SOLUTION : PRACTICE SET- 11

ANSWER KEY

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

SOLUTION

1. (c)
India's heaviest and most powerful communication satellite is GSAT - 11. It was launched by European Space Agency's Ariane-5 VA-246 Rocket from Guiana Space Centre, French Guiana on 5 December 2018. It's total weight is about 5854 kg.

2. (a)
At the time when question was asked D. Gukesh at the age of 12 years 7 months and 17 days became the second youngest Grandmaster of the world & India's youngest Grandmaster. At present Abhimanyu Mishra is the World's youngest Grandmaster at the age of 12 years 4 months and 25 days.

3. (a)
Thang Ta "the art of the sword and spear" is the traditional martial art of Manipur. It integrates various external weapons the sword, spear, dagger etc.
Rangama is a dance of Nagaland. Chakyar Koothu is a performance art from Kerala. Singhi is lion dance of Sikkim. In this dance form the dancers perform in a lion costume that represents the snow lion.

4. (d)
A.R. Rahman is popularly known as "Mozart of Madras" Time magazine dubbed him "the Mozart of Madras" and placed him in its list of the world's 100 most influential people in 2009. He is musician, singer and his most famous film Slumdog Millionaire earned him BAFTA, Golden Globe, Academy and Grammy awards.

5. (c)
Excess demand is the excess of aggregate demand over and above its level required to maintain full employment equilibrium in the Economy, as it does not cause any change in the level of employment or output. As a result inflation occurs in the Economy.

6. (a)
Article 356 of the Indian Constitution provides for President's rule. Accordingly, it should be known to the President that if the government of a state is not being run according to the Constitution, then he can impose President's rule. With the imposition of President's rule, the government and legislature of the state will be dissolved, the governor will govern as the representative of the President and all the legislative and financial functions of the state will be done by the Parliament of the Union. **Hence, the budget of the state under President's rule will be presented in the Lok Sabha.**

7. (d)

Deserts	Related Country
Atacama	Chile
Thar	India and Pakistan
Gobi	China and Mangolia
Taklamakan	China
Kalahari	Botswana, Namibia and South Africa
Pantagonian	Argentina

8.(a)
Savitri river originates from Mahabaleshwar, in Maharashtra and drains Arabian Sea. Also Mahabaleshwar is a source of five rivers:- Krishna, Koyna, Venna, Savitri, Gayatri.

9. (d)
Baba Dyal Das was the founder of the social reform movement for Sikhism is name a - the Nirankari movement. It was founded in 1851, to restore the practices and other beliefs of Sikhs, prevalent during the establishment of Sikhism by Guru Nanak Dev.

10. (a)
Provincial Autonomy was granted under the Government of India Act, 1935. The act gave more

autonomy to provinces. Diarchy was abolished at the provincial levels. The act divided powers between centre and provinces in term of three list federal, provincial and concurrent list. Residuary powers were given to the Viceroy. Government of India Act 1935 provided for the establishment of federal court in India.

11. (a)

From options-

(a) $K \xrightarrow{+3} N \xrightarrow{-8} F$

(b) $U \xrightarrow{+3} X \xrightarrow{-7} Q$

(c) $P \xrightarrow{+3} S \xrightarrow{-7} L$

(d) $J \xrightarrow{+3} M \xrightarrow{-7} F$

Hence, option (a) is different one.

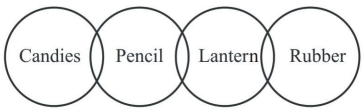
12. (a)

Answer figure 'D' will complete the given question figure.

Hence, option (a) is correct.

13. (c)

According to the statement the Venn diagram is as follows-



Conclusion : I. (×)

II. (×)

III. (×)

Hence, it is clear from above that 'None of the conclusions follows'.

14. (d)

Income Tax in India should not be abolished by CBDT as it is the main source of revenue in India. Hence, only argument 2 is strong.

15. (c)

Reading newspaper daily helps us to get information about the activities around and increase general awareness.

Hence only argument 1 is strong with respect to the statement.

16. (d)

According to the given question only Argument 2 is strong.

17. (d)

Just as,

$$32 \times 34 \equiv (3 \times 3)\ \&\ (2 + 4) \equiv 96$$

$$25 \times 14 \equiv (2 \times 1)\ \&\ (5 + 4) \equiv 29$$

Same as,

$$18 \times 51 \equiv (1 \times 5)\ \&\ (8 + 1) \equiv 59$$

18. (a)

The way water is extracted from the well by digging it. In the same way various ore or coal etc....are extracted from it by digging the mine.

19. (c)

According to the II conditions. On interchanging the place of second and fifth element 6#%385#4 → RBKWPGPU

20. (b)

In the figures given in the question,

The figure (1, 2 and 3) are formed using two straight lines,

The figure (4, 5 and 6) are formed using three straight lines.

The figure (9, 7 and 8) are formed using four straight lines,

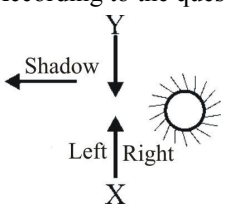
Hence option (b) is correct.

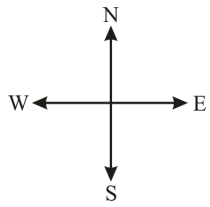
21. (a)

In the given figure series , figure A will be at the place of question mark.

22. (c)

According to the question,

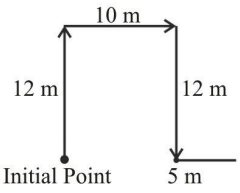


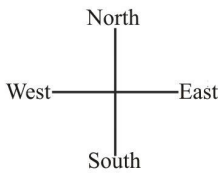


So, it is clear from the diagram that X's face is toward North direction and Y's face is toward South direction.

23. (a)

Ganesh's travelling path is as follows:

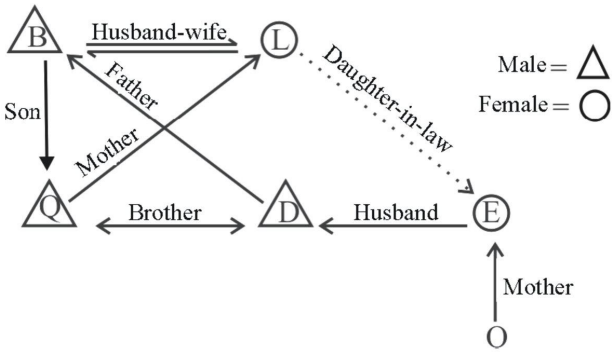




Hence, Ganesh is 15 m, East away from initial point.

24. (c)

According to the question,



Hence, it is clear from the blood relation diagram that E is the daughter-in-law of L.

25. (d)

Given,

$$42 \div 4 + 2 - 3 \times 5 = 29$$

On solving by interchanging ÷ and + from option (d),

26. (b)
The period of third generation computer was from 1965-1975. In this generation computers was used integrated circuit (IC). Some example of third generation computer are IBM-370, IBM-360, PDP-II, UNIVAC 1108, Honeywell-6000 etc.

27. (b)
Monitor, Projector and Speaker are softcopy output device, whereas plotter is a hardcopy output device.

Softcopy– Softcopy is a virtual copy. It refers to the digital document file or electronic version of a document that is not printed on paper. In softcopy the output presents in the computer or other output device like Speaker, Monitor etc.

Example– E-books, Pdf notes, Audio/Video etc.

Hard copy– Hard copy refers to the electronic or digital documents which is printed on paper or other material. We can say it is a physical copy because we can touch it.

Example– News paper, Book, Printed documents.

28.(a)
Monitor is a peripheral output device that gives information to the user in the form of a display. The devices that are externally connected to the CPU are called peripheral devices such as monitor, keyboard, mouse, printer scanner, BCR etc.

29. (d)
Resolution is the image quality displayed on a monitor resolution is measured by number of pixels horizontal by pixels vertically. When resolution increases, image become crisper due to a higher pixel density because pixels would pass by.

30. (c)
The sequential format in magnetic tape refers to the way data is stored and retrieved on the tape in a linear or sequential manner. In this format, data is written and read sequentially, from the beginning of the tape to the end or vice versa. Therefore sequential format is the major defect of magnetic tape.

31. (a)
In magnetic tape only one side of the ribbon is used for storing data. It is sequential memory which contains thin plastic ribbon to store data and coated by magnetic oxide. So the data read write speed is slower. DRAM works on sequential order like A, B, C, D is data, we have to go through BC to go from A randomly in optical disk.

32.(b)
In the context of computes, time taken to receive data from a storage device or to obtain data from a peripheral unit is known as access time.

33. (a)
Bluetooth is a wireless technology that allows devices to connect and work together.

It uses short-range radio waves to exchange data between devices over short distance. Inventor of Bluetooth is jaap Haartsen. Ethernet is a family of computer networking technology that uses cables to connect deices to the internet.

34. (c)
Data communication is a process in which digital data and analog are exchanged between two or more computers. Messages can contain text, number, picture, audio, video etc. Hence statement (ii) is true.

35. (a)
SMTP (Simple Mail Transfer Protocol) is an application that is used to send, receive outgoing e-mails between sender and receiver. When an e-mail is sent, it uses the SMTP protocol. This protocol specifies the exchange of e-mail.

36. (d)
The size option of Page setup is used to select the page size for the document in MS Word 365.

37. (d)
In Microsoft Word 365, when deleting a row or column in a table, the "Delete Cell" pop-up window offers three valid options.

1. Shift cells left
2. Shift cells up
3. Delete entire row or delete entire column

The "Shift cells right" option is not a valid option in this pop-up window when deleting a row or column in a table.

38. (c)
The zoom feature in MS Word 365 changes the on-screen font size without affecting any other features.

39. (d)
Host to Host layer is the layer just above the internetwork, which is responsible for end to end data integrity. The two most important protocols operating at this layer are Transmission Control Protocol (TCP) and User Datagram Protocol (UDP).

40. (b)
The TCP/IP (Transmission Control Protocol/ Internet Protocol) model follows a horizontal approach and has 5 layers.

- Physical Layer
- Link Layer or Network Access Layer
- Network Layer
- Transport Layer
- Application Layer

41. (d)
Packet switching is a method of transferring data by dividing it into multiple parts called packets.

42. (d)
In Google Chrome Ctrl + W shortcut is used to close the currently active window. Ctrl + T shortcut key is used to open a new tab in Google Chrome.

43. (c)
Google Search primarily uses an algorithm called "Page Rank" to rank websites its search engine results. Page Rank was one of the early and foundational algorithms developed by Larry Page and Sergey Brin, the founders of Google.

44. (d)

A web browser is a software application used to access and display websites on the internet. It allows users to interact with web pages, view text, images, videos, and other contents. Popular web browsers include Google Chrome, Mozilla Firefox, Microsoft Edge, and Safari.

45. (b)

Scaling is used to shrink or grow to a particular character in specified size.

46. (d)

The number is called composite number. which is formed more than two factors.

Hence, $209 = 11 \times 19$

$203 = 7 \times 29$

$161 = 7 \times 23$

But, 109 cannot be expressed in the form of factors. So it is not composite.

47. (b)

$= 2550 - [510 - \{270 - (90 - 80 + 70)\}]$

$= 2550 - [510 - \{270 - 80\}]$

$= 2550 - [510 - 190]$

$= 2550 - 320$

$= 2230$

48. (d)

$$\frac{6}{27} \div \frac{27}{30} \div \frac{20}{81}$$

$$= \frac{6}{27} \times \frac{30}{27} \times \frac{81}{20} = \frac{6 \times 3 \times 3}{27 \times 2} = \frac{6}{3 \times 2} = 1$$

49. (a)

Let numerator $= x-2$

denominator $= x$

According to the question,

$$\frac{(x-2)-2}{x+2} = \frac{1}{3}$$

$$\frac{x-4}{x+2} = \frac{1}{3}$$

$3(x - 4) = (x + 2)$

$3x - 12 = x + 2$

$2x = 14$

$x = 7$

Original fraction $= \frac{x-2}{x} = \frac{7-2}{7} = \frac{5}{7}$

50. (d)

HCF of 51 and 85

$51 = 3 \times 17$

$85 = 5 \times 17$

HCF = 17

According to the question,

$17 = 51\,m - 85$

$17 + 85 = 51\,m$

$102 = 51\,m$

$\boxed{m = 2}$

51. (a)

So, on finding the HCF by division method,

$$360\overline{)450}\,(1$$
$$\underline{360}$$
$$90\overline{)360}\,(4$$
$$\underline{360}$$
$$\times\times\times$$

So, the HCF is 90.

