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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

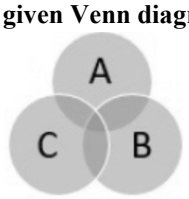
9. Ali Quli Salim and Abu Talib were important poets during the reign of ____.
(a) Aurangzeb (b) Jahangir
(c) Shah Jahan (d) Akbar

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

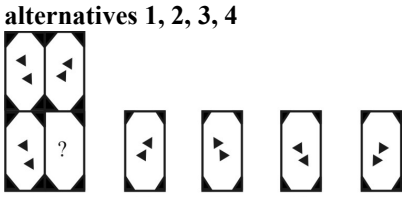
18. 'Gloves' is related to 'Hand' in the same way as 'Cap' is related to '.....'.
(a) Neck (b) Back
(c) Head (d) Foot

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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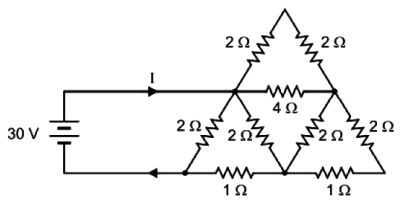
69. Work done will be maximum when the angle between the direction of force and the direction of displacement is.
(a) 45º (b) 0º
(c) 90º (d) 60º

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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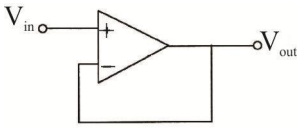
88. .....transistor is most suitable for high frequency circuits :
(a) Hermetically sealed
(b) Grown-diffusion
(c) Rate-grown
(d) Alloy

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

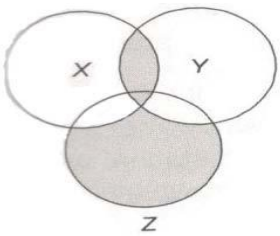
94. The purpose of a shunt in an ammeter is to-
(a) Increase the sensitivity of the ammeter
(b) Bypass the current
(c) Increase the sensitivity of the ammeter or by pass the current
(d) Increase the resistance of the ammeter

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

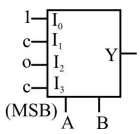
97. A code in which each decimal digit is represented by a group of 4 binary bits is
(a) BCD (Binary Coded Decimal)
(b) Gray code
(c) Excess 3 code
(d) ASCII code

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

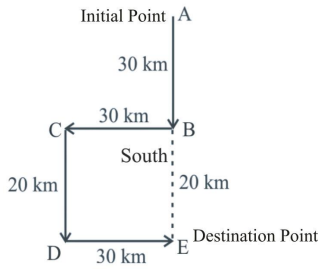
Same as,

(Opposite alphabetical order)

C	H	A	I	R
↓	↓	↓	↓	↓
X	S	Z	R	I
24	19	26	18	9

12. (d)

According to the question,

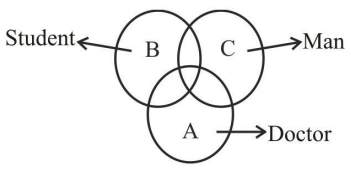


AE = AB + BE (∵ BE = CD = 20 km)

= 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

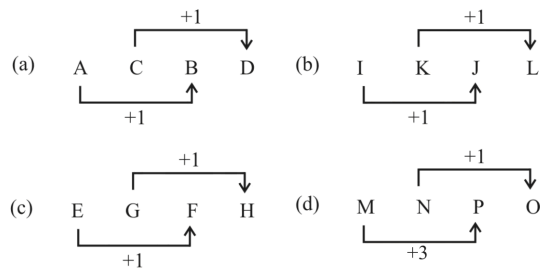
Same as,

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

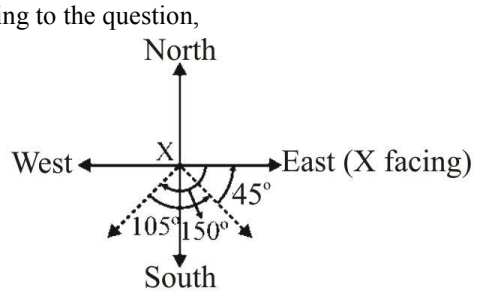
Hence option (a) will complete the series.

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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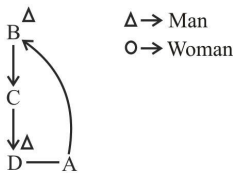
24. (c)

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

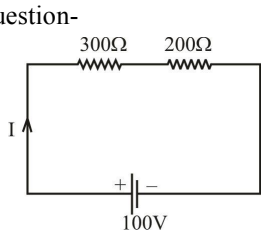
Q = 2400 Joule C = ?

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-

$$V = 100 \times \frac{300}{500} \text{ (by voltage divider rule)}$$

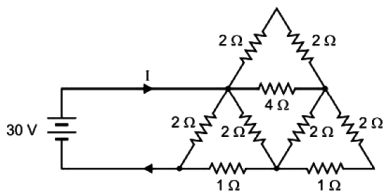
V = 60V

72. (a)

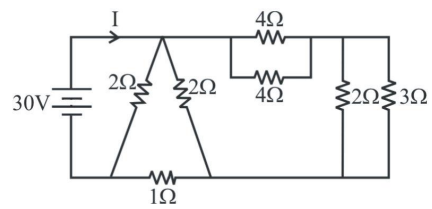
The units of absolute viscosity is Pascal-Second or $\frac{N.sec}{m^2}$

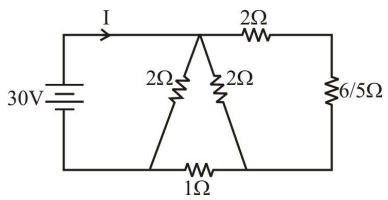
73. (c)

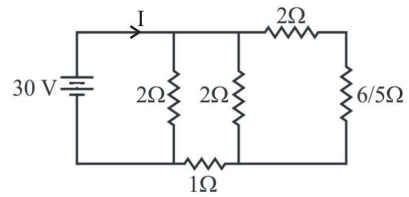
According to question -

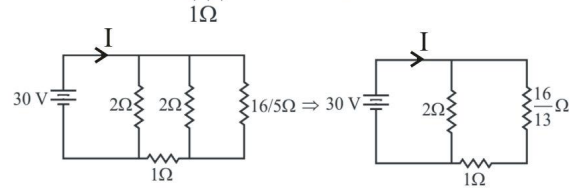


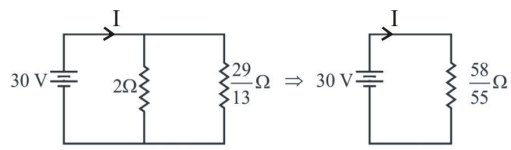
When break the circuit











$$I = \frac{V}{R_{eq}} = \frac{30 \times 55}{58} = 28.45A$$

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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.

