. You are given a question and two statements. Identify which of the statements is/are necessary/sufficient to answer the question.
Question:
Who is father of M?
Statements:
I. P and Q are brothers.
II. Q's wife is the sister of M's wife.
(a) Statement I alone is sufficient.
(b) Statement I and II both are necessary
(c) Statement II alone is sufficient
(d) Statement I and II both are not sufficient.

17. Study the given pattern carefully and select the number from among the given options that can replace the question mark (?) in it.



⇒ 6{(3 + P) + (4 + q) + (4 + r)}



⇒ 5{(4 + 3) + (3 + 2) + (5 + 5)}

⇒ ?

(a) 29 (b) 96
(c) 100 (d) 120

18. Select the term that can replace the question mark (?) in the following analogy.
STYLE : 81 : ARRIVAL :: CRACK : 36 : ?
(a) SMELL (b) RIDE
(c) ROSE (d) STREAM

19. If Charger = 60 , then Topper = ?
(a) 40 (b) 90
(c) 26 (d) 52

20. Rearrange the cluttered letters to form a meaningful word and find the odd one out.
(a) LOWELY (b) IFER
(c) THIWE (d) WRONB

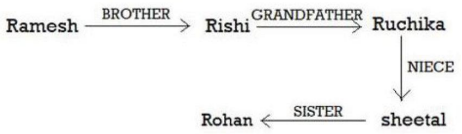
21. Study the given pattern carefully and select the number that can replace the question mark (?) in it.

(a) 8 (b) 10
(c) 12 (d) 6

22. Rahul left his school and walked 20 m straight towards the north, turned left and walked straight for another 20 m. He took a final left turn again and walked straight for 20 m to reach home. What is the shortest distance between the school and his home? (All turns are 90° turns only)
(a) 20 m (b) 25 m
(c) 40 m (d) 30 m

23. If the south-east direction moves two places and becomes north-east; and north-west moves two places to become south-west, what would be the direction that west would become, assuming all other directions make similar movements.
(a) North-east (b) East
(c) North-West (d) South

24. If 'A→B' means 'A is the mother (or any other relationship) of B', then using the given relationship chart, select the option that correctly depicts the meaning of 'Rohan→ Rishi'.



(Context - Brother - Grandfather - Niece - Sister -)
(a) Rohan is the grandson of Rishi
(b) Rishi is the son of Rohan
(c) Rohan is the son of Rishi
(d) Rohan is the nephew of Rishi

25. Select the correct set of symbols
63 7 5 4 = 49
(a) ×, –, ÷ (b) +, ÷, –
(c) +, –, ÷ (d) ÷, × , +

26. Which company manufactured the first microprocessor 4004?
(a) ENOcean Private Company
(b) INTEL Corporation
(c) PLX Devices
(d) NVIDIA Corporation

27. Which among the following is an output device in the context of computer system?
(a) Magnetic scanner (b) Track ball
(c) Light pen (d) Plotter

28. Which of the following is NOT an output device?
(a) Plotter (b) Printer
(c) Monitor (d) Touch screen

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29. Daisy wheel printer is a types of _____
(a) Laser (b) Dot matrix
(c) Manual (d) Impact

30. 1024 Terabyte is equal to which of the following?
(a) 10 Petabytes (b) 1 Gigabyte
(c) 1 Petabyte (d) 1 Exabyte

31. Which of the following is smallest storage?
(a) Megabyte (b) Gigabyte
(c) Kilobyte (d) Nano byte

32. Which of these units is the smallest unit of data storage in a computer?
(a) 1 Gigabyte (b) 1 Pentabyte
(c) 1 Terabyte (d) 1 Megabyte

33. Which of the following is not a component of a computer network?
(a) NIC (b) Router
(c) Switch (d) USB

34. Identify whether the following statements are true or false.
i) Switching at the network layer on the internet uses the datagram approach to packet switching.
ii) The Internet Protocol version 4 (IPv4) is the delivery mechanism used by TCP/IP protocols.
iii) An IPv4 address is represented by 8 bytes.
(a) i-False, ii-True, iii-True
(b) i-True, ii-True, iii-False
(c) i-True, ii-False, iii-True
(d) i-False, ii-False, iii-True

35. Which of the following is responsible for reassembling received packets at recipient computer?
(a) IP
(b) TCP
(c) TCP and IP both
(d) Neither TCP and nor IP

36. Which of the following is a portion of your document's text that is extracted from the same document and displayed as a graphic element on a page in MS - Word 365?
(a) Comment (b) Block quote
(c) Footnote (d) Pull quote

37. Which of the following options of MS - Word 365 is used to change the background color of selected text, paragraph or table cell?
(a) Shading
(b) Text Highlight color
(c) Font Color
(d) Text Effects and Typography

38. Which of the following tabs is the default tab in MS Word 365?
(a) File (b) Design
(c) Home (d) Layout

39. Which of the following statements is incorrect regarding the interent?
(a) The standard Internet Protocol is used in internet is called Hyper Text Markup Language (HTML).
(b) There is no centralized administration for the internet for accessing and using whether for technical implementation or policies.
(c) Internet has millions of small domestic, education, commercial and government networks.
(d) Internet is a collection of computers that shares information.

40. In order to transfer files between two computers located at distant places, whom should be they connected?
(a) Internet (b) Hub
(c) Repeater (d) Modem

41. __formally launched the first publicly available internet service for India in August 1995.
(a) VSNL (b) Aircel
(c) Airtel (d) BSNL

42. Which of the following is not a Web browser?
(a) XHTML (b) FireFox
(c) MacWeb (d) Net Scape

43. During a period of time, you visit the number of websites and pages are presented by-
(a) Title bar (b) History list
(c) Menu bar (d) Status bar

44. Alta Vista is a
(a) Program (b) Software
(c) Browser (d) Search Engine

45. The systematic process of solving an issue is called -
(a) Feedback (b) Troubleshooting
(c) Update (d) Patching

46. Calculate the total prime factors in the product of $\{(16)^7 \times (27)^6 \times 5^9\}$
(a) 28 (b) 43
(c) 55 (d) 56

47. $45 - [38 - \{80 \div 4 - (8 - 12 \div 3) \div 4\}] = ?$
(a) 25 (b) 27
(c) 26 (d) 28

48. What is the difference between the biggest and the smallest fraction among $\frac{2}{3}, \frac{3}{4}, \frac{4}{5}$ and $\frac{5}{6}$?
(a) $\frac{1}{30}$ (b) $\frac{1}{6}$
(c) $\frac{1}{12}$ (d) $\frac{1}{20}$

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49. When the numerator of a fraction increases by 6, the fraction increases by three-fourth. The denominator of the fraction is :
(a) 8 (b) 10
(c) 12 (d) 6

50. Find the greatest number by which when the numbers 158 and 215 are divided, it leaves remainders 4 and 5, respectively.
(a) 21 (b) 18
(c) 7 (d) 14

51. Find the smallest number which is exactly divisible by 6, 8, 12 and 16.
(a) 48 (b) 24
(c) 64 (d) 80

52. If a : b = c : d = e : f = g : h = 1 : 3 then find out the name of following
(pa + qc + re + sg) : (pb + qd + rf + sh)
(a) 1:3 (b) 1:2
(c) 1:5 (d) 1:4