52. (a)

Charan	:	Rajat
5x	:	4x

According to the question,

$$\frac{5x + 3000}{4x + 3000} = \frac{6}{5}$$

$25x + 15000 = 24x + 18000$

$25x - 24x = 18000 - 15000$

$x = 3000$

Salary of Charan $= 5x = 5 \times 3000$

$= ₹\ 15000$

53. (d)

Given,

75% of 480 + x % of 540 = 603

$$480 \times \frac{75}{100} + 540 \times \frac{x}{100} = 603$$

$$540 \times \frac{x}{100} = 603 - 480 \times \frac{3}{4}$$

$$540 \times \frac{x}{100} = 603 - 360$$

$$540 \times \frac{x}{100} = 243$$

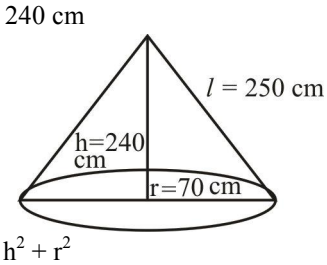
$$x = \frac{243 \times 100}{540}, \quad \boxed{x = 45}$$

54. (d)

Given,

radius (r) = 70 cm

height (h) = 240 cm



Then, $l^2 = h^2 + r^2$

$= (240)^2 + (70)^2$

$l = \sqrt{62500}$

$l = 250$ cm

Total surface area of cone $= \pi r(l + r)$

$$= \frac{22}{7} \times 70(250 + 70)$$

$$= \frac{22}{7} \times 70 \times 320$$

$= 70400\ cm^2$

55. (c)

Work done by A in 1 day $= \frac{1}{24}$ part

Work done by A in 21 days $= \frac{21}{24} = \frac{7}{8}$ part

Remaining work $= 1 - \frac{7}{8} = \frac{1}{8}$

$\therefore$ Time taken by 'B' to complete the total work $= 5 \times 8 =$ 40 days

B's one day work $= \frac{1}{40}$ part

Work done by A and B in one day $= \frac{1}{24} + \frac{1}{40}$

$$= \frac{5+3}{120} = \frac{8}{120} = \frac{1}{15} \text{ part}$$

Hence, the time taken by A and B to complete the work

$= \frac{1}{\frac{1}{15}} = 15$ days.

56. (c)

Given that -

Speed of first

Person = 15 m/s

Speed of second person = 35 m/s

Let speed of the train = X m/s

and length of the train = Lm.

According to the question,

(X – 15) = L/20

L = 20X – 300..... (i)

(X – 35) = L/40

L = 40X – 1400 ..... (ii)

eq. (i) = eq. (ii)

20X – 300 = 40X– 1400

20X = 1100

X = 55 m/s

On putting the value of X in eq. (i)

L = 20 × 55 – 300

L = 1100 – 300

L = 800 m

57. (b)

Let Amount = A

According to the question,

$A_2 - A_1 = 4544$

$$\Rightarrow P\left(1+\frac{R_2}{100}\right)^{t_2} - P\left(1+\frac{R_2}{100}\right)^{t_1} = 4544$$

$$\Rightarrow P\left(1+\frac{20}{100}\right)^{4} - P\left(1+\frac{40}{100}\right)^{2} = 4544$$

$$\Rightarrow P\left(\frac{6}{5}\right)^{4} - P\left(\frac{7}{5}\right)^{2} = 4544$$

$$\Rightarrow \frac{1296P}{625} - \frac{49P}{25} = 4544$$

$$\Rightarrow \frac{1296P - 1225P}{625} = 4544$$

$$\Rightarrow 71P = 4544 \times 625$$

$$\therefore P = \frac{4544 \times 625}{71}$$

Hence, P = ₹ 40000

58. (c)

Let, cost price of 1 gram of article = ₹1

$\therefore$ CP of 1000g = ₹1000

And, CP of 950g of article = ₹950

According to the question,

SP of article $= \frac{1000 \times 115}{100} =$ ₹1150

Required Profit % $= \frac{(1150-950)}{950} \times 100$

$$= \frac{200}{950} \times 100 \Rightarrow \frac{400}{19}$$

$$\Rightarrow 21\frac{1}{19}\%$$

59. (b)

$$\frac{6}{x} - \frac{2}{x-1} - \frac{1}{x-2} = 0$$

$$\frac{6(x-1)(x-2) - 2x(x-2) - 1x(x-1)}{x(x-1)(x-2)} = 0$$

$$\frac{6\left(x^2-2x-x+2\right) - 2x^2 + 4x - x^2 + x}{x\left(x^2-2x-x+2\right)} = 0$$

$$\frac{6x^2 - 18x + 12 - 2x^2 + 4x - x^2 + x}{x^3 - 3x^2 + 2x} = 0$$

$3x^2 - 13x + 12 = 0$

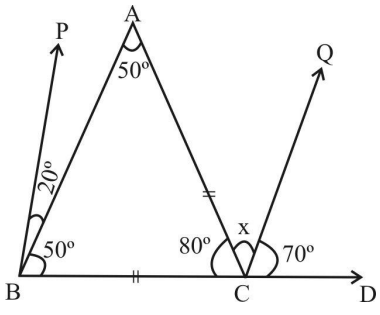
$3x^2 - 9x - 4x + 12 = 0$

$3x(x-3) - 4(x-3) = 0$

$(3x-4)(x-3) = 0$

roots $= \frac{4}{3}, 3$

60. (c)



Given that, BP || CQ and

AC = BC

$\angle$ PBC = $\angle$ QCD = 70°

$\angle$ PBA + $\angle$ ABC = 70°

$\angle ABC = 70° - 20° = 50°$

$\therefore$ $\angle BAC = 50°$

$\angle BCA = 180° - 2\times 50° = 80°$

$\angle BCA + \angle ACQ + \angle QCD = 180°$

$80° + x + 70° = 180°$

$x = 30°$

61. (b)

As per question,

$c - a = k$ ...(i)

$d - b = k$ ...(ii)

on subtracting

$c - a - d + b = 0$

$b + c = a + d$ ...(iii)

$\because$ mean $= 25$

$$\frac{a+b+c+d}{4} = 25$$

$a + (b + c) + d = 100$

$a + d + a + d = 100$ [from equation (iii)]

$a + d = 50$ ...(iv)

but $d - a = 20$

$d = 20 + a$

$\therefore$ $a + 20 + a = 50$

$2a = 30$

$a = 15$

62. (d)

Given,

$\sqrt{54} + \sqrt{150} = a$

$\sqrt{2\times 3\times 3\times 3} + \sqrt{2\times 3\times 5\times 5} = a$

$3\sqrt{6} + 5\sqrt{6} = a$

$8\sqrt{6} = a$

$$\boxed{\sqrt{6} = \frac{a}{8}} \quad ...(i)$$

According to the question,

$\sqrt{96} + \sqrt{216} = ?$

$\sqrt{2\times 2\times 2\times 2\times 2\times 3} + \sqrt{2\times 2\times 2\times 3\times 3\times 3}$

$4\sqrt{6} + 6\sqrt{6}$

$\Rightarrow$ $10\sqrt{6}$ ...(ii)

From equation (i) and (ii),

$$\Rightarrow \frac{a}{8}\times 10 \quad \Rightarrow \frac{5a}{4} = 1.25a$$

63. (d)

Let the present age of Suraj is x years and present age of Neeraj is $\frac{x}{2}$ years.

According to the question,

$$5\left(\frac{x}{2} - 8\right) = (x + 5)$$

$$\Rightarrow \frac{5x}{2} - 40 = x + 5$$

$$\Rightarrow \frac{5x}{2} - x = 5 + 40$$

$$\Rightarrow \frac{3x}{2} = 45$$

$\Rightarrow$ $x = 30$ years

Age of Suraj before 2 years $= 30 - 2 = 28$ years

Age of Neeraj before 2 years $= 15 - 2 = 13$ years

64. (b)

Filled part of tank by first pump in 1 hour

$$= \frac{1}{15} \text{ part}$$

Filled part of tank by second pump in 1 hour $= \frac{1}{20}$ part

Filled part of tank by third pump in 1 hour $= \frac{1}{30}$ part

Pre-filled part of the tank $= \frac{1}{5}$ (given)

Remaining part $= 1 - \frac{1}{5} = \frac{4}{5}$

Let it will take x hours to fill the tank.

According to the question,

$$\frac{4}{15} + \frac{x}{20} + \frac{6}{30} = \frac{4}{5}$$

$$\frac{16 + 3x + 12}{60} = \frac{4}{5}$$

$28 + 3x = 48$

$3x = 20$

$x = \frac{20}{3}$ or 6 hour 40 minutes

Hence required time = 8 am + 6 hour 40 minutes = 2:40 pm

65. (a)

$a : b = (3 : 4) \times 3$

$d : b = (4 : 3) \times 4$

$a : b : d$

$9 : 12 : 16$

Hence, $a : d = 9 : 16$

66. (a)

Fundamental quantities in SI system and their units

Physical Quantity	Name of unit	Symbol o unit
Mass	Kilogram	kg
Length	Meter	m
Time	Second	S
Temperature	kelvin	K
Luminous intensity	Candela	Cd
Electric current	Ampere	A
Amount of substance	Mole	Mol

67. (b)

The density of water is highest at 4°C and the volume is least. The volume of water increase when is heated or cooled at a temperature higher or lower than 4°C. Thus, volume of given amount of water decrease between 0°C and 4°C while it increase above 4°C.

68. (a) :

A car accelerating for two seconds would cover 4 time distance of a car accelerating for only one second.

69 (a) :

1 Horse power (H.P.) = 746 Watt

$\cong$ 0.75 Killowatt

70. (d)

The density of water is maximum at 4°C and volume of a given sample of water is minimum at this temperature. But when the water cooled from 4ºC to 0ºC, its volume increases due to **Anomalous expansion** of water.

71. (d)

Inductor- The coil that stores magnetic energy in a magnetic field is called an inductor.

The magnetic potential energy stored in an inductor is given by magnetic potential energy (U) = $\frac{1}{2}LI^2$

72. (b)

The resistance of the conductor in the electrolytic cell decrease with an increase in temperature

73. (b)

Resistors contribute to active power in electrical circuits. The power which is actually consumed in an AC or DC circuit is known as active power

74. (b)

Let us consider a very long straight wire carrying current I- The magnetic flux density 'B' at a perpendicular distance 'r' from the wire is given by-

$$B = \frac{\mu_0 I}{2\pi r}$$

Where μ_0 = Absolute permeability of air

$= 4\pi \times 10^{-7}$H/m.

75. (c)

Wattmeter cannot be designed on the principle of moving iron device.

According to the working principle, there are three types of wattmeters -

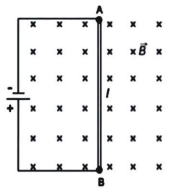
(i) Electrodynamometer type wattmeter

(ii) Electrostatic type wattmeter

(iii) Induction type wattmeter

$\Rightarrow$ Moving iron instrument is used to measure current and voltage.

76. (a)



According to question-

$V = 3V$

Resistance (R) = 3Ω

Current flow in conductor $I = \frac{V}{R} = \frac{3}{3} = 1A$

77. (b)

Potential remains constant inside a conducting sphere.

- The electric field inside the conducting sphere is zero. So the work done is zero.
- If V_a is the internal potential and V_b is the surface potential-

then

$$V_b - V_a = 0$$

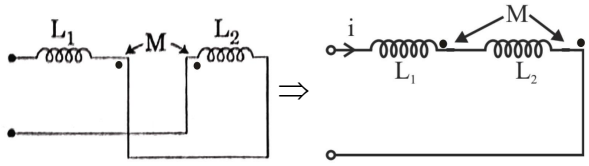
$$\boxed{V_b = V_a}$$

Hence the potential remains constant inside the conducting sphere.

78. (c)

When a current-carrying conductor is placed perpendicular to a magnetic field. It tends to move perpendicular to the field as well as itself. When a current-carrying wire is placed in a magnetic field then a force is applied by magnetic field on the wire. This force is called the magnetic force.