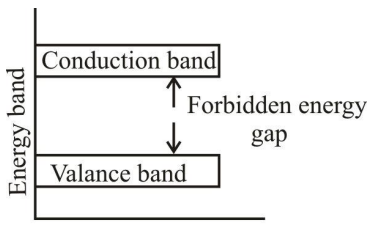
M = Magnetization

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

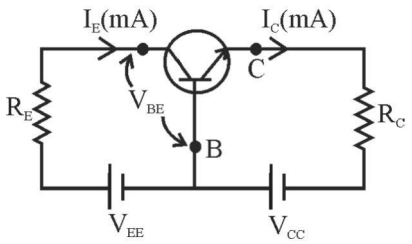
83. (d)

- 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)

$$\%\eta = \frac{\text{Average DC output power}}{\text{AC Input power}} \times 100\%$$

$$\%\eta = \frac{P_{dc}}{P_{ac}} \times 100\% = \frac{I_{dc}^2 R_L}{I_{rms}^2 (R_f + R_L)} \times 100\%$$

$$= \frac{\frac{4I_m^2}{\pi^2} \times R_L}{\frac{I_m^2}{2}(R_f + R_L)} \times 100\% = \frac{800}{\pi^2} \times \frac{R_L}{R_f + R_L}\%$$

$$\boxed{\%\eta = 81.2 \frac{R_L}{R_f + R_L}\%}$$

($R_f = 0$)

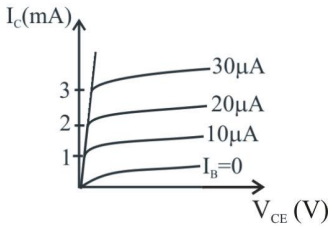
$\boxed{\% \ \eta = 81.2\%}$

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 $= -\frac{1}{R_C}$

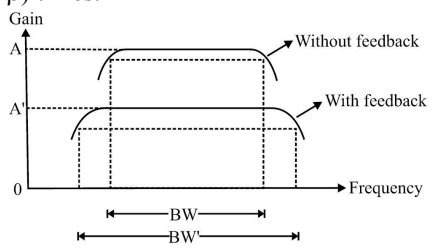
- β can be determined by the output characteristics of the CE-configuration.

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)

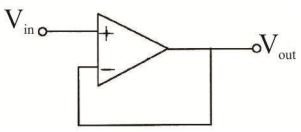
In negative feedback amplifier, its bandwidth increases by (1+Aβ) times.



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)

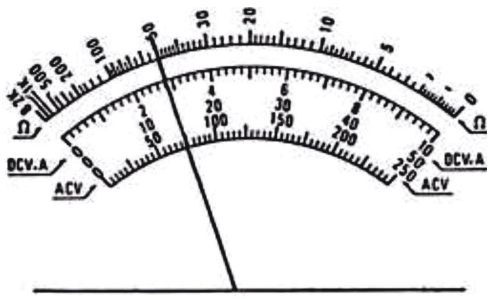
Correctness in measurement requires both accuracy and precision.

- 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.

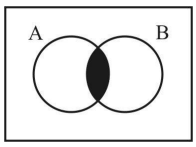
Note - Any code can be BCD only if its decimal number lies between 0-9. (eg - 8421)

98.(d)

According to Set theory in logic theorem-

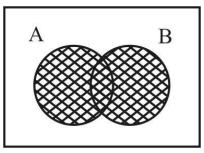
AND Circuit,

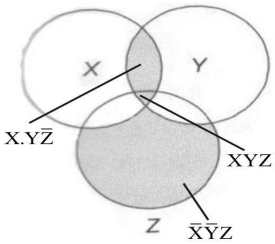
$$\Rightarrow Y = A.B = A \cap B$$



OR Circuit,

$$\Rightarrow Y = A + B = A \cup B$$



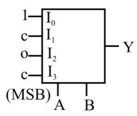


$$= XY\bar{Z} + XYZ + \bar{X}\bar{Y}Z \qquad (\because Z + \bar{Z} = 1)$$

$$= XY(\bar{Z} + Z) + \bar{X}\bar{Y}Z$$

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

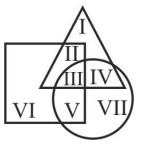
9. Who is the author of the book Geet Govindam written during medieval India?
(a) Meerabai (b) Tulsidas
(c) Kabir (d) Jayadev

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

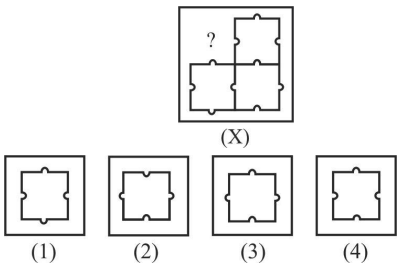
18. Select the option that is related to the sixth letter-cluster in the same way as the first letter-cluster is related to the second letter-cluster and the third letter-cluster is related to the fourth letter-cluster.
GCN : LHS :: OQU : TVZ :: ? : KRY
(a) GNT (b) ENS
(c) DMQ (d) FMT