53. If 40% of (a – b) is equal to 20% of (a + b), then b is what percentage of a?
(a) 25% (b) 35%
(c) 100/3% (d) 28%

54. The area of a rectangle is 9/20 times the area of a square. If the length and breadth of the rectangle are in the ratio 5 : 4, find the ratio of the perimeter of the rectangle and the square.
(a) 25:48 (b) 27:20
(c) 27:40 (d) 25:45

55. A father can complete a task in 8 days, while the son can do it in 7 days. If they work on alternate days, with the father starting, then in how many days will the task be completed?
(a) $7\frac{1}{2}$ (b) 6
(c) 7 (d) $6\frac{1}{2}$

56. Prithvi is going to Delhi by Rajdhani express, which is running late by six minutes. The driver increased its speed by 4 km/hr. The train reaches the next station which is 36 km far at the correct time. What is the original speed of the train?
(a) 20 km/hr (b) 36 km/hr
(c) 30 km/hr (d) 26 km/hr

57. The difference between simple interest and compound interest compounded a half yearly basis for 2 years at the rate of 10% per annum is ₹ 124.05. Find the amount.
(a) ₹ 8400 (b) ₹ 10000
(c) ₹ 8000 (d) ₹ 8200

58. A shopkeeper sold two items, one at 25% profit and second at 15% loss and earned profit of 35. If the price of the item sold at 25% profit is twice that of item sold at 15% loss, then find the sum of the cost price of both the items.
(a) 100 (b) 400
(c) 300 (d) 200

59. If $\frac{x}{2}+\frac{2}{y}=1$ and $\frac{y}{2}+\frac{2}{z}=1$, then the value of $\frac{z}{2}+\frac{2}{x}$ is:
(a) –1 (b) 1
(c) 0 (d) 2

60. If ABCD is a cyclic quadrilateral and ABC is an equilateral triangle find the angle of ∠CDA
(a) 45^0 (b) 90^0
(c) 120^0 (d) 60^0

61. A box contains 2 black, 6 green and 4 yellow balls. If 2 balls are picked up at random, the probability that both are green is:
(a) 1/6 (b) 1/22
(c) 3/11 (d) 5/22

62. Find the value of $\left[\left(\frac{5}{8}\right)^{-7}\times\left(\frac{8}{5}\right)^{-4}\times\left(\frac{1}{4}\right)^{-3}\right]^{-3}$
(a) $\left(\frac{5}{4}\right)^9$ (b) $\left(\frac{5}{4}\right)^7$
(c) $\left(\frac{32}{5}\right)^9$ (d) $\left(\frac{5}{32}\right)^9$

63. The age ratio of Jay and Jog is 5:2. The sum of their age is 63. What will be the ratio of their ages after 9 years?
(a) 5:2 (b) 2:1
(c) 3:2 (d) 4:3

64. Two inlet taps, in which one tap's capacity is 4.5 times more than the other, an outlet tap which can empty a tank in 9 hours, working together can fill an empty tank in 7.5 hours. How many hours will be taken by the less efficient pipe to fill the tank?
(a) 18 (b) 27
(c) 22.5 (d) 13.5

65. 8 : 4 :: 3.2 : x and 3 : 6 :: 6 : y. What is the ratio of x to y ?
(a) 3 : 8 (b) 2 : 15
(c) 4 : 19 (d) 1 : 3

66. Heat supplied to a system is measured in____.
(a) joules (b) amperes
(c) kilowatts (d) degrees kelvin

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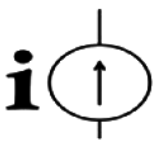
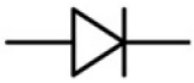
67. If the volume of four bodies of equal mass are V_1, V_2, V_3 and V_4 respectively then which body will have greater density if $V_4 > V_2 > V_3 > V_1$ then
(a) V_2 (b) V_3
(c) V_1 (d) V_4

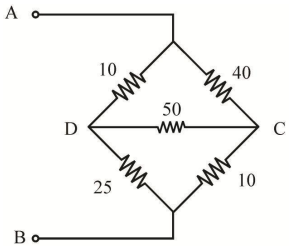
68. A force of 1.5 Newton is applied on a body of mass 5kg for 2 second. the distance covered by the body is -
(a) 2 m (b) 1.6 m
(c) 1.2 m (d) 0.6 m

69. The S.I unit of power (watt) is equal to -
(a) kg-meter –second^{-2}
(b) kg-meter^2 –second^{-2}
(c) kg-meter^2 –second^{-3}
(d) None of these.

70. The heat capacities of two objects made of the same metal are in the ratio 3:4. the ratio of their mass will be
(a) 3 : 4 (b) 3 : 7
(c) 4 : 3 (d) 4 : 7

71. Resistance of a choke coil is _____
(a) Low (b) Infinite
(c) High (d) Indefinite

72. Find the odd one-
(a) 
(b)
(c) 
(d)

73. Find the resistance between terminals A and B in the electric circuit of below figure


(a) 30Ω (b) 19Ω
(c) 50Ω (d) 100Ω

74. 2 Coils having self-inductance of 10mH and 15mH have an effective inductance of 40 mH when they are connected in series adding. What will be the equivalent inductance when they are connected in series opposition?
(a) 25 mH (b) 20 mH
(c) 10 mH (d) 5 mH

75. The moving coil in an electrodynamometer wattmeter is called :
(a) Power coil (b) Current coil
(c) Meter coil (d) Pressure coil

76. An SMD tantalum capacitor has a capacitance range of :
(a) 100 μF to 100 nF (b) 0.1 μF to 100 nF
(c) 0.1 μF to 1000 pF (d) 0.1 μF to 100 μF

77. The value of susceptibility of vacuum is
(a) 0 (b) Infinite
(c) Unity (d) None of these

78. The value of relative permittivity of vaccum is
(a) 1 (b) 0
(c) 8.854×10^{-12} (d) ∞

79. The inductance of a coil depends on turns, length, area of a coil and .....
(a) Permeability
(b) Back emf
(c) Coefficient of coupling
(d) Resistance

80. The current carrying capacity of aluminium is what percent of the carrying capacity of copper?
(a) 15% (b) 30%
(c) 75% (d) 25%

81. In an intrinsic semiconductor Fermi Level represents the energy, with probability of its occupation of
(a) 0% (b) 25%
(c) 50% (d) 100%

82. Doping materials are called impurities because they
(a) decrease the number of charge carriers
(b) change the chemical properties of semiconductors
(c) make semiconductors less than 100 percent pure
(d) alter the crystal structure of the pure semiconductors

83. The band gap energies for silicon and germanium photodiodes are 1.1 eV and 0.67 eV respectively, their cutoff wavelength respectively would be :
(a) 1127.27 nm, 1850.75nm
(b) 1850.27 nm, 2167.91 nm
(c) 456.12 nm, 1127.27 nm
(d) 1315.45nm, 1850.75 nm