79. (c)



The effective inductance of two coil with self inductance L_1, L_2 and mutual inductance M (as connected shown in figure) will be- L_1+L_2+2M.

80. (a)

All conducting materials have a resistivity of less than $10^{-3}\Omega$–m

- The electrical resistivity of particular conductor material is a measure of how strongly the material opposes the flow of electric current through it.

81 . (d)

When a varying potential applied to the proper axis of a crystal there is a change in dimension of the crystal. It is known as Piezo-electric effect.

Ex. - $BaTiO_3$, Quartz, Rochelle salt.

82. (b)

We know that

$$\text{Energy gap } (E_g) = \frac{1.24}{\lambda(\mu m)}$$

Given,

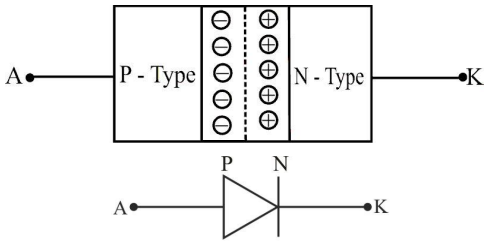
$$\lambda = 1000nm = 1000\times10^{-9} = 1\times10^{-6}\,m = 1\mu m$$

$$E_g = \frac{1.24}{1\mu m} = 1.24eV$$

83. (c)

If a p-type and n-type material are joined in such a way that single crystal structure is obtained at the junction then P-N junction diode is formed.

The arrow in the schematic symbol of a diode point to the p-type material which is called the anode.



84. (a)

A BJT is in inverse active mode if when E-B junction is reverse biased and C-B junction is forward biased.

Mode	J_{BE}	J_{BC}	Application
Saturation	Forward bias	Forward bias	On Switch
Cut-off	Reverse bias	Reverse bias	Off Switch
Active	Forward bias	Reverse bias	Amplifier
Reverse Active	Reverse bias	Forward bias	Attenuator

85. (a)

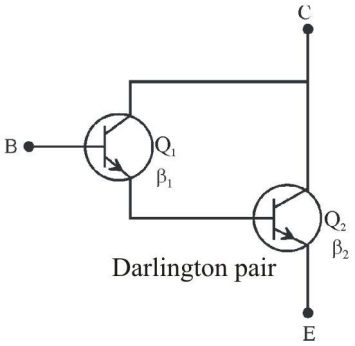
N-type semiconductor in P-well manufacturing processs and substrate in making p-channel MOSFET. In this substrate, the high concentration heavily doped two p-regions are created by diffusion. In this, one part acts as a source and the other part acts as a drain. The distance between source and drain is about 20μm. A thin dielectric layer of silicon dioxide is applied on the surface of this substrate, which also has two p regions.

86. (d)

The given circuit is a positive clamper. A circuit that represents the positive peak of a signal at a desired DC level is called a clamping circuit. In this the output waveform is shifted in the positive direction by the positive reference voltage.

87. (a)

Darlington pairing is mainly used for impedance matching.



$$\beta = \beta_1.\,\beta_2$$
$$= \beta_1^{\,2} \qquad \text{When } (\beta_1=\beta_2)$$

Application-

(i) Its current gain is high.

(ii) This is called β amplifier.

88. (a)

Thermal runway is not possible in FET because when the temperature of FET increase then the mobility of FET decreases. The energy dissipated in FETs is reduced so there is no free of excessive temperature rise or thermal run-away.

$$\mu \propto \frac{1}{T}$$

89. (d)

A relaxation oscillator is one producer non-sinusoidal output.

In electronics a relaxation oscillator is a nonlinear electronic oscillator circuit that produces a nonsinusoidal repetitive output signal such as a triangle wave a square wave.

90. (a)

Ideal operational amplifier characteristics-

Characteristics	Ideally	Pratically
Open loop gain	∞	10^6
Slew rate	∞	80 V/μs
PSRR	0	
R_i	∞	1MΩ
R_0	0	10Ω to 100Ω
CMRR	∞	120 dB(10^6)
Offset Voltage	0	2mV
Offset Current	0	20nA
Bandwidth	∞	1 MHz

91. (a)

A monostable multivibrator can be used to generate pulse. whereas astable multivibrator is also used to generate square wave.

92 . (b)

Repeatability and Reproducibility are related to precision of the instrument.

Repeatability - It is the characteristics of precise instrument (Precise ↑ repeatability ↑)

It describes the closeness of output reading with the conductor same location, same observer, same instrument, same procedures but repetition over a short time period.

Reproducibility - It is also the characteristics of precise instrument. (Precise ↑ reproducibility ↑)

93. (b)

A moving coil permanent magnet instrument can be used as flux meter by eliminating the control springs. The flux meter is based on Faraday's law. In flux meter induced voltage will be equal to the rate of change of flux.

94. (a)

In moving iron instruments the deflecting torque,

$$\boxed{T_d = \frac{1}{2} I^2 \frac{dL}{d\theta}} \qquad \{I = \text{rms current}\}$$

Where, I = Operating current

L = Self inductance

θ = Deflection angle

$$\boxed{T_d \propto I^2}$$

- It has non-uniform scale.
- Moving iron type instruments can be used for both AC and DC measurements.

95. (b)

A digital voltmeters which has the ability of measuring accurately in the presence of noise is integrating DVM.

- They are convert analog signals into digital voltage. They are also display the voltage to be measured in the form of discrete numbers in place of pointer deflection.
- Digital voltmeters are used for the measurement of AC as well as DC voltage and also to measure physical quantities such as temperature, pressure, stress through the of appropriate transducer and signal conditioning circuit.
- Input range of DVM is 1Volt to 1000V.

96. (c)

Dummy strain gauge is used along with measuring strain gauge to compensate for the change caused by temperature variation.

- A dummy strain gauge is used in a quarter bridge strain gauge circuit to compensate for changes in temperature and lead wire resistance.
- The dummy gauge is wind into a Wheatstone bridge on an adjacent arm to active gauge.

97.(b)

$13 \times 16^3 + 11 \times 16 + 2$

$= 13 \times 4096 + 11 \times 16 + 2$

$= (2^3+2^2+1)\times 2^{12} + (2^3+2+1)\times 2^4 + 2$

$= (2^3+2^2+2^0)\times 2^{12} + (2^3+2^1+2^0)\times 2^4 + 2^1$

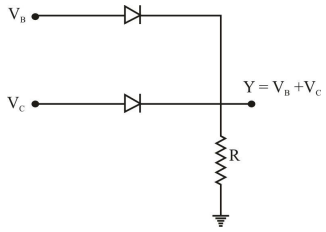
$= 2^{15}+2^{14}+2^{12}+2^7+2^5+2^4+2^1$

On converting to binary number each term has only one, the number will be in the form of 1.

So the number of one digit is 7.

98. (a)

Given figure is equivalent OR logic gate.



Truth table of OR gate

Inputs		Output
A	B	Y = A+B
0	0	0
0	1	1
1	0	1
1	1	1

99. (b)

Synchronous data transmission using demultiplexers in receiver and security monitoring system. Not done in the form of anti clock demultiplexers in the system.

De-multiplexer is used for parallel information and generation of ALU circuit.

- 1-line to 8-line demultiplexer consists of eight AND gates, all of them connected to a single line data input.
- It takes single input and distributes it over several outputs.
- It takes one input data source and selectively distributes in to 1-of-N output channels just like a multi-position switch

100. (b)

Given that-

Decimal equivalent of binary = $(10101101)_2 = (173)_{10}$

Output of analog

$$= \frac{V}{2^n - 1} \times \text{Decimal equivalent of binary number}$$

$$= \frac{5}{2^8 - 1} \times 173$$

$$= \frac{865}{255} = 3.392\text{V}$$

PRACTICE SET - 12

1. 'NAVIC' is another name for:
(a) A scheme by the Central Government for fisherman development
(b) The independent regional navigation satellite system developed by India
(c) The polar satellite launch vehicle of India
(d) A training programme for Indian maritime pilots

2. In volleyball, spike is also known with the name of ?
(a) Open (b) Protection
(c) Drop (d) Smash

3. The Indian martial art, Kalaripayattu originated from which state of India?
(a) Karnataka (b) Andhra Pradesh
(c) Kerala (d) Tamil Nadu

4. Who propounded the homeopathic principle of 'Like Cures Like'?
(a) Hippocrates
(b) Samuel Hahnemann
(c) Samuel Cockburn
(d) George Vithnoulkes

5. Which multiplier theory states that the economy will flourish the more the government spends?
(a) Earning Multiplier
(b) Keynesian Multiplier
(c) Investment Multiplier
(d) Fiscal Multiplier

6. Which of the following Articles of the Constitution of India has Part XX that deals with the powers of the Parliament to amend the Constitution and its procedures?
(a) Article 393 (b) Article 368
(c) Article 395 (d) Article 367

7. Pampas, Steppes, Savanna and Prairies are all names of famous:
(a) waterfalls (b) cyclones
(c) lakes in America (d) grasslands

8. Which of the following is /are advantage (s) of building dams?
i) Stores water for irrigation
ii) No equitable distribution of water
iii) Stores water for generating electricity
iv) Canals from dams help in transferring water to great distances
v) Benefits only to a few people
(a) Only v (b) Only ii
(c) ii and v (d) i, iii and iv

9. At which Sikh Guru's invitation did the Sufi saint Hazrat Mian Mir lay the foundation stone of Golden Temple (Harmandir Sahib) in Amritsar?
(a) Shri Guru Har Govind ji
(b) Shri Guru Arjun Dev ji
(c) Shri Guru Har Rai ji
(d) Shri Guru Tegh Bahadur ji

10. The kingdom of Awadh was formally annexed by the British in the year____.
(a) 1856 (b) 1805
(c) 1801 (d) 1897

11. In each of the number-pairs, the second number is obtained by performing a certain mathematical operation on the first number. Three of the following pairs follow the same pattern and thus form a group. Select the number-pair that does NOT belong to that group.
(a) 21 : 420 (b) 15 : 208
(c) 17 : 272 (d) 25 : 600

12. Study the pattern given below carefully and select the letter which can come in the place of question mark (?) in it.
Ⓓ Ⓕ Ⓙ Ⓟ ?
(a) W (b) X
(c) U (d) V

13. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusions logically follow(s) from the statements.
Statements:
Some mangoes are oranges.
All oranges are grapes.
Conclusions:
I. All grapes are oranges.
II. All mangoes are grapes.
(a) Only conclusion I follows
(b) Only conclusion II follows
(c) Neither conclusion I nor II follows
(d) Both conclusions I and II follow

14. What is the colour of the granite in the kitchen?
Statements:
1. The colour of the granite is the colour of the wall.
2. The colour of the granite is very bright.
(a) Neither 1 nor 2 is sufficient to answer the given question
(b) Both 1 and 2 are sufficient to answer the given question
(c) Only 1 is sufficient while 2 alone is not sufficient to answer the given question
(d) Only 2 is sufficient while 1 alone is not sufficient to answer the given question

15. A statement is given followed by two arguments. Decide which of the argument(s) is/are strong with respect to the statement question.
Statement:
Introduction of multiplication tables in the syllabus for class 2 is not advisable.

Arguments:

(1) Children in class 2 are too young to understand the mathematical concept.

(2) Burdening young children with such complex concepts may create fear of the subject.

(a) Both arguments (1) and (2) are not strong
(b) Only argument (1) is strong
(c) Only arguments (2) is strong
(d) Both arguments (1) and (2) are strong

16. A question is given, followed by two arguments. Decide which of the arguments is/are strong with respect to the question.

Question:
Should the sale and use of tobacco be completely banned in India?

Arguments:

I. Yes. Tobacco causes oral cancer and other diseases.

II. No. Millions of workers will lose their jobs.

(a) Only argument (II) is strong
(b) Both, (I) and (II) is strong
(c) Only argument (I) is strong
(d) neither (I) nor (II) is strong

17. If a cube of 3"×3"×3" is painted on all sides and then cut into 27 smaller cubes of 1"×1"×1", then how many such smaller cubes will be there that are painted only on two sides?