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

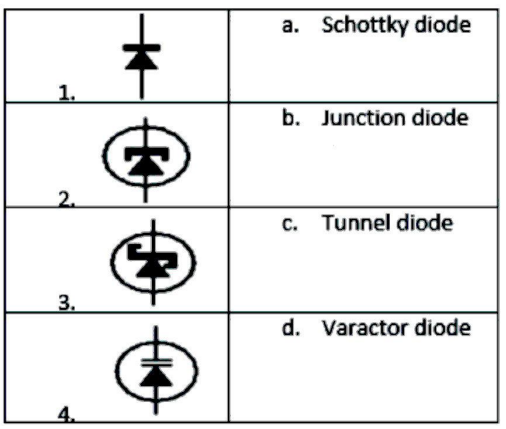
78. Which of the following is not a factor on which the capacitance of a parallel plate capacitor depends?
(a) Area of plates
(b) Medium between plates
(c) Distance between plates
(d) Materials of plates

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

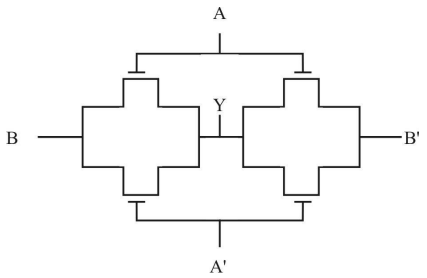
96. LVDT is a Transducer.
(a) Eddy current
(b) Resistance
(c) Magnetostriction
(d) Inductive

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

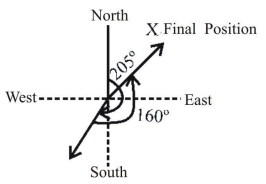
Similarly,

TILDW → WTLID

Note:- Alphabets are arranged in descending order.

12. (a)

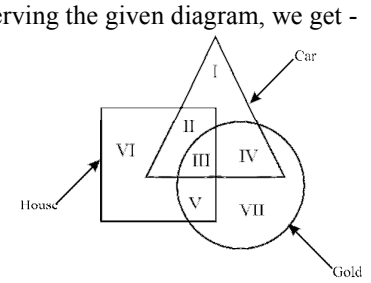
According to the question,



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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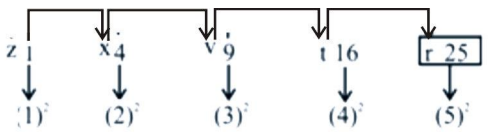
21. (c)

The given series is as follows–



Therefore, $\boxed{? = r25}$

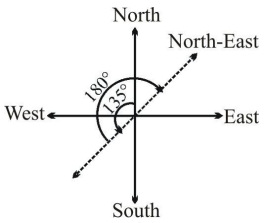
22. (b)

Answer figure (2) will complete the pattern of the question figure.

Hence, option (b) is correct.

23. (b)

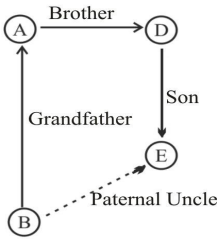
According to the question,



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

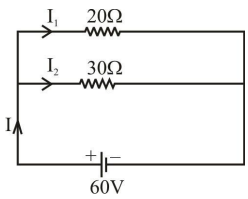
W = ?

$\Rightarrow \quad V = \dfrac{\text{Work done(W)}}{\text{Charge(Q)}}$

$\Rightarrow \quad W = V \times Q = 20\times10 = 200$ 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-

$$I_1 = \frac{I\times30}{20+30} = \frac{5\times30}{50} = 3A$$

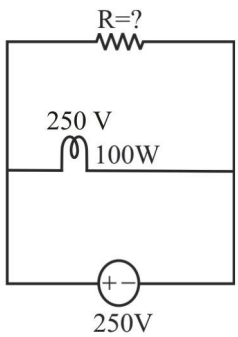
71.(c)

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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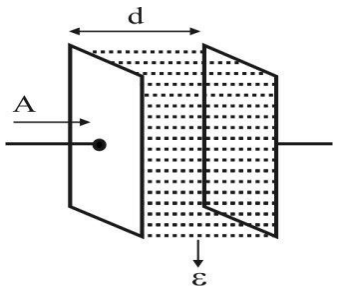
77. (d)

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.

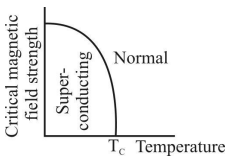
Effect of magnetic field on superconductivity -

$$H_c = H_{c(0)}\left[1 - \left(\frac{T^2}{T_c^2}\right)\right]$$

H_c = critical value of magnetic field

$H_{c(0)}$ = critical magnetic field at 0K

T_c = critical temperature

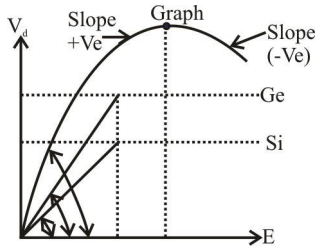


80. (a)

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

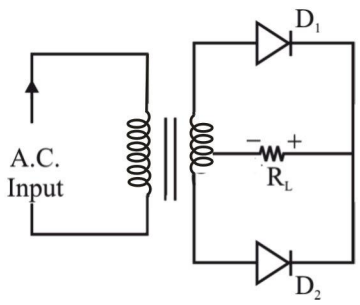
It is used as an inverter.

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,

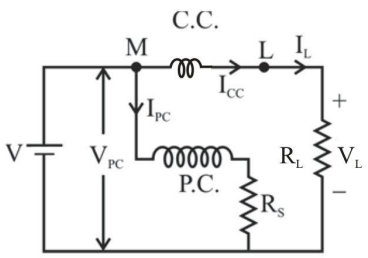
$$\boxed{R_{sh} = \frac{R_m}{\frac{I}{I_m} - 1}}$$

$$I = \frac{R_{sh} + R_m}{R_{sh}} \times I_m$$

$$I = \frac{(0.2+50)}{0.2} \times 2mA$$

I = 502 mA

95. (d)

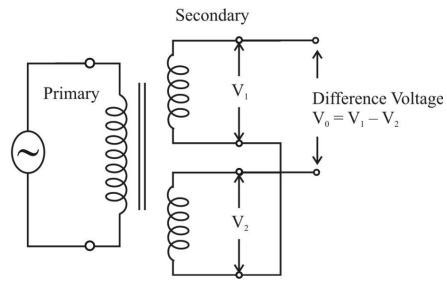


The pressure coil of a wattmeter should be connected on the supply side of the current coil when load impedance is high.