84. Thermal runaway in BJT will take place if the quiscent point is such that-
(a) $V_{CE}>1/2\ V_{CC}$ (b) V_{CE}
(c) $V_{CE}<2V_{CC}$ (d) $V_{CE}<1/2\ V_{CC}$

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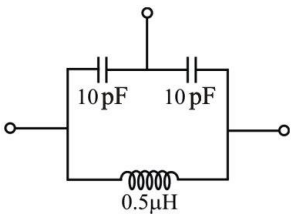
85. The MOSFETs have lower turn off time and they can be operated at higher frequencies when compared to BJTs because-
(a) The minority carrier storage time is absent in MOSFETs
(b) MOSFETs have higher input impedance
(c) MOSFETs are voltage controlled
(d) MOSFETs have positive temperature coefficient

86. Clipper circuit uses an arrangement of _____ and _____ along with resistor to clip either negative or positive part of the input waveform.
(a) diode, capacitor
(b) diode, inductor
(c) diode, voltage source
(d) inductor, voltage source

87. In a two stage CE amplifier circuit, the ac collector resistance of the first stage depends on
(a) the input impedance of first stage
(b) the input impedance of second stage
(c) load resistance only
(d) none of the above

88. The (I_d-V_{gs}) characteristics of a MOSFET in the saturation region is:
(a) Quadratic (b) Exponential
(c) Logarithmic (d) Hyperbolic

89. A tuned circuit used in colpitts oscillator, the frequency of oscillations will be-



(a) 1 MHz (b) 0.1 MHz
(c) 10 MHz (d) 100 MHz

90. A Schmitt trigger has V_T + = 2.0 V and V_T – = 1.2 V. What is the hysteresis voltage of the Schmitt trigger?
(a) 0.4 volts (b) 0.6 volts
(c) 0.8 volts (d) 1.2 volts

91. Normal timer Circuit has
(a) Resistor, Inductor and Capacitor
(b) Inductor and Capacitor
(c) Resistor and Inductor
(d) Resistor and Capacitor

92. The multiplying power of shunt of a milliammeter is 4. If the circuit current is 600 mA, then the current through the meter is :
(a) 250 mA (b) 240 mA
(c) 1500 mA (d) 150 mA

93. PMMC ammeter have uniform scale because :
(a) Of eddy current damping
(b) They are spring controlled
(c) Their deflecting torque varies directly as current
(d) Both spring controlled and having deflecting torque varies directly as current

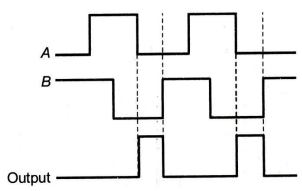
94. The bridge which is used to measure values of resistance below 1 ohm is
(a) Wheatstone bridge
(b) Kelvin's Bridge
(c) Maxwell's bridge
(d) Hay's bridge

95. The time base signal in a CRO is
(a) a sinusoidal signal
(b) a square wave signal
(c) a sawtooth signal
(d) a triangular wave signal

96. A microphone is classified as _____ transducer.
(a) Acoustical (b) Magnetic
(c) Optical (d) Thermal

97. A 5 bit code is called
(a) EBCDIC (b) BAUDOT
(c) MORSE (d) ASCII

98. If the input signals (A and B) and output signal are as below then the circuit element is:



(a) AND Gate (b) OR Gate
(c) NOR Gate (d) XOR Gate

99. Propagation delay of logic gate
(a) Increases the power dissipation
(b) Limit the maximum speed at which circuit can operate
(c) Increases the logic level for high state
(d) None of the above

100. A 4-bit R/2R digital-to-analog (DAC) converter has a reference of 5V. What is the analog output (in V) for the input code 1010?
(a) 1.125 V (b) 1.725 V
(c) 2.125 V (d) 3.125 V

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SOLUTION : PRACTICE SET- 15

ANSWER KEY

1. (a)	11. (b)	21. (d)	31. (d)	41. (a)	51. (a)	61. (d)	71. (a)	81. (c)	91. (d)
2. (b)	12. (b)	22. (a)	32. (d)	42. (a)	52. (a)	62. (d)	72. (b)	82. (d)	92. (d)
3. (a)	13. (b)	23. (d)	33. (d)	43. (b)	53. (c)	63. (b)	73. (b)	83. (a)	93. (d)
4. (d)	14. (a)	24. (c)	34. (b)	44. (d)	54. (c)	64. (c)	74. (c)	84. (a)	94. (b)
5. (b)	15. (a)	25. (d)	35.(b)	45. (b)	55. (a)	65. (b)	75. (d)	85. (a)	95. (c)
6. (d)	16. (d)	26. (b)	36. (d)	46. (c)	56. (b)	66. (a)	76. (d)	86. (c)	96. (a)
7. (a)	17. (b)	27. (d)	37. (a)	47. (c)	57. (c)	67. (c)	77. (a)	87. (b)	97. (b)
8. (a)	18. (b)	28. (d)	38. (c)	48. (b)	58. (c)	68. (d)	78. (a)	88. (a)	98. (c)
9. (c)	19. (b)	29. (d)	39. (a)	49. (a)	59. (b)	69. (c)	79. (a)	89. (d)	99. (b)
10. (d)	20. (b)	30. (c)	40. (a)	50. (d)	60. (c)	70. (a)	80. (c)	90. (c)	100. (d)

SOLUTION

1. (a)
Kalpana Chawla was assigned as a mission specialist in November 1996 as STS-87 aboard the space shuttle columbia, becoming the first woman of Indian origin to fly into space IN 2003, chawla was one of the seven crew members who died in the space shuttle columbia disaster during its re-entry into the Earth's atmosphere.

2. (b)
A boxing ring often referred simply as a ring or the squared circle, is the space in which boxing match occurs.

3. (a)
Chainsoo is a famous food of Uttarakhand which is made up of Black Gram.

4. (d)

Some newspaper magazines and its authors-			
1819	Sambad Kaumudi	Bengali weekly newspaper	Raja Ram Mohan Roy
1780	Bengal Gazette	English newspaper	James Augustus Hicky
1822	Mirat-ul-Akhbar	Persian language journal	Raja Ram Mohan Roy
1912	Al-Hilal	Urdu weekly newspaper	Abul Kalam Azad
1913	Pratap	Hindi language newspaper	Ganesh Shankar Vidyarthi
1947	Navjivan	Weekly Hindi newspaper	M. K. Gandhi
1932	Harijan	Weekly journal	M.K. Gandhi
1919	Independent	Newspaper	Motilal Nehru
1919	Young India	Weekly English journal	M.K. Gandhi
1920	MookNayak	Marathi weekly newspaper	B.R. Ambedkar

5. (b)
Primary deficit is the difference between the government's income-expenditure gap and its interest payment on previous borrowings. Primary deficit can be calculated by finding the difference between current year's fiscal deficit and interest payment on the borrowings for the previous year. Thus if the fiscal deficit comes out to be equal to interest payment then Primary deficit is zero in the government budget. [Primary Deficit ⇒ fiscal Defict - Interest payment]

6. (d)
A Political party is recognised as a National Party only if it fulfils any one of the following three conditions:

- The party wins 2 percent of the seats in the Lok Sabha (as of 2014, 11 seats) from at least 3 different States; or
- At a General Election to Lok Sabha or Legislative Assembly, the party polls 6% of votes in four States and in addition it wins 4 Lok Sabha seats from any state or states; or
- A party gets recognition as State Party in four or more States.