(a) 16 (b) 4
(c) 12 (d) 8

18. Select the missing figure based on the given related pair of figures.

(a) 
(c) 
(b) 
(d) 

19. In this question, a group of numbers/symbols is coded using letters as per the table given below and the condition which follow. The correct combination of codes following the conditions is your answer.

Number/ Symbols	2	@	9	5	$	&	3	%	#	7	+	4	8	6
Code	T	F	A	J	L	E	W	Q	D	P	R	B	U	S

Conditions:

(i) If the first elements is a symbol and the last is a number, the codes for these two (the first and the last elements) are to be interchanged.

(ii) If the first element is an odd number and the last is an even numbers, the first and the last elements are to be coded as ©

(iii) If both the second and the third elements are perfect squares, the third element is to be coded as the code for the second element.

Question : + # 7 & 6

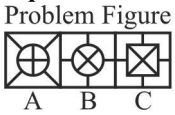
(a) DEPSR (b) RDPRS
(c) SDPER (d) PERDS

20. If three groups can be formed using the given figures only once the these groups will be ____.

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

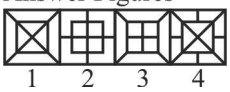
21. Choose the correct figure which will replace the question mark.

Problem Figure



A B C D

Answer Figures



1 2 3 4

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

22. A stand at the entrance of the mall waiting for his friend to come. He is facing east. After that turns his head to the right to see that his friend has arrived. In which direction is he expecting his friend to come?

(a) West (b) South
(c) North (d) East

23. Starting from point M, Harish walks 18 m towards 'South'. He turned to the 'Left' and walked 25 m. He then turned to the 'Left' and walked 25 m. He again turned to the 'Left' and walked 18 m. He again turned to the 'Left' and walked 35 m to reach point P. How far and in which direction is Harish from point M?

(a) 35 m, west
(b) 28.86 m, south-east
(c) 28.86 m, south-west
(d) 28.86 m, north-east

24. 'P + Q' means 'P is the daughter of Q'
'P × Q' means 'P is the son of Q'
'P – Q' means 'P is the wife of Q'
Which of the following options is correct for the given expression?
'A + B – C × D'

(a) C is the wife of D
(b) B is the son of D
(c) B is the daughter of D
(d) A is the daughter of D's Son

25. **If "–" and "+" signs as well as "x" and "÷" are interchanged, then which of the value is**
27 –15 ÷ 84 × 6 + 13 ?
(a) 43 (b) 260
(c) –170 (d) 224

26. **The most important advantage of an Integrated Circuit is its……..**
(a) easy replacement in case of circuit failure
(b) extremely high reliability
(c) reduced cost
(d) low power consumption

27. **Which output device draws pictures on a paper based on the commands given from a computer using a pen?**
(a) Scanner (b) Monitor
(c) Inkjet printer (d) Drum plotter

28. **Which of the following is NOT an output device?**
(a) Plotter (b) Printer
(c) Monitor (d) Touch screen

29. **Printing-device resolutions are measured in**
(a) Dots per inch (b) Bits per inch
(c) Pictures per inch (d) Images per inch

30. **Which of the following is not a secondary storage device?**
(a) Flash Drive (b) Pen Drive
(c) Compact Disc (d) DRAM

31. **Which is not a type of secondary memory?**
(a) Solid State Drive
(b) Hard Disk
(c) Random Access Memory (RAM)
(d) USB Pen Drive

32. **Secondary memory is also known as?**
(a) External memory (b) Cache memory
(c) Internal memory (d) primary memory

33. **A TCP is a ____ protocol, while UDP is a ___ protocol.**
(a) Connection - oriented - connection - less
(b) Application - layer connection - oriented
(c) Connection - less connection - oriented
(d) Connection - less application - layer

34. **In which layer of the Internet architecture do various protocols included for building Internet services?**
(a) Application (b) TCP
(c) IP (d) Physical

35. **Which layer of internet architecture includes protocols that provide services like SMTP and FTP?**
(a) Data link (b) IP
(c) Application (d) TCP

36. **Which of the following options is used to set the layout option of a page in MS word 365?**
(a) Review (b) Design
(c) Page Setup (d) Draw

37. **Which of the following statements is true regarding print preview in MS - Word 365?**
(a) Word combines print and preview in single window
(b) By clicking file > Print on the right side you will see the print button and configurable settings
(c) In the paragraph group of the Home tab, we can select option like printing only certain pages, changing the page orientation etc
(d) On clicking file > print on the left you will see a preview of you presentation

38. **How many options are available in the alignment group to align text in a table in MS word 365?**
(a) 6 (b) 3
(c) 7 (d) 9

39. **Which of the following switching technology is used by the internet?**
(a) Telephone Switching (b) Packet Switching
(c) Circuit Switching (d) Telex Switching

40. **A small text file created by a website that is stored in the user's computer temporarily for that session is called _____**
(a) bug (b) cache
(c) cookie (d) malware

41. **IP serves as a focal point for the internet protocol architecture, it defines a common method for exchanging _____ between a wide collection of networks.**
(a) message (b) Packet
(c) packet (d) Information

42. **Which of the following options is correct about opening a Google Chrome browser in Incognito mode?**
(a) It saves neither the browsing history nor the data entered in the personal account.
(b) It saves only the cookies in the personal account but neither the browsing history nor the data entered.
(c) It saves the browsing history and the data entered in the personal account./
(d) It saves only the browsing history in the personal account but not the data entered.

43. **Which of the following is NOT a well-known web browser?**
(a) Microsoft Edge (b) Jungle Safari
(c) Google Chrome (d) Mozilla Firefox

44. **A new Incognito window in Google Chrome can be opened with the ———— command.**
(a) Ctrl + T (b) Alt + T
(c) Ctrl + N (d) Ctrl + Shift + N

45. **Which of the following is not a security level?**
(a) Calculation (b) Worksheet Level
(c) Cell Protection (d) File Protection

46. **Pragya invited male and females to her birthday party in the ratio of 7 : 6. If the number of males in the party were 56, then the total number of guests attending the party were?**
(a) 48 (b) 104
(c) 108 (d) 112

47. $56 \div \frac{1}{3}\left\{15+12-\left(9+6-\overline{5+7}\right)\right\} = ?$
(a) 9 (b) 8
(c) 12 (d) 7

48. **Which of the fractions below given is NOT equal to $\frac{9}{17}$?**

(a) $\frac{108}{221}$ (b) $\frac{27}{51}$

(c) $\frac{63}{119}$ (d) $\frac{153}{289}$

49. **If the numerator of a fraction is decreased by 80% and the denominator of the fraction is decreased by 60%, then the resultant fraction is $\frac{5}{6}$. What is the original fraction?**

(a) $\frac{7}{3}$ (b) $\frac{3}{5}$

(c) $\frac{5}{3}$ (d) $\frac{6}{5}$

50. **HCF of $2^4 \times 3^4 \times 5^3 \times 7^2$ and $2^2 \times 3^6 \times 5^5$ is:**

(a) $2^2 \times 3^4 \times 5^3$ (b) $2^3 \times 3^5 \times 5^4 \times 7$

(c) $2^6 \times 3^{10} \times 5^8 \times 7^2$ (d) $2^2 \times 3^2 \times 5^3 \times 7^2$

51. **What is the length of the side of the largest square tile, which is used for constructing the floor of tile of 13.92m length and 5.22m breadth.**

(a) 58 cm (b) 1 m 16 cm

(c) 1 m 74 cm (d) 87 cm

52. **A number is divided in the ratio of 9 : 5 when 8 is added to each number, the ratio becomes 5 : 3 which will be the largest number among the two?**

(a) 80 (b) 72

(c) 69 (d) 81

53. **The price of petrol has been increased by 10% in the new budget. The passenger of a motor vehicle can reduce the consumption to how many %, so that his total expenditure on petrol remains the same?**

(a) 10% (b) $9\frac{1}{11}\%$

(c) 11% (d) $11\frac{1}{9}\%$

54. **A tent as such that its lower part is like a cylinder of 24 m height having 126 m diameter. Its apex is cone shaped with a base of the same diameter of 126 m and is 80 m slant height. Its canvas is 8 m wide. Calculate the length of canvas required to construct the tent.**

(a) 3296 m (b) 3020 m

(c) 3168 m (d) 3190 m

55. **A and B can complete a work in 40 days and 60 days respectively. They work together for some days and B leaves the job. If A completes the rest of the work in 10 days, find for how many days B worked.**

(a) 15 days (b) 14 days

(c) 18 days (d) 16 days

56. **A train over takes two people who are moving with speed of 2 km/h and 4 km/hr respectively, of the train moving in the same direction and the train passes them in 9 and 10 seconds respectively. Find the length and speed of the train.**

(a) 22 km/hr, 50 metre (b) 22 km/hr, 80 metre

(c) 32 km/hr, 50 metre (d) 32 km/hr, 80 metre

57. **An amount of ₹16400 is borrowed and is to be repaid in 2 years in equal annual installments at the rate of 5% compound interest. Find the amount of annual payment.**

(a) ₹ 7590 (b) ₹ 7495

(c) ₹ 7600 (d) ₹ 8820

58. **A dealer buys 200 quintals of wheat at ₹1,200 per quintal. He spends ₹10,000 on transportation and storage. If he sells the wheat at ₹13 per kg, then the profit percentage of the dealer is:**

(a) 1% (b) 3%

(c) 2% (d) 4%

59. **If a and b are the roots of equation $3x^2 - 5x + 2 = 0$ then find the value of (a/b)+(b/a).**

(a) 13/9 (b) 13/6

(c) 13/2 (d) 9/13

60. **In a rhombus ABCD, if ∠ACB = 40°, then ∠ADB = ?**

(a) 50° (b) 70°

(c) 60° (d) 45°

61. **What will be the median, mode and mean of the given numbers?**

9, 5, 8, 9, 9, 7, 8, 9, 8

(a) 9, 9, 9 (b) 9, 8, 9

(c) 8, 9, 8 (d) 8, 9, 9

62. **If $\sqrt{x^2 + y^2} = 25$ and $y = 2x$ then find the value of x.**

(a) 5 (b) 25

(c) $\sqrt{125}$ (d) $\sqrt{5}$

63. **A man says to his son seven years ago that I was 7 times of your age and after three years, I will be three times of your age. Find their age.**

(a) 42, 12 (b) 52, 12

(c) 40, 14 (d) 20, 42

64. **Starting from the inlet pipe in the reservoir, an inlet pipe and an outlet pipe take an hour to fill and empty the reservoir. The inlet pipe takes 11.25 hours to fill the empty reservoir and the outlet pipe can empty the filled reservoir completely in 22.5 hours. How much time will be taken to fill the reservoir?**

(a) 44 hours

(b) 45 hours

(c) 43 hours 50 minutes

(d) 42 hours 45 minutes

65. **If the income of A is 15% more than of B and the income of B is 20% less than that of C, then the income of A, B and C respectively are in the ratio:**

(a) 23 : 20 : 25 (b) 25 : 23 : 20
(c) 20 : 23 : 25 (d) 23 : 25 : 20

66. Farad per meter is the unit of———.
(a) Permeability
(b) Electric conductance
(c) Permittivity
(d) Watt per steradian

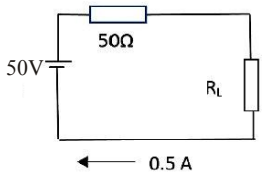
67. If an object has a mass of 100 kg on Earth, what would be its mass on the Moon?
(a) 980 kg (b) 100 kg
(c) 0 kg (d) 16.7 kg

68. A car starts from rest with a constant acceleration of $3m/s^2$. Find the distance covered by this car in 10s.
(a) 250m (b) 100m
(c) 200m (d) 150m

69. How much work required to be done to increase the speed of a ball of mass 0.4 kg from 1 m/s to 3m/s?
(a) 1.6J (b) 1.2J
(c) 0.8J (d) 0.4J

70. A steel rod with the thermal conductivity of 50.2 W/(m-K) has an area of cross-section 0.02 m^2 and length 15 cm. If the two ends of the rod are maintained at a temperature difference of 300^0C, the rate of heat flow through the rod is : 50.2 W
(a) 4.0 kJ/s (b) 1.0 kJ/s
(c) 3.0 kJ/s (d) 2.0 kJ/s

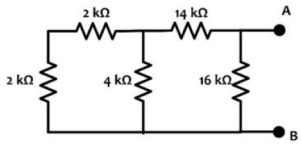
71. Power dissipated in R_L is



(a) 1W (b) 50W
(c) 0.5W (d) 12.5W

72. Twelve wires each having resistance r are connected to form a skeleton cube. Find the equivalent resistance between the two diagonally opposite corners of the cube.
(a) 5r (b) $\frac{2}{3}r$
(c) $\frac{5}{6}r$ (d) r

73. A multi-meter in resistance measurement mode is used in the given circuit across terminals A and B. Which of the following is the best setting to display the measured value on a 3-digit screen?