$$\boxed{\%\text{Error} \downarrow = \frac{\Delta R}{R_L \uparrow} \times 100}$$

⇒ 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

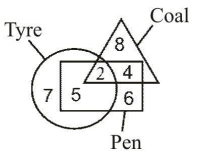
9. Which of the following was NOT built by Shah Jahan?
(a) Shalimar Gardens
(b) Red Fort (Delhi)
(c) Buland Darwaza
(d) Jama Masjid (Delhi)

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

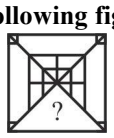
18. Select the option that is related to the fifth letter-cluster in the same way as the fourth letter-cluster related to the third letter-cluster and second letter-cluster is related to the first letter-cluster.
FTPY : JVTA :: NVZG: RXDI :: MPRE: ?
(a) QSVH (b) QRVG
(c) PSUH (d) PRUG

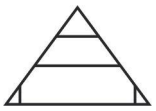
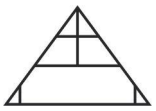
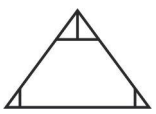
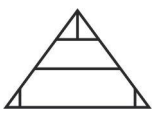
19. In a certain code language.
'living inside houses' is coded as 'ca de mo'.
'snow houses built' is coded as ' ni tp ca'.
'living with snow man' is coded as 'vr hs ni mo'
If 'built with brick' is coded as 'vr aj tp'.
(Note: All codes are two letter codes only)
What is the probable code for 'brick man' 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

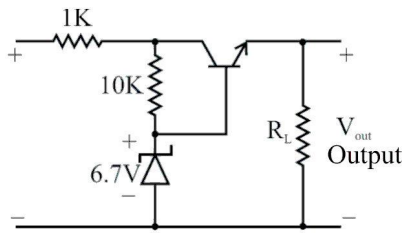
89. If the voltage gain is 100, the decibel voltage gain is

(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

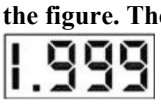
93. Damping of deflecting type instruments is done to

(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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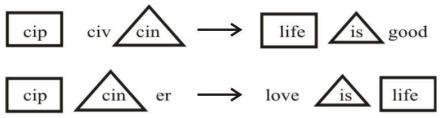
11. (c)

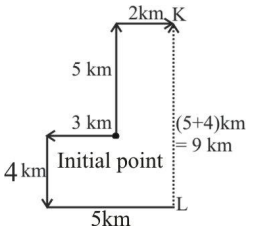
According to the question,



∴ 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 $4 \div 7 + 2 \times 15 = 29$

$\div \rightarrow \times$

$+ \rightarrow \div$

$\times \rightarrow +$

$9 \div 5 + 3 \times 7 = 9 \times 5 \div 3 + 7 = 22$

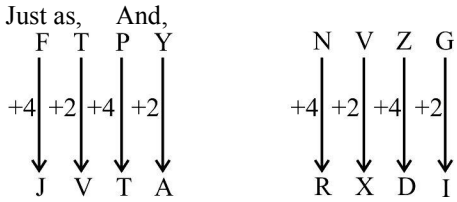
$4 \div 7 + 2 \times 15 = 4 \times 7 \div 2 + 15 = 29$

Hence, $14 \div 5 + 35 \times 9$

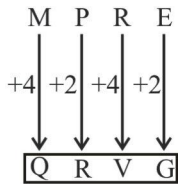
$= 14 \times 5 \div 35 + 9 = 11$

18. (b)

Just as, And,

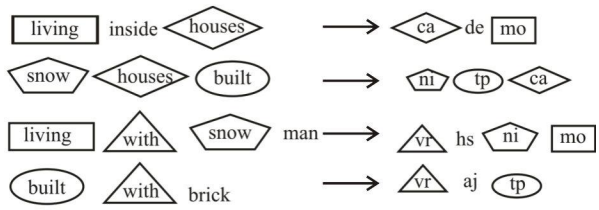


Same as,



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) $14 \times 6 + 1 = 85$

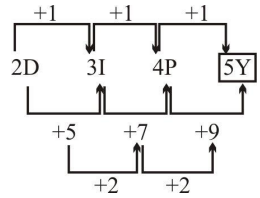
(c) $16 \times 6 + 1 = 97$

(d) $18 \times 6 + 1 = 109 \neq 107$

Hence, option (d) is different from other options.

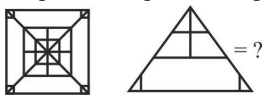
21. (b)

The given series is as follows



22. (b)

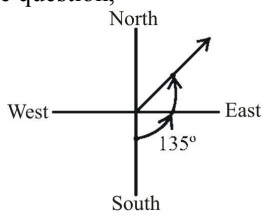
In the given question figure, the answer figure given in option (b) will complete the question figure.



So option (b) is correct.

23. (a)

According to the question,



Hence, the direction of Gautam is North-East.

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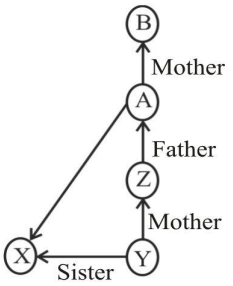
24. (d)

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

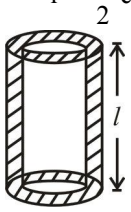
x = 4500

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)

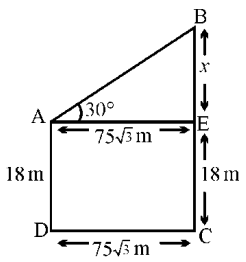
$\left(x - \frac{1}{x}\right)^2 = x^2 + \frac{1}{x^2} - 2$

$\left(x - \frac{1}{x}\right)^2 = 27 - 2$ (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)

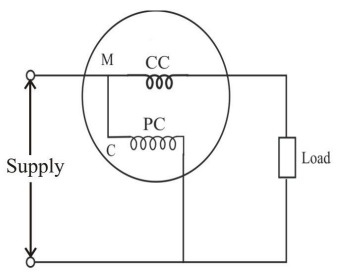
A time-varying flux causes an induced electromotive force" this statement represented by Faraday's law of electromagnetic induction and this induced electromotive force can be given by-

$$\boxed{E = -N\frac{d\phi}{dt}}$$

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.