7. (a)
The Denube River passes through most countries as Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria, Moldova, Ukraine via Romania. It starts from south Germany and runs into the Black sea through Romania. It is the second-longest river in Europe after the Volga with a lenght of 2,850 kilometers.

8. (a)
During the summer, in India, pre-monsoon showers are very common, especially in Kerala, Karnataka and parts of Tamil Nadu. They help in the early ripening of mangoes, hence often referred to as 'Mango showers.

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9. (c)

Famous medieval literary genius 'Guru Basav' compiled his famous literary works in Kannada language. Guru Basava was a 12th century statesman, philosopher, poet, social reformer during the reign of the Kalyan/Kalachuri dynasty. 'Basav Puran' is Biographical epic poem of Guru Basava.

10. (d)

"Indian Railways contributed to the freedom struggle of India by bringing together people from diverse cultures." This statement is given by Mahatma Gandhi.

11. (b)

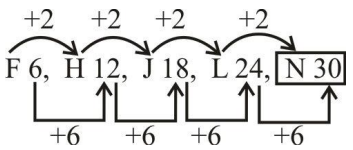
The given series is as follows-

ACEBD / ACEBD / ACEBD

Hence, CEADAD will complete the series.

12. (b)

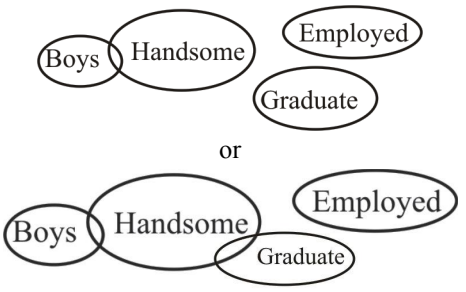
The given series is as follows-



Hence, option (b) is correct.

13. (b)

According to the question, Venn diagram is as follows-



Hence, it is clear from above Venn diagram neither conclusion I nor II follows.

14. (a)

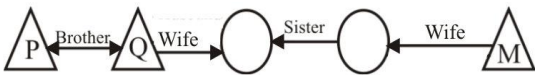
According to the given question "only argument (ii) is strong".

15. (a)

In the given statement assumption I and II are implicit.

16. (d)

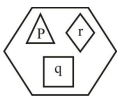
From the statements I and II–



Thus, statement I and II both are not sufficient to answer the given question.

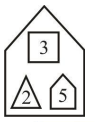
17. (b)

Just as,



$\Rightarrow 6\{(3 + P) + (4 + q) + (4 + r)\}$

And,



$\Rightarrow 5\{(4 + 3) + (3 + 2) + (5 + 6)\}$

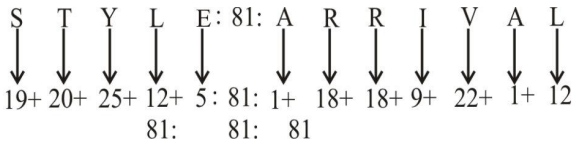
Same as,

$\Rightarrow 4\{(6+4) + (5+3) + (4+2)\}$

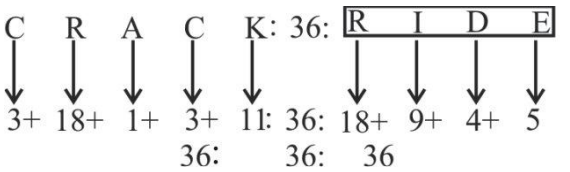
$= 4[10 + 8 + 6] = 96$

18. (b)

Just as,



Same as,



19. (b)

Just as,

Charger $\rightarrow 3 + 8 + 1 + 18 + 7 + 5 + 18 = 60$

Similarly,

Topper $\rightarrow 20 + 15 + 16 + 16 + 5 + 18 = 90$

20. (b)

On arranging the the given words is as follows-

(a) LOWELY $\rightarrow$ YELLOW

(b) IFER $\rightarrow$ FIRE

(c) THIWE $\rightarrow$ WHITE

(d) WRONB $\rightarrow$ BROWN

Except of FIRE, all others are colours name.

Hence, option (b) is odd one.

21. (d)

Just as,

From pattern I

$$\frac{(8+2)+(12+4)}{2} = \frac{26}{2} = 13$$

From pattern II

$$\frac{(16+4)+(24+8)}{2} = \frac{52}{2} = 26$$

Same as,

From pattern III

$$\frac{(14+2)+(22+?)}{2} = 22$$

$16 + 22 + ? = 44$

$? = 44 - 38$

$? = 6$

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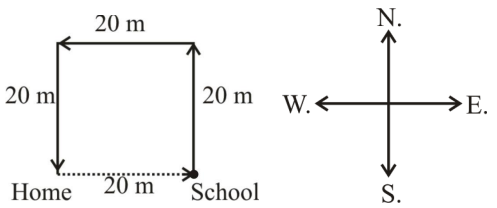
22. (a)

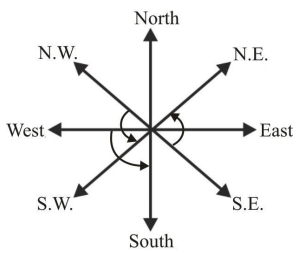
According to the question,



Hence, Shortest distance between school and his home is 20m.

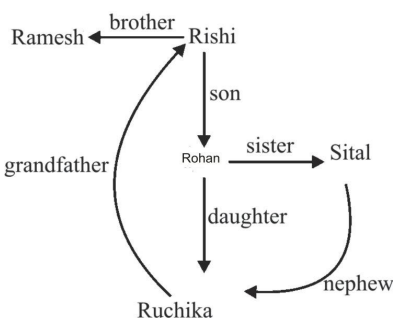
23. (d)

The changed direction is obtained by rotating 90^0 anticlockwise from the direction, thus rotating 90° clock wise from the west direction will give the south direction.



24. (c)

On drawing blood relation diagram according to the question,



It is clear from the above blood relation diagram that Rohan is the son of Rishi.

25. (d)

Given,

$$63\ 7\ 5\ 4 = 49$$

From option (a),

$$63 \times 7 - 5 \div 4 = 49$$

$$\Rightarrow 441 - \frac{5}{4} = 49$$

$$\Rightarrow \frac{1764-5}{4} = 49 \quad = \frac{1759}{4} \neq 49$$

From option (b),

$$63 + 7 \div 5 - 4 = 49$$

$$\Rightarrow 63 + \frac{7}{5} - 4 = 49$$

$$\Rightarrow \frac{315+7-20}{5} = 49$$

$$\Rightarrow \frac{302}{5} \neq 49$$

From option (c),

$$63 + 7 - 5 \div 4 = 49$$

$$\Rightarrow 70 - \frac{5}{4} = 49$$

$$\Rightarrow \frac{280-5}{4} = 49$$

$$\Rightarrow \frac{275}{4} \neq 49$$

From option (d),

$$63 \div 7 \times 5 + 4 = 49$$

$$\Rightarrow 9 \times 5 + 4 = 49$$

$$\Rightarrow 45 + 4 = 49$$

$$\Rightarrow 49 = 49$$

Hence option (d) is correct.