(a) 10 kΩ (b) 10 MΩ
(c) 1 kΩ (d) 1 Ω

74. If both the number of turns and core length of an inductive coil are doubled, then its self inductance will be
(a) halved (b) doubled
(c) quadrupled (d) unaffected

75. The minimum number of wattmeter(s) required to measure 3-phase 3-wire balanced or unbalnced power is:
(a) 4 (b) 1 (c) 2 (d) 3

76. Ria needs to calculate the number of turns that a solenoid should have, in order to induce a voltage of 50 V provided that the magnetic flux in its cavity changes from 70 mWb to 20 mWb per time 0.20 s. What will be her answer?
(a) 200 (b) 20
(c) 50 (d) 2

77. If the distance between two charged bodies is made half, the force between them becomes
(a) One fourth (b) Double
(c) Half (d) None of the above

78. 2 coils having self-inductance of 10mH and 15mH have an effective inductance of 40mH when they are connected in series aiding. What will be the equivalent inductance when they are connected in series opposition?
(a) 20mH (b) 25mH
(c) 5mH (d) 10mH

79. A coil would behave as-
(a) An inductor at high frequencies
(b) A capacitor at very low frequencies
(c) A resistor at high frequencies
(d) A capacitor at very high frequencies

80. A conductor material has a free-electron density of 10^{25} electrons per m^3, When a voltage is applied, a constant drift velocity of 1.4×10^{-3} m/s. If the cross-sectional area of the material is 1 cm^2, calculate the magnitude of the current. Electronic charge is 1.6×10^{-19} coulomb.
(a) 0.224 A (b) 0.2 A
(c) 0.25 A (d) 0.1 A

81. Basic composition of Mica is given by:
(a) $H_2Al_3(SiO_4)_3$ (b) $KH_2Al_3(SiO_4)_3$
(c) $KH_2Al_3O_4$ (d) $KH_2(SiO_4)_3$

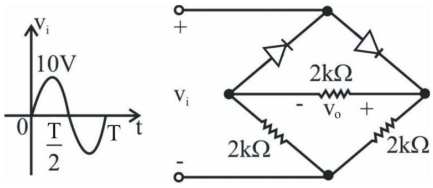
82. N–type semiconductors are formed by adding:
(a) Divalent impurities to pure semiconductor
(b) Trivalent impurities to pure semiconductor
(c) Tetravalent impurities to pure semiconductor
(d) Pentavalent impurities to pure semiconductor

83. Avalanche breakdown occurs at a reverse bias voltage of :
(a) 2 – 4 V (b) 4 – 6 V
(c) 6 – 8 V (d) 8 – 10 V

84. **The stability factor (S) for common emitter circuit is given by _____ (treating base current constant)**
(a) $S = \alpha + \beta$ (b) $S = 1 + \beta$
(c) $S = 1 - \beta$ (d) $S = 2 + \beta$

85. **Which of the following statements is INCORRECT?**
(a) Similar to the MOSFET, the IGBT has a low impedance gate.
(b) Similar to the MOSFET, the IGBT has a high impedance gate.
(c) Like the BJT, the IGBT has a small on- state voltage.
(d) Similar to the GTO, the IGBT can be designed to block negative voltage.

86. **When the transformer is not center tapped, the required PIV across each diode is :**



(a) 10 V (b) 20 V
(c) 5 V (d) 0.636 V

87. **What is the value of collector current (I_C) for β_{dc} = 150 and base current (I_B) = 30 μA ?**
(a) 5 A (b) 4.5 mA
(c) 50 mA (d) 6 A

88. **When n-channel depletion type MOSFET are used in enhanced mode–**
(a) The gate will be positive
(b) The gate will be negative
(c) The gate will be ground level
(d) The gate will be undetermined

89. **An oscillator which generates sine wave oscillations is called_**
(a) Damped wave oscillator
(b) Relaxation oscillator
(c) Feedback oscillator
(d) Harmonic oscillator

90. **Slew rate is defined by.**
(a) di/dt (max) (b) dv/dt (max)
(c) di/dt(min) (d) dv/dt(min)

91. **Which of the following multi vibrator is also called as Eccles-Jordan circuit in early days?**
(a) Bistable multivibrator
(b) Monostable multivibrator
(c) Astable multivibrator
(d) All of these

92. **A (0-200) V voltmeter has an accuracy of 0.75% of full scale reading. If voltage measured is 100 V, the error is**
(a) 3% (b) 2%
(c) 1.5% (d) .75%

93. **A PMMC meter has an internal resistance 200Ω and the current required for its full scale deflection is 50μA. The meter is capable of measuring on its own a maximum voltage of :**
(a) 50μV (b) 10μV
(c) 5mV (d) 10 mV

94. **Potentiometer is basically a..... Instrument–**
(a) Digital (b) Deflection type
(c) Null type (d) Recording

95. **The _____ aquadag coating on the inner surface of a CRT-based CRO acts as a _____.**
(a) non-conducting; high-voltage electrode
(b) conducting; high-voltage electrode
(c) conducting; low-voltage electrode
(d) non-conducting; low-voltage electrode

96. **Identify the name of instrument shown in figure.**

(a) Dial gauge type displacement Transducer
(b) High Sensitive acceleration Transducer
(c) Cavity type pressure Transducers
(d) Flux meter

97. **If $(101)_n$ = 65, where n represents the base of the respective number system, then the value of n is–**
(a) 2 (b) 4
(c) 8 (d) 16

98. **The NOR - NOR realization is equivalent to …….**
(a) NOT-AND realization
(b) AND-OR realization
(c) OR-NOT realization
(d) OR-AND realization

99. **What will be next state in a JK flipflop if clock = 0, J = 0, K = 1? (Q_n and Q_{n+1} are present and next states, respectively)**
(a) Q_n (b) Q' n
(c) 1 (d) 0

100. **In dual slope type of ADCs, an input hold time is____**
(a) Almost zero
(b) Higher than that of flash type ADCs
(c) Longest
(d) All of the above

SOLUTION : PRACTICE SET- 12

ANSWER KEY

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

SOLUTION

1. (b)
Indian Regional Navigation Satellite System (IRNSS) is a regional navigation system developed by the Indian Space Research Organization (ISRO) which is totally under control by Government of India. The Prime Minister of India Shri Narendra Modi has named it NAVIC dedicated to fishermen of India. It's purpose is to give accurate location information to its user in part of the country and upto a distance of 1500 km from the Indian border.

2. (d)
In Volleyball Spiking is the off play where a player slams the ball sharply down-wards over the net & into the opposite court, making it difficult for the opposing team to recover the ball. In Volleyball, spike in also known with the name Smash.

3. (c)
Kalaripayattu is an ancient martial art indigenous to Kerala. The word 'Kalari' first appears in the Tamil sangam literature to describe both a battle field and combat arena.

4. (b)
Christian Friedrich Samuel Hahnemann was a German physician, best known for creating the pseudoscientific system of alternative medicine called homeopathy. He propounded the homeopathic principle of 'Like Cures Like.

5. (b)
Kynesian Multiplier theory states that the economy will flourish the more the government spends. This theory was propounded by British economist John Maynard Keynes in 1936. The multiplier effect refers to the theory that government spending intended to stimulate the economy causes increase in private spending that further stimulates the economy.

6. (b)
Article 368 under part XX of the Indian Constitution deals with the powers of the parliament to amend the constitution and its procedures. According to the procedures laid in this, Parliament can amend the constitution by adding new provisions or by removing or by changing the given provisions, structure of the constitution.

7. (d)

Famous Grasslands	Location
Pampas	South America
Steppes	Central Asia and Eastern Europe
Savanna	Africa
Prairies	North America

8. (d)
Dams and reservoirs are constructed to store surplus water during wet periods, which can be used for irrigating arid lands. One of the major benefits of dams and reservoirs are where water flows can be regulated as per agricultural requirements of the various regions over the year.
Reservoir-based hydroelectric projects provide much needed peaking power to the grid. Hydropower is a renewable source of energy.
Canals from dams help in transferring water from reservoir to greater distance which facilitates equitable distribution of water.

9. (b)
Guru Ram Das Ji was gifted the land for Harmandir Sahib by Mughal Emperor Akbar. The 5th Guru Sri Arjun Dev ji brick lined the structure and began construction of the Golden Temple Complex in December of 1588. In Sikh history, Sufi saint Mian Mir Mohammed Muayyinul Islam, laid the foundation stone of Harmandir Sahib.

10. (a)
On 7th February 1856, Lord Dalhousie Annexed Wajid Ali Shah's kingdom 'Awadh' on the account of alleged internal misrule.
The Doctrine of lapse was an annexation policy followed widely by Lord Dalhousie when he was India's Governor-General from 1848 to 1856.

States Annexed by Doctrine of Lapse	Year of Annexation
Satara	1848
Jaitpur	1849
Sambhalpur	1849

Baghat	1850
Udaipur	1852
Jhansi	1853
Nagpur	1854

11. (b)

From the given options,

(a) 21 : 420

$\Rightarrow \quad 21^2 - 21 \Rightarrow 441 - 21 = 420$

(b) 15 : 208

$\Rightarrow \quad 15^2 - 15 \Rightarrow 225 - 15 = 210 \neq 208$

(c) 17 : 272

$\Rightarrow \quad 17^2 - 17 \Rightarrow 289 - 17 = 272$

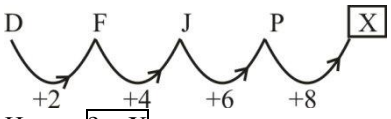
(d) 25 : 600

$\Rightarrow \quad 25^2 - 25 \Rightarrow 625 - 25 = 600$

Hence, option (b) is different from others.

12. (b)

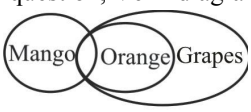
Given series is as follows-



Hence, ? = X

13. (c)

According to the question, Venn diagram is as follows,



Conclusion:-

(I) (×)

(II) (×)

Hence, Neither conclusion I nor II follows.

14. (a)

From statement-1, The color of granite is the color of wall

The color of the wall is not known by this statement 2- The color of granite is very bright/Shiny. This only shows that granite is shiny.

Hence from both statements we cannot detect the color of granite.

15. (d)

According to statement both arguments (1) and (2) are strong.

16. (b)

According to the assumption, it is clear that arguments I and II follows.

17. (c)

Two surface coloured $= 12 (n - 2)$

$n = 3$

Then, two surface painted $= 12 (3 - 2)$

$= 12 \times 1$

$= 12$

18. (a)

Just as, Rabbit and Snail is creature (living) in the same way Aeroplane and Bullock cart is the means of transport. So, option (a) is correct.

19. (c)

Given, + # 7 & 6

Number/ Symbols	**2**	**@**	**9**	**5**	**$**	**&**	**3**	**%**	**#**	**7**	**+**	**4**	**8**	**6**
Code	**T**	**F**	**A**	**J**	**L**	**E**	**W**	**Q**	**D**	**P**	**R**	**B**	**U**	**S**

$\Rightarrow$ Given code is following the condition (i) so first and last element will be interchanged.

+ # 7 & 6 $\Rightarrow$ 6 # 7 & +

↓ ↓ ↓ ↓ ↓ (Code)

S D P E R

Hence, option (c) is correct.

20. (a)

A total of three group of three picture can be formed by using them from the pictures given in the above question or using pictures only once. These groups will be :

(1) Picture (1, 4, 7)

(2) Picture (2, 3, 6)

(3) Picture (5, 9, 8)

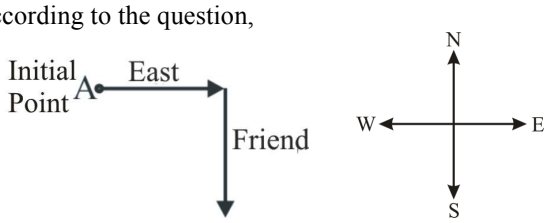
Hence, option (a) is correct.