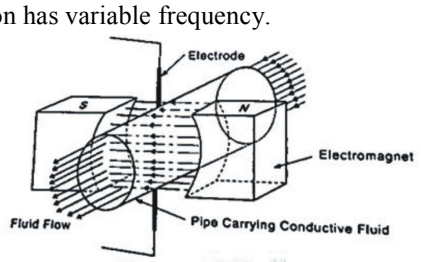
Disadvantage of induction type instrument -

(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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$$\left\{\begin{array}{l}\text{Where,}\\ n_p = \text{Concentration of holes}\\ n_e = \text{Concentration of electrons}\\ n_i = \text{Concentration of intrinsic semiconductor}\end{array}\right\}$$

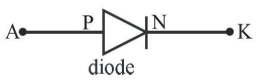
$$n_e = \frac{1.5\times10^{10}\times1.5\times10^{10}}{2.25\times10^{15}}$$

$$n_e = \frac{2.25\times10^{20}}{2.25\times10^{15}}$$

$$\boxed{n_e = 10^5/cm^3}$$

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.

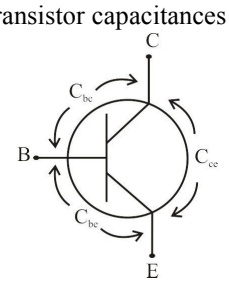
87. (a)

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 = $20\log_{10}(A_V)$

$= 20\log_{10}(100)$

$= 20\log_{10}(10^2)$

$= 20\times2\log_{10}10$

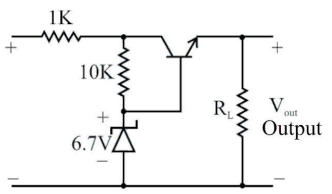
Voltage gain in dB = 40 dB

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

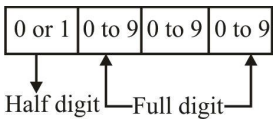
94. (b)

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	

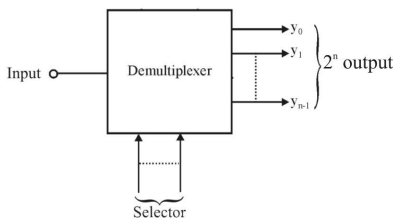
Hence, binary = 110110

$0.375\times2 = 0.750 = 0$
$.750\times2=1.500 \quad = 1$
$.500\times2 = 1.000 \quad = 1$

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

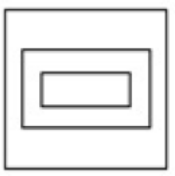
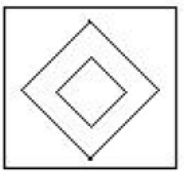
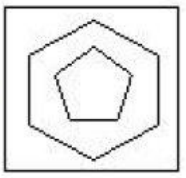
17. Study the given pattern carefully and select the number from among the given options that can replace the question mark (?).

(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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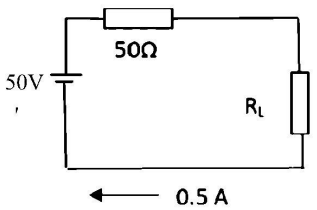
70. The Fahrenheit and Celsius scales converge at _____.

(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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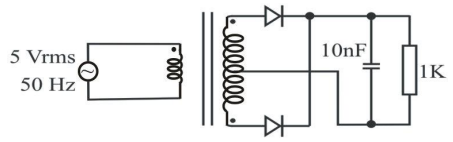
86. Which is the correct waveform across capacitor in the following circuit?



(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

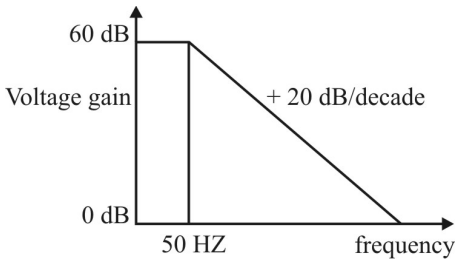
88. For an n-channel E-MOSFET V_{th} =5V, what is the condition to turn ON the device?

(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

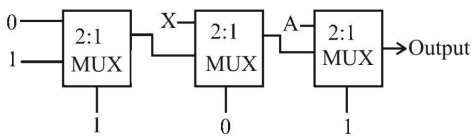
97. Gray code of decimal 3 is :

(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)

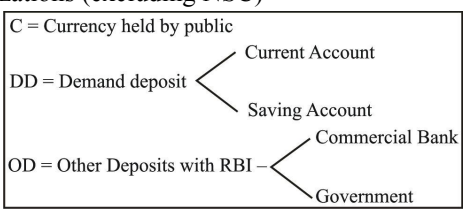
In Indian economy, there are four types of money.

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,

$2 + 9 = 11$
$7 + 5 = 12$
$6 + 7 = 13$

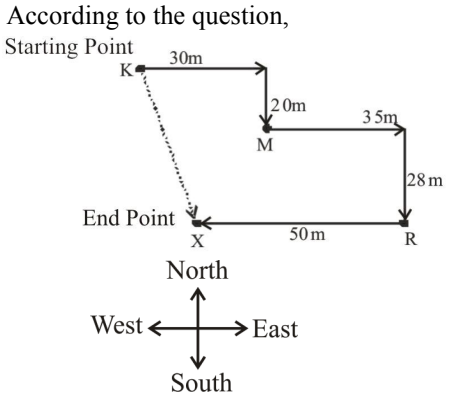
Same as,

$6 + 8 = 14$
$8 + 7 = 15$
$9 + 7 = 16$

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 :

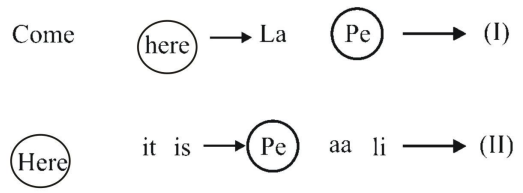
(i) $S > P$ (√)
(ii) $V > Q$ (√)
(iii) $P < V$ (√)

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,

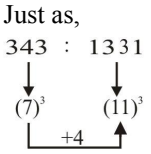
$4 + 5 + 3 + 6 + 3 = ?$

$? = 21$

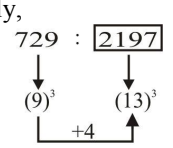
Hence option (d) will be correct.