26. (b)

The first microprocessor 4004 was made by Intel company. This processor was invented in 1969 which is made up of a 4 bit processor and 2300 transistors.

27. (d)

Plotter is an output device. It is such a device as prints charts, graph, Image, linegraph etc on the hard copy. Drum pen plotter and Flatbed plotters, both are types of plotter. Along with the 3-D printing, it includes banner, poster printings etc. Monitor, printer, earphone, disk etc are examples of output device.

28. (d)

Plotter, Printer and Monitor are output devices whereas Touch screen is an input device.

29. (d)

Daisy wheel printer is a type of impact printer. It was invented by David S. Lee in 1969 but its commercial production started in 1972. All printers produce output in the form of hard copy.

30. (c)

In computing 1 Nibble equal to 4 bit

1 bit = 0 or 1
4 bits = 1 Nibble
8 bits = 1 Byte
1024 Bytes = 1 KB
1024 KB = 1 MB
1024 MB = 1 GB
1024 GB = 1 TB
1024 TB = 1 PB
1024 PB = 1 EB
1024 EB = 1 ZB
1024 ZB = 1 YB

31. (d)

10^{-9} Nanobyte = 1 byte
1024 Byte = 1 Kilobyte

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32. (d)
Out of the above units, Megabyte is the smallest unit of data storage in a computer.

33. (d)
There are three computer networking devices such as NIC, Router, Switch where as a USB drive is a data storage device.
USB drive- A USB drive is a device used to store data that consists of flash memory and an integrated Universal Serial Bus (USB) interface included. Most USB flash drives are removable and rewritable. It is small, durable and reliable. There are bigger their storage space, the faster they will work.

34. (b)
The datagram approach to packet switching is used by switching at the network on the internet. In this network the two delivery mechanisms Internet Protocol versions IPv4 and IPv6 are used by TCP/IP protocols. The IPv4 address is a 32-bit number that is written in decimal digits of 8-bit fields. Each field is represented by 8-bit field that represents a byte. The IPv6 address is a 128-bit number.

35.(b)
TCP is a short form transmission control protocol. The function of TCP is to break the information and message in to pieces so that data can be delivered to the target through IP, after which TCP again converts the pieces of data same form.

36. (d)
Pull quotes are short sentences usually a quote from someone important to the story, but sometimes just a short, interesting sentence set off from body text to grap the reader's attention. Pull quotes should be short from a few words to a few lines.

37. (a)
Shading option or feature in MS - Word 365 is used to change the color behind the selected paragraph or table cell.

38. (c)
The Home tab is the default tab in Microsoft Word. It has five groups of related commands - clipboard, font, paragraph, styles and editing. It helps you change document settings like font size, adding, bullets, adjusting, styles and many other common features.

39. (a)
The internet is a global system for interconnected computer networks that use the internet protocol suite (TCP/IP) for communications between networks and devices. It includes private, public, educational, businness, networks while HTML is a language used to create webpages.

40. (a)
The Internet is the global system of interconnected computer network that uses the internet protocol suite (TCP/IP) to communciate between network and devices. It is a network of networks that consists of private, public, academic, business and government networks of local to global scope.

41. (a)
It was on August 15, 1995 Videsh Sanchar Nigam Limited formally launched the Internet for the Indian Public.

42. (a)
XHTML stands for Extensible Hyper Text Markup Language. This is a language used on the world wide web (WWW). It is a software language. It is a feature of HTML and XML language are included, where are all other browsers.

43. (b)
The number of websites you visit during a period of time, it displays the history list to all those who have viewed the page. History list stores the information of all those pages in the browser.

44. (d)
Alta Vista is a search engine developed in December 1995. A browser is an application program that allows HTML files to be opened on the internet.

45. (b)
The systematic process of solving an issue is called, Trouble shooting. Trouble shooting is a systematic approach to problem solving that is often used to find and correct issues with complex machines, electronics, computers and software systems.

46. (c)
Total prime factors $\{(16)^7 \times (27)^6 \times 5^9\}$

$$= \left(2^4\right)^7 \times \left(3^3\right)^6 \times 5^9$$
$$= 2^{28} \times 3^{18} \times 5^9$$
$$= 28 + 18 + 9 = 55$$

47. (c)
From the given expression,

$$45 - [38 - \{80 \div 4 - (8 - 12 \div 3) \div 4\}]$$
$$= 45-[38-\{80\div4-4\div4\}]$$
$$= 45-[38-\{20-1\}]$$
$$= 45-[38-19]$$
$$= 45-19= 26$$

48. (b)
$\frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}$

For equaling denominator we have to multiply and divide each fraction by LCM of 3, 4, 5 and 6 = 60.

$$\Rightarrow \frac{2}{3}\times\frac{60}{60}, \frac{3}{4}\times\frac{60}{60}, \frac{4}{5}\times\frac{60}{60}, \frac{5}{6}\times\frac{60}{60}$$

$$\Rightarrow \frac{40}{60}, \frac{45}{60}, \frac{48}{60}, \frac{50}{60}$$

Hence, biggest fraction $= \frac{5}{6}$

Smallest fraction $= \frac{2}{3}$

Required difference $= \frac{5}{6} - \frac{2}{3} = \boxed{\frac{1}{6}}$

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49. (a)

If fraction is $\frac{x}{y}$

$\Rightarrow \quad \frac{x+6}{y} = \frac{x}{y} + \frac{3}{4}$

$\Rightarrow \quad \frac{x+6}{y} - \frac{x}{y} = \frac{3}{4}$

$\Rightarrow \quad \frac{6}{y} = \frac{3}{4}$

$\Rightarrow \quad y = 8$

50. (d)

According to the question,

First number = 158–4 = 154

Second Number = 215 – 5 = 210

```
154)210(1
    154
     56)154(2
        112
         42)56(1
            42
            14)42(3
               42
               ××
```

Hence, the greatest required number = 14

51. (a)

The required number = LCM of 6, 8, 12 and 16

On finding the LCM by common division method,

2	6,	8,	12,	16
2	3,	4,	6,	8
2	3,	2,	3,	4
2	3,	1,	3,	2
3	3,	1,	3,	1
	1,	1,	1,	1

LCM = 2 × 2 × 2 × 2 × 3 = 48

52. (a)

$\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{g}{h} = \frac{1}{3}$

$\frac{pa}{pb} = \frac{qc}{qd} = \frac{re}{rf} = \frac{sg}{sh} = \frac{1}{3}$

$\frac{a}{b} = \frac{c}{d} = k \Rightarrow k = \frac{a+c}{b+d}$

$\because \frac{pa+qc+re+sg}{pb+qd+rf+sh} = \frac{1}{3}$

(pa+qc+re+sg):(pb+qd+rf+sh)=1:3

53. (c)