21. (c)

The given figure completes figure A has + sign in the middle, B Shape has x sign, similarly C figure has an x sign, D shape should have a + sign in the middle and the side pole should be attached to the corner denoted in figure 3.

22. (b)

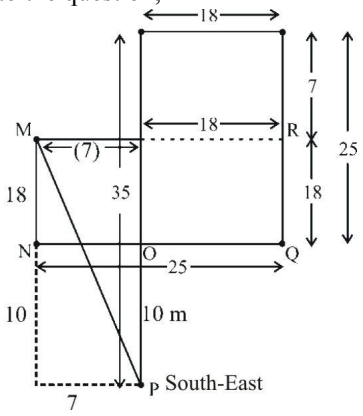
According to the question,



Initially he stand facing towards East and turns his head to the right to look at his friend. So, it is clear that his friend is coming from the South direction.

23. (b)

According to the question,

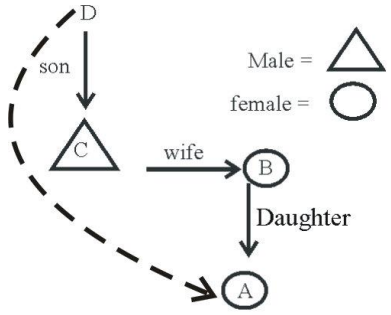


Distance of Harish from point M to P $= \sqrt{28^2 + 7^2}$

$= \sqrt{833} = 28.86$ m (South-East)

24. (d)

According to the question,



Hence, it is clear from blood relation diagram that A is the daughter of D's son.

25. (d)

Given,

$$27-15 \div 84 \times 6 + 13$$

On interchanging the mathematical symbols,

$\Rightarrow$ $27 + 15 \times 84 \div 6 - 13$

$\Rightarrow$ $27 + 15 \times 14 - 13$

$\Rightarrow$ $27 + 210 - 13$

$\Rightarrow$ $237 - 13$

$\Rightarrow$ 224

26. (b)

An Integrated Circuit (IC) is based entirely on electronics in which the active and passive components are built on a silicon crystal chip. Components in ICs are made together and there are no soldering joints, hence it has high reliability. Jack Kilby and Robert Noyce invented Integrated Circuit (IC).

27. (d)

Drum plotter is a graphic output device that draws lines or image with a continuously moving pen on a sheet of paper rolled around a rotating drum that moves the paper in a direction perpendicular to the motion of the pen. The plotters are divided into the following four categories on the basis of their working Drum plotter, Flatbed, Inkjet and Electrostatic etc.

28. (d)

Plotter, Printer and Monitor are output devices whereas Touch screen is an input device.

29. (a)

Printing devices resolutions are measured in Dot Per Inch, resolution is the image quality produced by a printer.

Digital image or video display resolution is measured in Pixels Per Inch (PPI).

30. (d)

DRAM (Dynamic Random Access Memory) is a primary memory or primary storage device while other option (Flash drive, Pen drive, CDs) are example of secondary storage device.

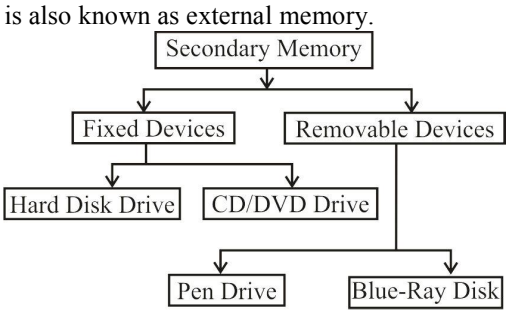
31. (c)

RAM (Random Access Memory) is a primary memory while SSD (Solid State Drive), Hard Disk, USB Pen Drive etc. are example of secondary memory.

32. (a)

Secondary memory is non-volatile memory it retains data when power is switch off. We can use secondary memory to store large amount of data, audio, video and multimedia files.

- It store data for long term or permanently. It is cheaper as compared to primary memory.
- It is also known as external memory.



33. (a)

A TCP is connection - oriented protocol while UDP is connectionless protocol.

TCP is reliable for maintaining a connection between sender and receiver UDP is connection less and due this it is unreliable to transfer data.

34. (a)

The Internet architecture is a meta-network that refers to a group of thousands of separate networks interacting with a common protocol. It is the third application layer which includes various protocols for building Internet services such as email (SMTP), file transfer (FTP), transfer of hypermedia pages, transfer of distributed databases (World Wide Web) etc.

35. (c)

Application layer is the 7^{th} layer of the OSI model. This layer uses protocols like HTTP, FTP, SMTP and NFS etc.

36. (c)

Page setup options are used to set the layout and print options of a page in MS word 365. To use the page setup dialog box, click the page layout tab, then click dialog box launcher in the page setup group.

37. (a)

In MS word 365, when Ctrl + P shortcut key is used to print a document, word combines print and preview in a single window.

38. (d)

9 options are available in the alignment group to align text in a table in MS 365.

39. (b)

Packet switching technology is used by the Internet. Packet switching is a method of transferring data in the form of packets across different networks. In order to transfer files over the network in a fast and efficient manner and reduce transmission latency, data is divided into smaller pieces of variable length, called packets.

40. (c)

A cookie is information that a website puts on a user's computer. Cookies store limited information from a web browser session on a given website that can be retrieved in the future. They are also sometimes referred to as browser cookies, web cookies or internet cookies.

41. (b)
IP serves as the focal point for the architecture, it defines a common method for exchanging packets among a wide collection of networks. Above IP there can be arbitrarily many transport protocols, each offering a different channel abstraction to application programs.

42. (a)
Google Chrome's Incognito mode is a private browsing feature that allows users to browse the web without their browsing history, cookies, or site data being saved. It also doesn't store the data entered in the personal account.

43. (b)
Microsoft Edge, Google Chrome and Mozilla Firefox are web browsers while Jungle Safari is not web browsers.

44. (d)
The shortcut key to open in Linux is incognito Ctrl + Shift + N. It is windows and uses the new incognito window of Google Chrome. It is used for browsing. Your browser history, cookies and data forms sides or forms are not saved on your device this means that your activity is stored in your chrome browser history.

45. (a)
We can protect, file, Worksheet & cell also but calculation is meant for to calculate.

46. (b)
Let number of males $= 7x$
and, number of female $= 6x$
According to the question-

$$7x = 56$$
$$x = 8$$

$\therefore$ Total number of guests $= 7x + 6x$
$= 13x$
$= 13 \times 8$
$= 104$

47. (d) From question

$$56 \div \frac{1}{3}\left\{15+12-\left(9+6-\overline{5+7}\right)\right\}$$
$$= 56 \div \frac{1}{3}\left\{15+12-(15-12)\right\}$$
$$= 56 \div \frac{1}{3}\left\{15+12-3\right\}$$
$$= 56 \div \frac{1}{3}\left\{24\right\}$$
$$= 56 \div 8$$
$$= \frac{56}{8} = 7$$

48. (a)

Given: $\frac{9}{17}$

$$\frac{9\times3}{17\times3} = \frac{27}{51}$$
$$\frac{9\times7}{17\times7} = \frac{63}{119}$$
$$\frac{9\times17}{17\times17} = \frac{153}{289}$$

Hence $\frac{108}{221}$ will not equivalent fraction of $\frac{9}{17}$.

49. (c)
Let original fraction is $\frac{x}{y}$
According to the question,

$$\frac{x\times\frac{20}{100}}{y\times\frac{40}{100}} = \frac{5}{6}$$
$$\frac{x}{2\times y} = \frac{5}{6}$$
$$\frac{x}{y} = \frac{5}{3}$$

Hence original fraction $= \frac{x}{y} = \frac{5}{3}$

50. (a)
On finding the HCF of
$(2^4\times3^4\times5^3\times7^2)$ and $(2^2\times3^6\times5^5)$
HCF $= 2^2\times3^4\times5^3$

51. (c)
The side of the largest square tile = HCF of 13.92m and 5.22m,
On finding the HCF by division method,

$$522\overline{)1392}\,(2$$
$$\underline{1044}$$
$$348\overline{)522}\,(1$$
$$\underline{348}$$
$$174\overline{)348}\,(2$$
$$\underline{348}$$
$$\times\times\times$$

So, the HCF is 174.
Hence, the length of the side = 174cm = 1m 74cm,

52. (b)
Let the number is 9x and 5x respectively.
According to the question,

$$\frac{9x+8}{5x+8} = \frac{5}{3}$$
$$27x + 24 = 25x + 40$$
$$2x = 40 - 24$$
$$2x = 16$$
$$x = 8$$

So, the largest number $= 9 \times 8 = 72$

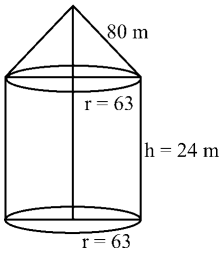
53. (b)
Formula- for such cases,

$$\text{Decrease \%} = \left(\frac{x}{100+x}\right)\times100$$

Given- Growth = 10%
So, decrease % in 10% consumption,

$$= \left(\frac{10}{100+10}\right)\times100$$
$$= \frac{1}{11}\times100 = 9\frac{1}{11}\%$$

54. (c)
We know that, $r = \frac{D}{2} = \frac{126}{2} = 63\text{m}.$



Curved surface of tent $= 2\pi rh + \pi rl$

$= \pi r(2h + l)$

$= \frac{22}{7} \times 63(2 \times 24 + 80)$

$= 198\ (48 + 80)$

$= 198\ (128)$

$= 25344\ m^2$

Area of canvas $= (l \times b) = 25344$

$l \times 8 = 25344$

$\therefore\ l = \frac{25344}{8}$

Length of required canvas $= 3168$ m

55. (c)

A's 1 day work $= \frac{1}{40}$ part

B's 1 day work $= \frac{1}{60}$ part

Let-

B leave the work after working x days, then the work done by B in x days $= \frac{x}{60}$ part

And work done by A in $(x + 10)$ days $= \frac{x+10}{40}$ part

Now,

$$\frac{x}{60} + \frac{(x+10)}{40} = 1$$

$$\frac{2x + 3(x+10)}{120} = 1$$

$$2x + 3x = 120 - 30$$

$$5x = 90$$

$$x = 18$$

Hence, B worked for 18 days.

56. (a)

Let the length of train $= x$ m.

and speed $=$ y m./sec.

Speed of first person $= 2 \times \frac{5}{18} = \frac{5}{9}$ m./sec.

Speed of second person $= 4 \times \frac{5}{18} = \frac{10}{9}$ m./sec.

Speed of train relative to first person $= \left(y - \frac{5}{9}\right)$ m./sec.

Speed of train relative to second person

$= \left(y - \frac{10}{9}\right)$ m./sec.

$y - \frac{5}{9} = \frac{x}{9}$, $\quad y - \frac{10}{9} = \frac{x}{10}$

$y = \frac{x+5}{9}$ -----(i)

$y = \frac{x}{10} + \frac{10}{9} = \frac{9x+100}{90}$ ----- (ii)

$\frac{x+5}{9} = \frac{9x+100}{90}$ {from equation (i) & (ii)}

$10x + 50 = 9x + 100$

$x = 50$ m.

and speed $= \frac{50+5}{9} = \frac{55}{9}$ m./sec.

$= \frac{55}{9} \times \frac{18}{5} = 22$ km./hr.

57. (d)

Let installment = ₹x

Total amount $=$ installment $\left[\frac{1}{\left(1+\frac{r}{100}\right)^1} + \frac{1}{\left(1+\frac{r}{100}\right)^2}\right]$

$$16,400 = x\left[\frac{1}{\left(1+\frac{5}{100}\right)^1} + \frac{1}{\left(1+\frac{5}{100}\right)^2}\right]$$

$$16,400 = x\left[\frac{1}{\frac{21}{20}} + \frac{1}{\left(\frac{21}{20}\right)^2}\right] = x\left[\frac{20}{21} + \frac{400}{441}\right]$$

$$16,400 = x\left[\frac{420+400}{441}\right]$$

$$16400 = x \times \frac{820}{441}$$

$x = 20 \times 441 =$ ₹ 8820

58. (d)

∵ Cost price of wheat

$= 1200 \times 200 + 10000 =$ ₹ 2,50,000

∵ Total selling price at ₹13 per kg.