18. (b)

Just as,



Similarly,



19. (a)

According to the question,

she is [beautiful] → mat mug [bit]

[beautiful] and water → [bit] cap lan

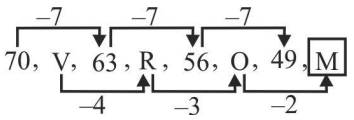
Hence it is clear from above code that 'beautiful' will be written as 'bit'.

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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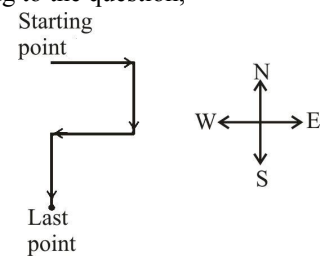
22. (b)

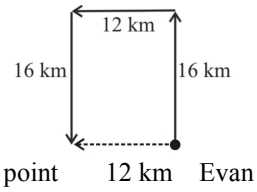
According to the question,



From the given figure, it is clear that Mahesh is in South direction after reaching at the school.

23. (a)

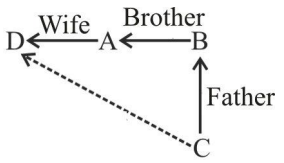
According to the question,



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, $C° = F° = x°$

$$\frac{x°}{5} = \frac{x°-32}{9}$$

$9x° = 5x° - 32 \times 5$

$9x° = 5x° - 160$

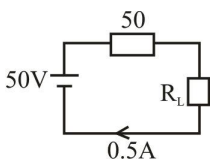
$4x° = -160$

$$x° = -\frac{160}{4}$$

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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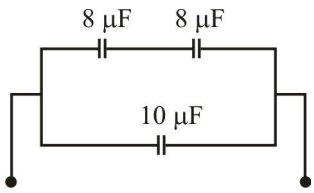
72. (c)



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.

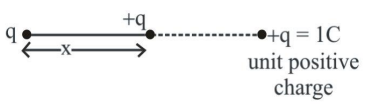
1 unit = 1 kWh

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.

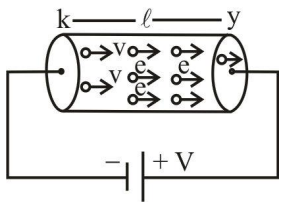
79. (d)

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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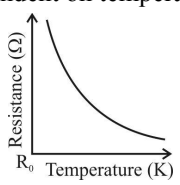
Where, I = flowing current
n = Electron density
e = Charge of electron
A = Area of cross section.

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.

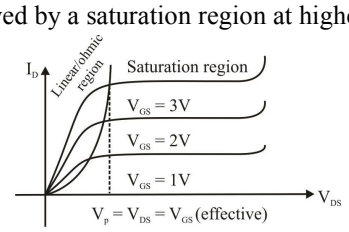
$$C_D \propto e^{\frac{V_D}{\eta V_T}}$$

- Diffusion capacitance is also called storage capacitance and it occurs when the diode is in forward bias.
- Diffusion capacitance $(C_D) = \frac{\tau \cdot I_S}{\eta V_T}$

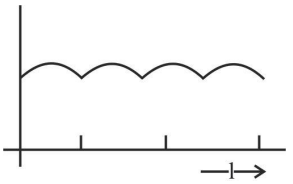
84. (c)
N-type transistors are preferred over p-type transistors because mobility of electrons is more than that of holes.

	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.

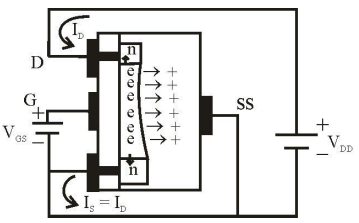


87. (b)
In a Common Emitter amplifier, the unbypassed Emitter resistance provides current-series feedback.

Performance parameter-
- Input impedance increases.
- Provides linear operation for large input signals.
- This current acts as series feedback.

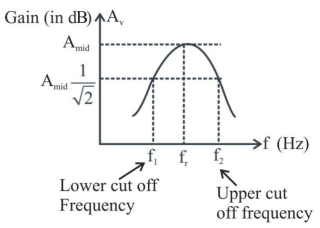
88. (c)
The condition to turn ON the device is

$$V_{GS} > V_{TH}$$
$$V_{GS} > 5V$$



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 $g_3 \quad g_2 \quad g_1 \quad g_0$

$b_3 \quad b_3 \oplus b_2 \quad b_2 \oplus b_1 \quad b_1 \oplus b_0$

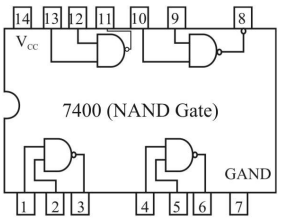
$0 \quad 0 \oplus 0 \quad 0 \oplus 1 \quad 1 \oplus 1$

$0 \quad 0 \quad 1 \quad 0$

Hence the gray code of 0011 will be 0010.