According to the question,

(a – b) of 40% = (a + b) of 20%

$\Rightarrow \frac{(a-b)\times 40}{100} = \frac{(a+b)\times 20}{100}$

$\Rightarrow$ 40a – 40b = 20a + 20b

$\Rightarrow$ 20a = 60b

$\Rightarrow$ a = 3b

$\frac{a}{b} = \frac{3}{1}$

Required percentage $= \frac{1}{3} \times 100$

$= \frac{100}{3}\%$

54. (c)

Let the length of rectangle is 5x and breadth is 4x

Area of rectangle = 5x × 4x = $20x^2$

According to the question

Area of square $\times \frac{9}{20}$ = Area of rectangle

Area of square $\times \frac{9}{20} = 20x^2$

Area of square $= \frac{400x^2}{9}$

Side of square $= \frac{20x}{3}$

$\frac{\text{Perimeter of rectangle}}{\text{Perimeter of square}} = \frac{2\times(5x+4x)}{4\times\frac{20x}{3}}$

$= \frac{18x\times 3}{80x} = \frac{27}{40}$

Required ratio = 27 : 40

55. (a)

Father's 1 day work $= \frac{1}{8}$ th part

Son's 1 day work $= \frac{1}{7}$ th part

(Father + Son)'s two days work $= \frac{1}{8} + \frac{1}{7} = \frac{15}{56}$

(Father + Son)'s 2 × 3 days work $= \frac{15}{56} \times 3 = \frac{45}{56}$

Remaining work $= 1 - \frac{45}{56} = \frac{11}{56}$

The remaining work after the work done by the father on 7th day

$= \frac{11}{56} - \frac{1}{8} = \frac{4}{56} = \frac{1}{14}$

$\because$ On 8th day son will do $\frac{1}{14}$ of the work in $\frac{1}{2}$ day

$\therefore$ Total time $= 7 + \frac{1}{2} = 7\frac{1}{2}$ days.

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56. (b)

According to the question,

Let the real speed of train is x km/hr.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\frac{36}{x} - \frac{36}{x+4} = \frac{6}{60}$$

$$36\left(\frac{x+4-x}{x^2+4x}\right) = \frac{1}{10}$$

$x^2 + 4x - 1440 = 0$

$x^2 + 40x - 36x - 1440 = 0$

$x(x + 40) - 36(x + 40) = 0$

$(x + 40)(x - 36) = 0$

$x - 36 = 0 \Rightarrow x = 36$ km/h

57. (c)

Given

Interest Rate = R/2 = 10/2 = 5% (Half yearly)

Time = 2 Years = 4 Half yearly

Let Principal = P

$$P\left[\left(1+\frac{R}{100}\right)^T - 1\right] - \left(\frac{P\times R\times T}{100}\right) = 124.05$$

$$P\left[\left(1+\frac{5}{100}\right)^4 - 1\right] - \left(\frac{P\times 5\times 4}{100}\right) = 124.05$$

$$P\left[\frac{21\times21\times21\times21 - 20\times20\times20\times20}{20\times20\times20\times20}\right] - \left(\frac{P\times5\times4}{100}\right) = 124.05$$

$$P\left[\frac{194481-160000}{160000}\right] - \frac{P\times5\times4}{100} = \frac{12405}{100}$$

$$P\left[\frac{34481-32000}{160000}\right] = \frac{12405}{100}$$

$$P\left[\frac{2481}{1600}\right] = 12405$$

$$P = \frac{12405\times1600}{2481} = ₹8000$$

58. (c)

Let the cost price of the item sold at 25% profit = 2x

Cost of item sold at 15% loss = x

According to the question,

$$\frac{2x\times125}{100} + \frac{x\times85}{100} = 3x + 35$$

$$\frac{250x+85x}{100} = 3x + 35$$

$335x - 300x = 3500$

$35x = 3500$

$x = 100$

Hence, cost of second item = 2x = ₹200

Hence the required sum = 100 + 200 = ₹300

59. (b)

Given,

$$\frac{x}{2} + \frac{2}{y} = 1$$

$xy + 4 = 2y$

$2y - xy = 4$

$$y = \frac{4}{2-x} \quad \text{_____(i)}$$

$$\frac{y}{2} + \frac{2}{z} = 1$$

$yz + 4 = 2z$ _____(ii)

On putting the value of y in equation (ii),

$$\frac{4}{(2-x)}\times z + 4 = 2z$$

$4z + 8 - 4x = 4z - 2xz$

$8 - 4x = -2xz$

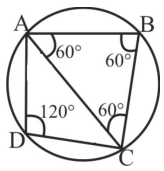
$4 - 2x = -xz$

$2x = 4 + xz$

$$1 = \frac{4}{2x} + \frac{xz}{2x}$$

$$\text{or } \frac{2}{x} + \frac{z}{2} = 1$$

60. (c)



$\because$ In any cyclic quadrilateral the sum of opposite angle of quadrilateral is 180º

Hence,

$\angle CDA + \angle ABC = 180^0$

$\angle CDA + 60° = 180^0$

$\angle CDA = 180^0 - 60^0 = 120^0$

61. (d)

Total balls = 2 + 6 + 4 = 12

$$\text{Probability of green balls} = \frac{6_{c_2}}{12_{c_2}} = \frac{\frac{6\times5}{2\times1}}{\frac{12\times11}{2\times1}}$$

$$= \frac{30}{12\times11}$$

$$= \frac{5}{22}$$

62. (d)

$$\left[\left(\frac{5}{8}\right)^{-7}\times\left(\frac{8}{5}\right)^{-4}\times\left(\frac{1}{4}\right)^{-3}\right]^{-3}$$

$$\Rightarrow\left[\left(\frac{8}{5}\right)^{7-4}\times4^3\right]^{-3}$$

$$\Rightarrow\left[\frac{8^3}{5^3}\times4^3\right]^{-3}$$

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$$\Rightarrow \left[\frac{(32)^3}{5^3}\right]^{-3}$$

$$= \left[\left(\frac{5}{32}\right)^3\right]^3$$

$$= \left(\frac{5}{32}\right)^9$$

63. (b)

Let the present age of Jay and Jog is 5x and 2x years respectively.

According to the question,

$5x + 2x = 63$

$7x = 63$

$x = 9$

$\therefore$ Ratio of their ages after 9 years $= (5\times9+9) : (2\times9+9)$

$= 54 : 27$

$= 2 : 1$

64. (c)

Let pipe A fills a tank in x hours then pipe B will fill that tank in $\frac{x}{4.5}$ hours because the efficiency of B is 4.5 times more than A.

According to the question-

$$\left(\frac{1}{x}+\frac{4.5}{x}\right)-\frac{1}{9}=\frac{1}{7.5}$$

$$\frac{5.5}{x}-\frac{1}{9}=\frac{2}{15}$$

$$\frac{49.5-x}{9x}=\frac{2}{15}$$

$\Rightarrow 5(49.5 - x) = 6x \Rightarrow 247.5 - 5x = 6x$

$\Rightarrow 11x = 247.5$

$\Rightarrow x = \frac{2475}{110}$

$\Rightarrow x = 22.5$ hours

65. (b)

$8 : 4 :: 3.2 : x$ and $3 : 6 :: 6 : y$

$8 \times x = 4 \times 3.2$ $\quad$ $3 \times y = 6 \times 6$

$x = 1.6$ $\quad$ $y = 12$

Then,

$$\frac{x}{y}=\frac{1.6}{12}=\frac{16}{120}=\frac{2}{15}$$

$\therefore$ $x : y = 2 : 15$

66. (a)

Heat supplied to a system is measured in Joule or Calorie.