$= 13 \times 200 \times 100 =$ ₹ 2,60,000

Profit % $= \frac{260000 - 250000}{250000} \times 100$

$= \frac{10000}{250000} \times 100 = 4\%$

59. (b)

Comparing equation $Ax^2 + Bx + C = 0$ from equation $3x^2 - 5x + 2 = 0$

A = 3, B = -5, C = 2

Sum of roots $(a + b) = \frac{-B}{A} = \frac{-(-5)}{3} = \frac{5}{3}$

Multiplication of roots $(ab) = \frac{C}{A} = \frac{2}{3}$

$$\frac{a}{b}+\frac{b}{a} = \frac{a^2+b^2}{ab}$$

$$= \frac{a^2+b^2+2ab-2ab}{ab}$$

$$= \frac{(a+b)^2-2ab}{ab}$$

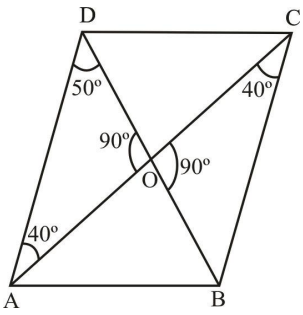
$$= \frac{\left(\frac{5}{3}\right)^2-2\times\frac{2}{3}}{\frac{2}{3}}$$

$$= \frac{\frac{25}{9}-\frac{4}{3}}{\frac{2}{3}}$$

$$= \frac{\frac{25-12}{9}}{\frac{2}{3}}$$

$$= \frac{13}{9}\times\frac{3}{2} = \frac{13}{6}$$

60. (a)



The diagonals of rhombus bisect each other at right angle (90°).

$\angle AOD = 90°$

$\angle ACB = \angle DAO = 40°$ [Transversal line AC cuts AD|| BC]

In ΔDAO

$\angle AOD + \angle OAD + \angle ADO = 180^0$

$90^0 + 40^0 + \angle ADO = 180^0$

$\angle ADO = 180^0 - 130^0$

$\boxed{\angle ADB = 50^0}$ $\{\because \angle ADO = \angle ADB\}$

61. (c)

Arranging the numbers in ascending order-

5, 7, 8, 8, 8, 9, 9, 9, 9

$\because$ terms number = 9 (odd)

$\therefore$ median $= \left(\frac{n+1}{2}\right)$ th term

$= \frac{9+1}{2} = 5^{th}$ term $= 8$

mode $= 9$ (the highest frequent number)

$\text{mean} = \frac{5+7+8+8+8+9+9+9+9}{9}$

$= \frac{72}{9} = 8$

62. (c)

$\sqrt{x^2+y^2} = 25$, $y = 2x$

$\sqrt{x^2+y^2} = 25$ ..... (i)

On squaring equation (i),

$x^2 + y^2 = 625$

$x^2 + (2x)^2 = 625$ ($\because y = 2x$)

$x^2 + 4x^2 = 625$

$5x^2 = 625$

$x^2 = 125$

$x = \sqrt{125}$

63. (a)

Let the age of father is y years and age of son is x years.

According to the first conditon,

$7(x - 7) = (y - 7)$

$7x - 49 = y - 7$

$7x - y = 42$ .....(i)

According to the second conditon,

$3(x + 3) = (y + 3)$

$3x + 9 = y + 3$

$3x - y = -6$ .....(ii)

From equation (i) and (ii),

$7x - y = 42$

$3x - y = -6$

$- \quad + \quad +$

$4x \quad = 48$

$x = 12$

From equation (i),

$7x - y = 42$

$7 \times 12 - y = 42$

$84 - 42 = y$

$y = 42$

Therefore, age of father = 42 years

And age of son = 12 years

64. (d)

Filled part of the tank by inlet pipe in 1 hour $= \frac{1}{11.25}$ part

Emptied part of the tank by outlet pipe in 1 hour $= \frac{1}{22.5}$ part

Filled part by both pipes in 2 hours

$= \frac{1}{11.25} - \frac{1}{22.5} = \frac{2-1}{22.5}$

$$= \frac{1}{22.5}$$

Fill part of the tank by both pipes in 2 × 21 hours

$$= \frac{1}{22.5} \times 21$$

Water filled in 42 hours $= \frac{42}{45}$ part

Remaining part of tank $= 1 - \frac{42}{45} = \frac{3}{45}$

Time taken to fill the $\frac{3}{45}$ part by inlet pipe

$$= \frac{3}{45} \times 11.25 = \frac{3}{4} \text{ hours}$$

$$= \frac{3}{4} \times 60 = 45 \text{ minute}$$

Total time = 42 hour 45 minutes

65. (a)

According to the question,

$$A = B \times \frac{115}{100}$$

$$\frac{A}{B} = \frac{23}{20}$$

$$B = C \times \frac{80}{100}$$

$$\frac{B}{C} = \frac{20}{25}$$

Hence, A : B : C = 23 : 20 : 25

66. (c)

Farad per meter is the unit of permitivity

- Electric conductance → Siemen (s)
- Permeability → Henry/ meter

67. (b)

If an object has a mass of 100 kg on earth, then its mass on the moon is 100 kg i.e. remains same.

Weight = mass × gravity

$\boxed{W = mg}$

68. (d)

a= 3m/s^2

t = 10s

S = ?

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

$$S = 0 \times 10 + \frac{1}{2} \times 3 \times 10^2$$

$$S = \frac{1}{2} \times 300$$

S= 150m

Total distance covered by the car is 150 m.

69. (a)

Let the mass of ball (M) = 0.4kg

Work (W) = Change in kinetic energy (ΔKE)

$$= \frac{1}{2} m\left(v_2^2 - v_1^2\right)$$

$$= \frac{1}{2} \times (0.4) \times \left(3^2 - 1^2\right)$$

So, W = 1.6 J

70. (d)

Thermal conductivity (K) = 50.2 W/(m-K)

Length of rod (l) = 15 cm = 0.15 m

Area of cross-section of rod (A) = 0.02 m^2

Temperature difference betweens $(\theta_1 - \theta_2)$ = 300°C

Rate of flow of heat (Q) $\frac{KA(\theta_1 - \theta_2)}{l}$

$$= \frac{50.2 \times 0.02 \times 300}{0.15}$$

= 2008 J/s

= 2 kJ/second

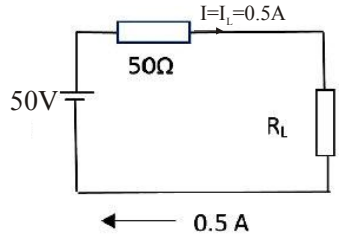
71. (d)

Given that-

V_s = 50V

$I = I_L$ = 0.5A

R_s = 50Ω



$V_L = V_s - 25$

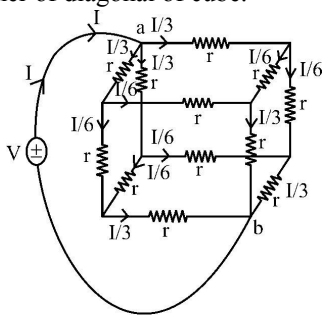
$V_L = 50 - 25 = 25V$

$P_L = V_L I_L$

= 25×0.5 = 12.5Ω

72. (c)

Let, Current (I) flow when V volt supply is given on the diagonal. By dividing current (I) we find out the value of current in different each branch. KVL apply at opposite corner of diagonal of cube.



$$V - \frac{I.r}{3} - \frac{I.r}{6} - \frac{I.r}{3} = 0$$

$$V - r\left[\frac{I}{3} + \frac{I}{6} + \frac{I}{3}\right] = 0$$

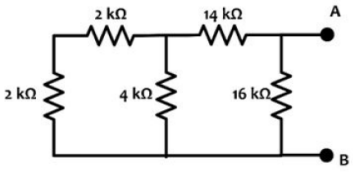
$$V - r\left[\frac{2I + I + 2I}{6}\right] = 0$$

$$V - \frac{5I.r}{6} = 0$$

or $\frac{V}{I} = \frac{5}{6}r$ ohm

$R_{eq} = \frac{5}{6}r$ ohm

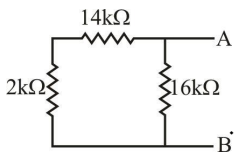
73. (a)



$(2 + 2) \parallel 4 = 4 \parallel 4$

$= \frac{4 \times 4}{4 + 4}$

$= 2k\Omega$



$(2 + 14) \parallel 16 \Rightarrow 16 \parallel 16$

$= \frac{16 \times 16}{16 + 16} = 8\ k\Omega$

10 kΩ is the best setting for 8kΩ resistance.

74. (b)

$\because$ Self inductance of coil

$$L = \frac{N^2}{\frac{1}{\mu_o \mu_r} \cdot \frac{\ell}{A}} \Rightarrow L \propto \frac{N^2}{\ell} \qquad (A = \text{constant})$$

$$\Rightarrow \frac{L_1}{L_2} = \left(\frac{N_1}{N_2}\right)^2 \left(\frac{\ell_2}{\ell_1}\right)$$

$\because$ $\ell_1 = \ell, \quad \ell_2 = 2\ell$

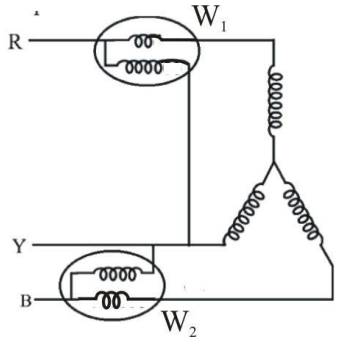
$N_1 = N, \quad N_2 = 2N$

$$\frac{L_1}{L_2} = \left(\frac{N}{2N}\right)^2 \left(\frac{2\ell}{\ell}\right) = \frac{1}{2} \Rightarrow L_2 = 2L_1$$

If both the number of turns and core length of an inductive coil are doubled, then its self inductance will be doubled.

75. (c)

The minimum number of wattmeter (s) required to measure 3-phase 3 wire balanced or unbalanced power is 2.



76. (a)

Given, e = 50V

N = ?

Flux $d\phi = 70 - 20 = 50$ mWb

$= 50 \times 10^{-3}$ Wb

Time dt = 0.20 sec

$\because \quad e = \frac{-Nd\phi}{dt}$

$\therefore \quad N = \frac{e \times dt}{d\phi}$

$= \frac{50 \times 0.20}{50 \times 10^{-3}}$

$N = 200$

77. (d)

Force between the two charge proportional to the product of the charge and inversely proportional to the square of distance between them

$$F = \frac{1}{4\pi\varepsilon_0} \frac{q_1 q_2}{r^2}$$

where, $\frac{1}{4\pi\varepsilon_0} = K$

$\therefore \quad F = K.\frac{q_1 q_2}{r^2}$

Given that, $r' = \frac{r}{2}$

$$F' = K.\frac{q_1 q_2}{\left(\frac{r}{2}\right)^2}$$

$$F' = 4K.\frac{q_1 q_2}{r^2}$$

$F' = 4F$

So, the force between them become 4 times of initial value.

78. (d)

Given

$L_1 = 10$ mH $\qquad L_{eff} = 40$mH

$L_2 = 15$ mH

When connected in series aiding

$L_{eff} = L_1 + L_2 + 2M$

$40 = 10 + 15 + 2M$

$2M = 15$

$\boxed{M = 7.5mH}$

When connected in series opposition

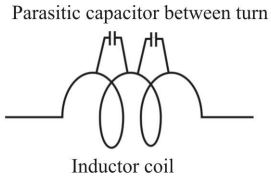
$L'_{eq} = L_1 + L_2 - 2M$

$= 10+15-2\times7.5 = 10 + 15 - 15$

$\boxed{L_{eq} = 10mH}$

79. (d)

A coil would behave as a capacitor at very high frequencies.



80. (a)

Given that,

Free-electron density (n) = 10^{25} per m^3

Charge on electron (e) = 1.6×10^{-19} Coulomb

Cross section area (A) = 1 cm^2 = 1×10^{-4} m^2

Drift velocity (V_d) = 1.4×10^{-3} m/s

$I = neAV_d$

$= 10^{25} \times 1.6 \times 10^{-19} \times 1 \times 10^{-4} \times 1.4 \times 10^{-3}$

$\boxed{I = 0.224 \text{ A}}$

81. (b)

(i) Basic composition of mica is $KH_2Al_3(SiO_4)_3$.