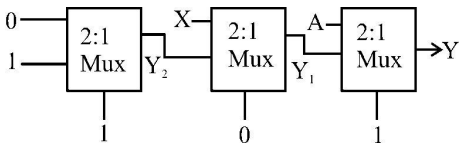
98. (a)

IC 7400 is a NAND gate IC



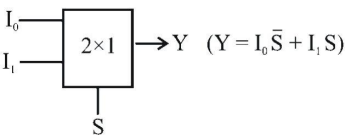
IC No	IC NAME
7400	NAND gate
7402	NOR gate
7404	NOT gate
7408	AND gate
7232	OR gate
7286	EX – OR gate
747266	EX – NOR gate

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

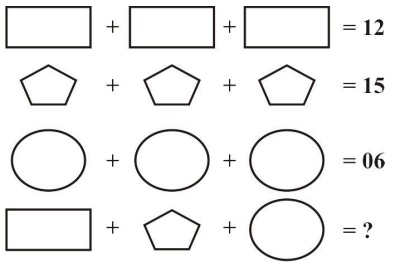
8. Bari Doab is the area between:
(a) Ravi and Ganga (b) Beas and Ravi
(c) Sutlej and Ravi (d) Beas and Sutlej

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

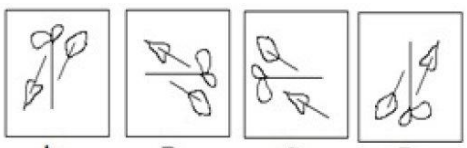
18. Select the number from among the options given that is related to the fifth number in the same way as the second and fourth numbers are related to the first and third numbers respectively
11 : 143 :: 13 : 221 :: 7 : ?
(a) 35 (b) 56
(c) 57 (d) 77

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

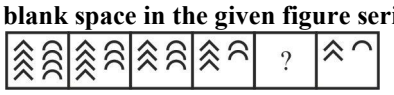
Conditions:
(i) If the first element is a symbol and the last a number, the codes for these two are to be interchanged.
(ii). If the first element is an odd number and the last, an even number, the first and last elements are to be coded as ∅.
(iii). If both second third elements are either symbols or 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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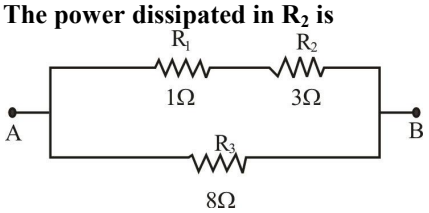
69. A girl of weight 440 N climbs up a rope through a height of 7 m in 20 s. The power expended by the girl is:
(a) 36 W (b) 15.4 W
(c) 72 W (d) 154 W

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

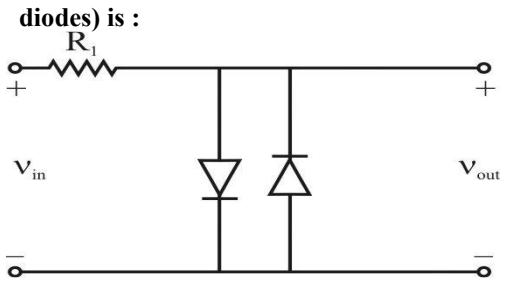
82. The Fermi level represents the energy state with____ probability of being filled if no forbidden band exists.
(a) 80% (b) 100%
(c) 50% (d) 45%

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

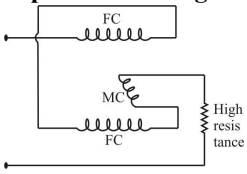
89. For microwave frequencies, a _____ oscillator is required.
(a) Klystron (b) Wien Bridge
(c) Hartley (d) Colpitts

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

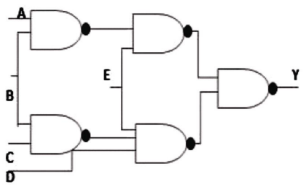
94. Which type of measuring instrument is depicted in the figure below?


(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 = $\frac{15}{3} = 5$

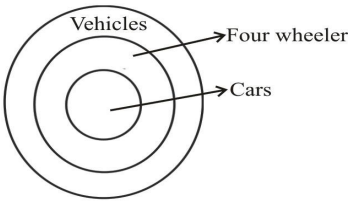
And ◯ + ◯ + ◯ = 3 circle = 6

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

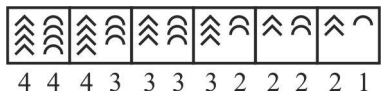
Hence, option (b) is correct.

20. (a)

Figure 'C' is different from other figures. So option (a) is correct.

21. (b)

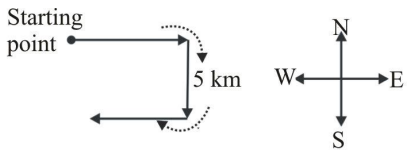
The number of picture in each box in the series of picture given in the question will be as follows-



Hence, option (b) will be in the blank picture place.

22. (d)

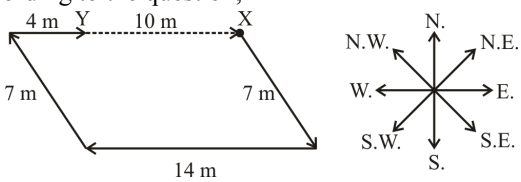
According to the question,



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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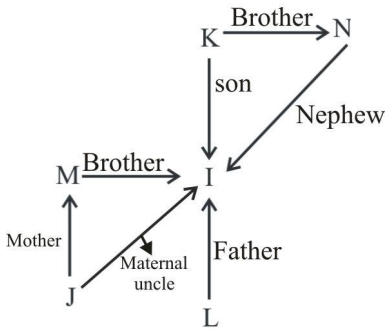
24. (a)

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

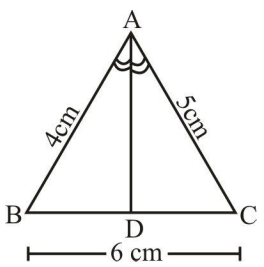
Then a + b = 4 + 3 = 7

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)

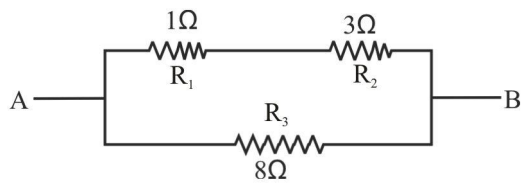
Given that,

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-

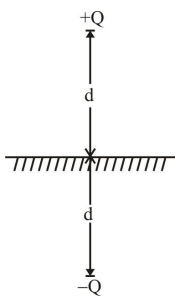
(i) Every magnetic field line is a closed loop.

(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.

$$\because \quad I_D = \frac{V_{DS} \times A}{\rho.\ell}$$

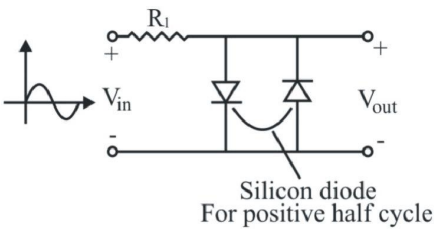
So,

$$I_D \propto \frac{1}{\ell}$$

$\therefore$ If the length is halved the current will be twice.