1 Calorie = 4.18 Joule

67. (c)

By the formula-

$$\text{density} = \frac{\text{mass}}{\text{volume}} \quad \text{.....(i)}$$

(Mass is same for all bodies)

According to the equation (i), which body has less volume, has more density.

Hence, V_1 has density. (given: $V_4 > V_2 > V_3 > V_1$)

68. (d)

F = Ma

$$a = \frac{F}{M} = \frac{1.5}{5} = 0.3 \text{ m/sec}^2$$

Then $\quad S = ut + \frac{1}{2}at^2$

$$S = 0\times2+\frac{1}{2}0.3\times(2)^2$$

$S = 0 + 0.3 \times 2$

$\boxed{S = 0.6\text{m}}$

69. (c)

The rate of doing work is called power. The S.I unit of power is the watt.

$$1 \text{ Watt} = \frac{1 \text{ Joule}}{\text{second}} = \frac{1\text{N}\times\text{m}}{\text{second}} = \frac{\text{kg}\times\text{m}\times\text{m}}{\text{sec}^2\times\text{sec}}$$

$$1 \text{ Watt} = \frac{\text{m}^2\times\text{kg}}{\text{second}^3}$$

$\boxed{1 \text{ Watt} = 1 \text{ kg} - \text{m}^2\text{second}^{-3}}$

70. (a)

Heat capacity, $C = ms$

Then $\frac{C_1}{C_2}=\frac{m_1s_1}{m_2s_2}$

For material made of same metal $s_1 = s_2$

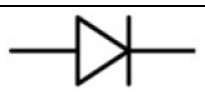
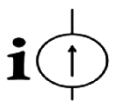
$$\boxed{\frac{3}{4}=\frac{m_1}{m_2}}$$

71. (a)

The resistance of a choke coil is low (0.5Ω).

- The inductance of a choke coils is about 0.2 H.
- Choke coil works on the principle of self induction.
- A choke coil is an inductor used to block higher frequency.

72. (b)

Active source	Passive source
	
	

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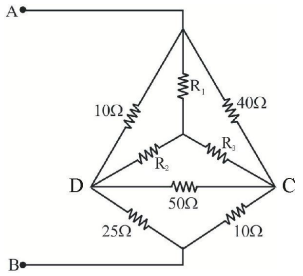
73. (b)

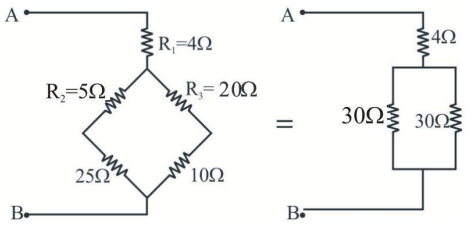
In the given circuit 10 Ω, 40Ω and 50Ω delta connection convert into star connection.



$$\therefore \quad R_1 = \frac{40\times10}{50+40+10} = 4\Omega$$

$$R_2 = \frac{10\times50}{50+40+10} = 5\Omega$$

$$R_3 = \frac{40\times50}{50+40+10} = 20\Omega$$



$$\therefore \; R_{AB} = 4+30||30 = 4+\frac{30\times30}{30+30} = 4+15$$

$$R_{AB} = 4+15$$

$$\boxed{R_{AB} = 19\Omega}$$

74. (c)

Given−

$L_1 = 10mH, \qquad L_2 = 15mH$

$L_{eq} = 40mH$

According to question,

$L_{eq} = L_1 + L_2 + 2M$ (Additive)

$40 = 10 + 15 + 2M$

$$M = \frac{40-25}{2}$$

$M = 7.5$

$L_{eq} = L_1 + L_2 - 2M$ (Substractive)

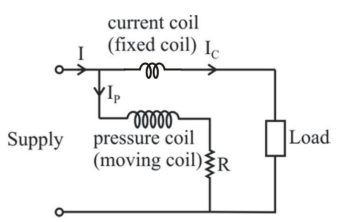
$L_{eq} = 10 + 15 - 2\times7.5$

$L_{eq} = 10 + 15 - 15$

$\boxed{L_{eq} = 10mH}$

75. (d)

Electrodynamometer wattmeter:-



Moving coil or Potential coil -

(i) The moving coil is connected across the load carries current proportional to voltage. It is also called potential coil or pressure coil.

(ii) A high non-inductive resistance is connected in series with potential coil (P.C.) to limit the current to a small value.

Fixed coil or Current coil -

(i) The fixed coils or current coil are connected in series with the load and carry the load current.

⇒ Both fixed and moving coil are air-cored.

76. (d)

An SMD tantalum capacitor has a capacitance range of 0.1μF to 100μF.

- It has voltage rating of 1V to 20V.
- It can operate over a higher temperature range.
- It has low ripple current rating.

77. (a)

The value of susceptibility of vacuum is zero because vacuum can not be magnetized. But relative permittivity of vacuum is one.

Susceptibility - It is defined how much, magnetism is developed in a material due to an external magnetic field.

78. (a)

Relative permittivity is the ratio of the permittivity of a substance to the permittivity of space or vacuum.

$$\boxed{\varepsilon_r = \frac{\varepsilon}{\varepsilon_0}}$$

Where, $\varepsilon_r \rightarrow$ relative permittivity

$\varepsilon \rightarrow$ absolute permittivity

$\varepsilon_0 \rightarrow$ Permittivity of vacuum

The value of relative permittivity of vacuum is 1.

79. (a)

Inductance of coil $(L) = \frac{\mu_0\mu_r N^2 A}{\ell}$ the inductance of a coil depend on turns, length, area of a coil and permeability.

80. (c)

The percentage current carrying capacity of Aluminum is 75 % of current carrying capacity of copper.

Current carrying capacity- Current carrying capacity of a conductor is defined as how much load a conductor can carry. When the current flows through the conductor a certain level of heat generates which can further increases up-to the melting temperature of the insulation or insulating material.

These factors are-
- Conductor size
- Ambient temperature
- Installation conditions.

81. (c)

Fermi energy is determined as the energy point where the probability of occupation of an electrons is exactly 50% or 0.5 i.e. $\frac{1}{2}$ for the intrinsic semi conductor,

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since electrons and holes are always created in pairs, n = p = n_i.
Hence there are equal number of hole and electrons in valence band and conduction band respectively.

82. (d)
Doping materials are called impurities because they alter the crystal structure of the pure semiconductors.

- When a small amount of trivalent impurity like Aluminium (Al) is added to a pure silicon semiconductor, then it is called P-type semiconductor.
  Example of trivalent impurity-
  Al, B, Ga, In.
- When a small amount of pentavalent impurity like arsenic, antimony and phosphorus is added to a pure semiconductor then it is known as n-type semiconductor.

83. (a)
We know that-

Band gap energy $E_g = \frac{hC}{\lambda}$

Where, h - Plank's constant (6.63×10^{-34})
C - Speed of light $(3 \times 10^8$ m/s)

Wavelength $\lambda_{Si} = \frac{hc}{E_g} = \frac{6.63\times10^{-34}\times3\times10^8}{1.1\times1.6\times10^{-19}}$

$= 1130.11$ nm

$\boxed{\lambda_{Si} \simeq 1127.27\text{nm}}$

$\lambda_{Ge} = \frac{6.63\times10^{-34}\times3\times10^8}{0.67\times1.6\times10^{-19}}$

$= 1855.41$ nm

$\boxed{\lambda_{Ge} \simeq 1850.75\text{nm}}$

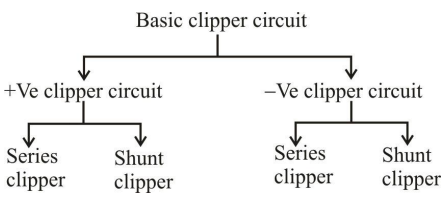
84. (a)
Thermal runaway in BJT will take place if the quiscent point is, $V_{CE} > \frac{V_{CC}}{2}$

- Thermal runaway in BJT avoided by

$$V_{CE} < \frac{V_{CC}}{2}$$

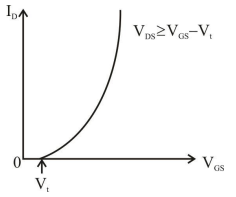
85. (a)
The turn off time of MOSFETs is less as compared to BJT because minority carrier storage time is absent in MOSFET and MOSFET operates at maximum frequencies.

86. (c)
Clipper circuit uses an arrangement of diode and voltage source along with resistor to clip either negative or positive part of the input waveform.



87. (b)
In a two stage CE amplifier circuit, the ac collector resistance of the first stage depends on the input impedance of second stage

88. (a)
The $(I_d\text{-}V_{gs})$ characteristics of a MOSFET in the saturation region is Quadratic.



$$I_D = K(V_{GS} - V_{th})^2$$

89. (d)

$$f = \frac{1}{2\pi\sqrt{L\left(\frac{C_1C_2}{C_1+C_2}\right)}}$$

$$C_T = \frac{C_1C_2}{C_1+C_2} = \frac{10\times10}{10+10} = \frac{100}{20} = 5\text{pF}$$

$L = 0.5\mu\text{H}$

$$= \frac{1}{2\pi\sqrt{5\text{pF}\times0.5\mu\text{H}}}$$

$$= \frac{0.159}{\sqrt{5\times10^{-12}\times0.5\times10^{-6}}} = \frac{0.159}{\sqrt{5\times5\times10^{-19}}}$$

$$= \frac{0.159}{5\sqrt{10^{-19}}} = \frac{0.159\times10^9\times\sqrt{10}}{5} = \frac{159\times10^6\times3.16}{5}$$

$$= \frac{502.44\times10^6}{5} = 100\text{MHz}$$

90. (c)
Given,
Upper threshold voltage $(V_T+) = 2.0$ V
Lower threshold voltage $(V_T-) = 1.2$ V
Hysteresis voltage of the Schmitt trigger
$= V_{T+} - V_{T-}$
$= 2.0 - 1.2$
$= 0.8$ Volt

91. (d)
A Timer can be used to make time difference on the triggering circuit. This time delay can be produce by the consumer. In general, a timer circuit contain of R and C combinations. e.g. IC 555 timer.

92. (d)
Given that,
M = 4
I = 600mA

$$\boxed{M = \frac{I}{I_m}}$$

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Where,

I - Required full-scale range

I_m - Full scale deflection of current

M - Multiplying power

$$I_m = \frac{600\times10^{-3}}{4}$$

$I_m = 150mA$

93. (d)

PMMC ammeter have uniform scale because both spring controlled and having deflecting torque varies directly as current.

Deflecting torque $(T_d) = NBId\ell = GI$

$G = \text{Constant} = NB\ell d$

Spring control torque $(T_C) = K\theta$

(K = Spring constant)

For final steady deflection, $T_C = T_d$

$$\theta = \left(\frac{G}{K}\right)I$$

$$\boxed{I = \left(\frac{K}{G}\right)\theta}$$

$$\boxed{I \propto \theta}$$

Advantages of PMMC-

- It has a linear scale.
- The power consumption is very low.
- It has high torque to weight ratio of moving parts.
- Field strength varies from 0.1 wb/m^2 to 1 wb/m^2

94. (b)

Kelvin's bridge is used measure values of resistance below 1 ohm.

Measurement of low resistance (below 1 ohm)

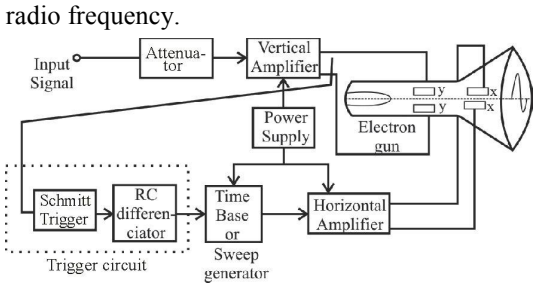
- Kelvin's double bridge method
- Ammeter Voltmeter method
- Potentiometer method

95. (c)

The time base signal in a CRO is a sawtooth signal.

CRO is a very fast X-Y plotter that shows the input signal versus time.

Applications - The CRO are used to analyze the waveforms, transient phenomena and other time-varying quantities from a very low-frequency range to the radio frequency.



96. (a)

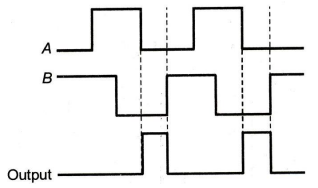
A microphone is classified as acoustical transducer. It converts sound into an electrical signal. The two most common transducer types are dynamic and condenser another microphone employ a diaphragm a voice coil and a magnet.

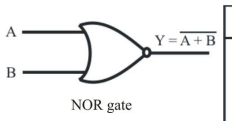
97. (b)

A 5 bit code is called BAUDOT

98. (c)

Given that figure -





Truth Table

A	B	A+B	$\overline{A+B}$
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

In an NOR gate all inputs must be low to provide a high output.

99. (b)

Propagation Delay of logic gate, limit the maximum speed at which circuit can operate.

$$\boxed{t_{pd} = \frac{t_{PHL} + t_{PLH}}{2}}$$

(a) t_{PLH}= Delay time in going from High logic to Low logic.

(b) t_{PHL} = Delay

To eliminate to propagation delay, all flip-flop are provided with a common clock.

Generally propagaton delay ae represented in nano second.

100. (d)

Given that –

n = 8 bit

Digital input = $(1010)_2$

Decimal equivalent of binary = $(10)_{10}$

Reference voltage V_{ref} = 5V

Analog output voltage

$$= \frac{V_{ref}}{2^n} \times \text{Decimal equivalent of binary}$$

$$= \frac{5}{2^4} \times 10$$

Analog output voltage = 3.125 V

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