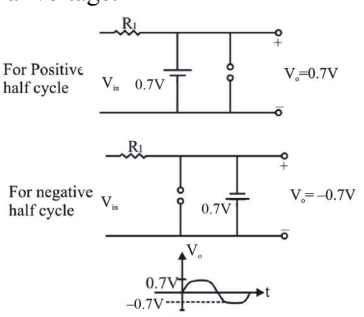
86. (b)

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)

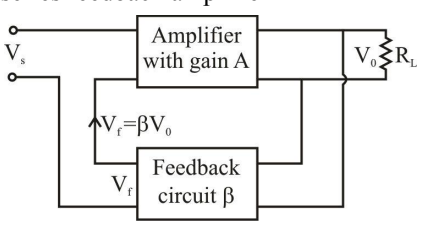
For microwave frequency a klystron oscillator required.

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.

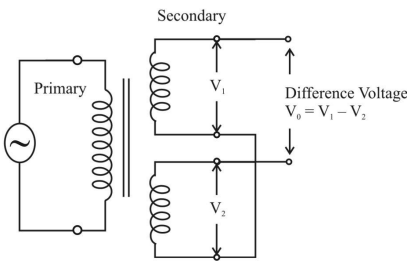
- Voltmeter is a voltage measuring device whose resistance is very high.
- To increase the range of the voltmeter need to connect a high resistance in series with the voltmeter.

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 -

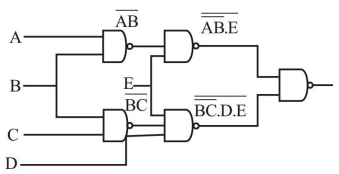
$= -1\times2^5+1\times2^4+1\times2^3+0\times2^2+0\times2^1+1\times2^0$

$= -32+16+8+1$

$= -32+25$

$= -7$

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

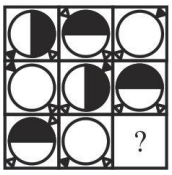
9. Who was the founder of the social reform movement for Sikhism - the Nirankari movement?
(a) Baba Balak Singh (b) Baba Gurmeet Dev
(c) Shri Sohan Singh (d) Baba Dyal Das

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

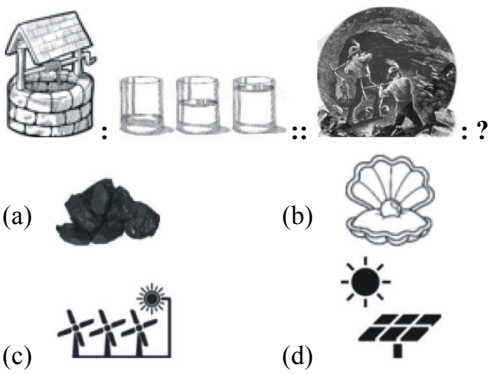
(a) Neither Arguments 1 nor 2 is strong
(b) Only Arguments 1 is strong
(c) Both, Arguments 1 and 2 are strong
(d) Only Arguments 2 is strong

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.

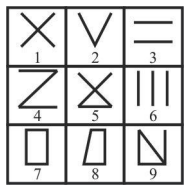
(ii). If the second element is a symbol and the first element is an even number, the codes for these two (the second and the fifth element) are to be interchanged.

(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

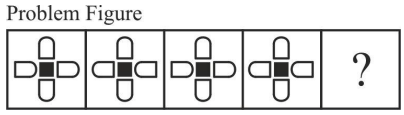
20. Form three groups using each figure only once given below. The three groups thus formed are:



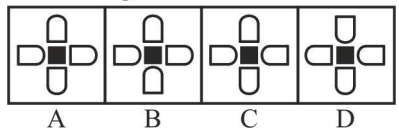
(a) (1,4,3), (2,5,6), (9,7,8)
(b) (1,2,3), (4,5,6), (9,7,8)
(c) (1,2,6), (4,5,3), (9,7,8)
(d) (1,2,3), (4,7,6), (9,5,8)

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

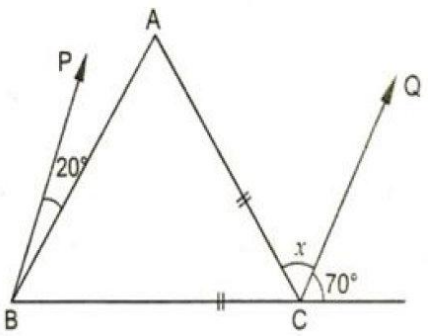
58. A shopkeeper uses a weight of 950 gm instead of 1 kg sells the articles at the marked price, which is 15% above the cost price. What is his profit percentage?

(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-

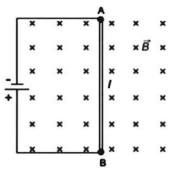
(a) $B = \frac{\mu_0 I}{2\pi r^2}$ (b) $B = \frac{\mu_0 I}{2\pi r}$

(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

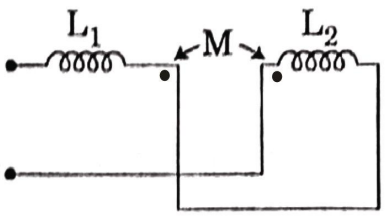
77. Which of the following remains constant inside a conducting sphere?

(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

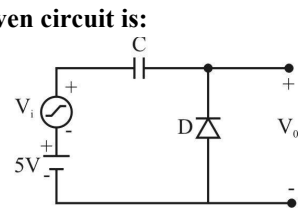
84. A BJT is in inverse active mode if:

(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

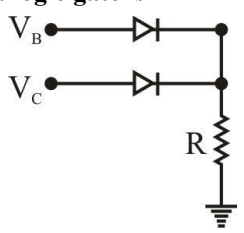
94. Deflecting torque in moving iron instruments is given by:
(a) $\frac{1}{2}I^2\frac{dL}{d\theta}$ (b) $\frac{1}{2}LI^2$
(c) $\frac{1}{4}I^2$ (d) $2LI^2$

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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