(ii) Mica is a complex silicate compound.

(iii) Alkaline substance like potassium, silica and alumina are also found in it.

(iv) Mica is conductor of heat and insulator of electricity. Due to its high thermal resistance mica is used as an insulator in various electronic devices.

82. (d)

An N-type semiconductor is formed when a small amount of pentavalent impurity is added to a pure germanium or silicon crystal. The addition of pentavalent impurity produces a large no. of free electrons in the host crystal. To explain the formation of N-type semiconductor let us introduce a pentavalent impurity atom into the lattice of pure silicon.

83. (d)

Avalanche breakdown occurs at a reverse bias voltage of 8-10V. The number of charge carrier in the P-N junction diode increase cumulatively and the junction breaks this effect is called the avalanche effect and this breakdown of junction is called avalanche breakdown.

84. (b)

The stability factor (S) for common emitter circuit is given by

$\boxed{S = 1 + \beta}$ (I_B= constant)

Stabilization is the process that makes the Q-point independent of changes in temperature and transistor parameters.

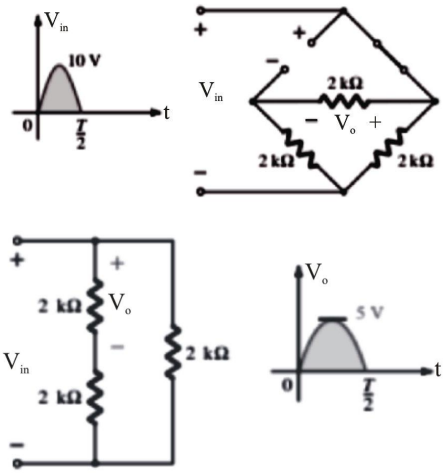
Hence, I_C will be unstable when S is very large.

85. (a)

IGBT and MOSFET are two different types of transistors used in electronics industry.

Sr.	BJT	MOSFET	IGBT
1.	Bipolar device	Unipolar device	Bipolar device
2.	Low on-state voltage drop	High on-state voltage drop	Low on-state voltage drop
3.	Low on-state conduction power loss	High on-state conduction power loss	Low on-state conduction power loss
4.	High switching power loss	Low switching power loss	Low switching power loss
5.	Low input impedance	High input impedance	High input impedance
6.	Current control device	Voltage control device	Voltage control device.
7.	Usage UPS charging battery	SMPS	Inverter, chopper
8.	Negative temperature coefficient of resistance	Positive temperature coefficient of resistance	Positive temperature coefficient of resistance

86. (c)



$V_o = \frac{1}{2} V_i$

$V_{o(max)} = \frac{1}{2} V_{i(max)}$

$= \frac{1}{2}(10V) = 5V$

PIV = $V_{o(max)}$

= 5V

87. (b)

Given,

$\beta_{dc} = 150$

Base current (I_B) = 30μA

$\because I_C = \beta_{dC} I_B$

$I_C = 150 \times 30 \times 10^{-6}$

$I_C = 4500 \times 10^{-6}$

$I_C = 4.5 \times 10^{-3}$

$I_C = 4.5$ mA

88. (a)

When n-channel depletion type MOSFET are used in enhanced mode then the gate will be positive. At zero bias operation, this MOSFET operates in depletion mode at negative values of V_{GS} and in enhancement mode at positive V_{GS}.

89. (d)
Sinusoidal or harmonic oscillator are oscillators that generate an output using a sine waveform.
The total phase shift around the loop in a sinusoidal oscillator is either 0º or 360º.
• Sinusoidal oscillator-
(i) RC phase shift oscillator
(ii) Wien bridge oscillator
(iii) Hartley oscillator
(iv) Crystal oscillator
(v) Clapp oscillator
(vi) Colpitts oscillator.

90. (b)
Slew rate - The maximum rate of change of an op-amp's output voltage.

$$\text{Slew rate} = \left(\frac{dv}{dt}\right)_{max} \text{ volts/}\mu s$$

Generally, slew rate typical value is 80 V/μs and ideally infinite.

$$\left|\frac{dV_0}{dt}\right|_{max} = V_m.2\pi f = \text{slew rate}$$

91. (a)
Bistable multivibrator is also called as Eccles-Jordan circuit in early days.

92. (c)

$$\text{Error} = 200 \times \frac{0.75}{100} = 1.50$$

$$\text{limiting error } \% = \frac{1.5}{100} \times 100 = 1.5\%$$

93. (d)
Given,
Internal resistance, $R_i = 200\ \Omega$
Full scale deflection = 50μA
$V = IR = 200 \times 50 \times 10^{-6}$
$V = 10000 \times 10^{-6}$
V = 10 mV
The meter is capable of measuring maximum voltage = 10 mV.

94. (c)
Potentiometer is basically a null type instrument.
Null type instrument - An instrument in which zero or null indication determines the magnitude of measured quantity such type of instrument is called a null type instrument. Sensitivity and accuracy are high of null type instrument and it is not suitable for dynamic measurement.
Potentiometers - A potentiometer is very simple and cheap form of transducers. It converts linear or rotational displacement into a voltage.

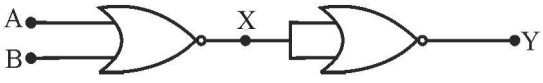
95. (b)
A conductive aquadag coating applied to the inside of the glass envelope of cathode ray tubes, serves as a high-voltage electrode. The coating covers the inside walls of the "bell" of the CRT tube from just inside the neck and stops just inside the neck and stops just short of the screen.

96. (a)
Identified name of instrument shown in figure is dial gauge type displacement transducer.
A displacement transducer is a dial gauge with a strain sensing element 3 integrated bridge circuit.
It is used for accurate measurement of very small linear distances.

97.(c)

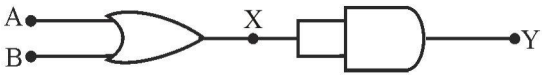
$$(101)_n = 1 \times n^2 + 0 \times n^1 + 1 \times n^0 = 65$$
$$1 + n^2 = 65$$
$$n^2 = 64$$
$$n = 8$$

98. (d)
NOR-NOR realization -



$X = \overline{A + B}$ $\quad$ $\boxed{Y = A + B}$

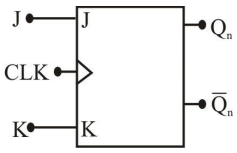
OR-AND realization -



$X = A + B$ $\quad$ $\boxed{Y = A + B}$

Both output are same, So the NOR-NOR realization is equivalent to the OR-AND realization.

99. (a)



$Q_{(n+1)} = J\overline{Q}_n + \overline{K}Q_n$

CLOCK	J	K	$Q_{(n+1)}$	State
0	0	0	Q_n	Hold State
0	0	1	Q_n	Hold State
0	1	0	Q_n	Hold State
0	1	1	Q_n	Hold State

CLOCK	J	K	$Q_{(n+1)}$	State
1	0	0	Q_n	Hold State
1	0	1	0	Reset State
1	1	0	1	Set State
1	1	1	$\overline{Q}_n$	Toggle State

100. (b)
In Dual slope type of ADCs, an input hold time is higher than that of flash type ADCs and accuracy high resolution in the form of dual slope ADC.
Response time for flash type ADC - T_{CLK}
Dual slope type ADC - $(2^{n+1})\ T_{CLK}$

PRACTICE SET - 13

1. A satellite orbiting around the equator 3600 kilometers above the center of the earth is called as–
(a) Polar (b) Synchronous
(c) Mediterranean (d) Elliptical

2. With which of the following sports is the term 'double fault' associated?
(a) Tennis (b) Bridge
(c) Baseball (d) Golf

3. ..... is the traditional martial art of Manipur.
(a) Bihu (b) Thang-Ta
(c) Bagurumbo (d) Rauf

4. The Tibetan Buddhist monk who unified Bhutan as a Nation?
(a) Ygyen Wangchuck
(b) Ngawang Namgyal
(c) Ngawang Gyaltsen
(d) Jigme Wangchuck

5. SENSEX is an index of Bombay Stock Exchange's top _____ companies.
(a) 50 (b) 100
(c) 30 (d) 40

6. Which constitutional amendment, known as 'Mini Constitution', gave effect to the recommendations of Swaran Singh.
(a) 42nd constitutional amendment
(b) 43rd constitutional amendment
(c) 41st constitutional amendment
(d) 44th constitutional amendment

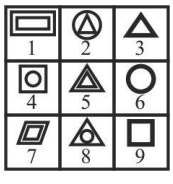
7. Which canal connects the Pacific Ocean and the Atlantic Ocean?
(a) Corinth Canal (b) Kiel Canal
(c) Panama Canal (d) Suez Canal

8. On which river is Idukki Dam built?
(a) Mahanadi (b) Krishna
(c) Ghataprabha (d) Periyar

9. Qila Mubarak monument is situated in _____.
(a) Haryana (b) Rajasthan
(c) Uttar Pradesh (d) Punjab

10. Who described the kingdom of Awadh as 'A cherry that will drop into our mouth one day'?
(a) Waren Hastings (b) Lord Wellesley
(c) Lord Dalhousie (d) Lord Curzon

11. If three groups can be formed using each of the given figures only once, then these groups will be _____.



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

12. Select the number from among the given options that can replace the question mark (?) in the following table.

5	4	3
6	5	4
7	6	5
384	245	?

(a) 144 (b) 269
(c) 249 (d) 244

13. Read the given statements and conclusions carefully. Assuming that the information given in the statements is true, even if it appears to be at variance with commonly known facts. decide which of the given conclusions logically follow (s) from the statements.
Statements:
Some dogs are donkeys.
No donkey is a horse.
Conclusions:
I. Some dogs are not horse.
II. Some horses are dogs
(a) Only conclusion II follows.
(b) Both conclusions I and II follow.
(c) Either conclusion I or II follows.
(d) Only conclusion I follow.

14. Given below is a 'main statement' followed by four subsidiary statement.
From the given options, choose the ordered pair of subsidiary statements, where the first statement implies the second and the two statements are logically consistent with the main statement.
Main Statement:
You can drive over 60 km/h only on the national highways.
Subsidiary Statements :–
A. You are on the national highways.
B. You cannot drive over 60 km/h.
C. You can drive over 60 km/h.
D. You are not on the national highway.
(a) DB (b) DA
(c) CD (d) AB

15. Argument: During an election, the opposition party said, "look at the rise in price the last five years".
Assumptions:
1. **This time, give a chance to our party for power.**
2. **Prices will still rise if you choose the same party to be in power**

(a) Both 1 and 2 are implicit
(b) Only assumption 2 is implicit
(c) Neither 1 nor 2 is implicit
(d) Only assumption 1 is implicit

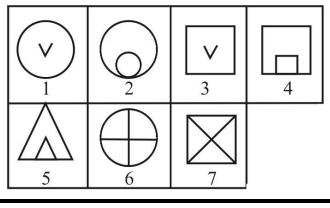
16. A question is given followed by two statements labelled I and II, Identify which of the statements is/are sufficient to answer the question.
Question:
How is Damini related to Bhola?
Statements:
I. Tika has only one son, Bhola and only one daughter Kamala.
II. Damini is Roma's son's wife. Kamala is the only daughter of Roma. Meghan is the daughter of Bhola.
(a) Statement I alone is sufficient, while Statement II alone is not sufficient to answer the question.
(b) Both Statements I and II together are sufficient to answer the question.
(c) Statement II alone is sufficient, while Statement I alone is not sufficient to answer the question.
(d) Statements I and II together are not sufficient to answer the question.

17. Consider the following statements and decide which of them is/are correct.
(1) Every prime is odd
(2) Product of any two prime numbers is odd
(a) 1 and 2 (b) Neither 1 nor 2
(c) 1 alone (d) 2 alone

18. Select the option that is related to the third expression in the same way as the second expression is related to the first expression.
L × V : 12 × 22 :: Q × Z : ?
(a) 18 × 10 (b) 12 × 14
(c) 17 × 26 (d) 11 × 15

19. The word ORANGE has been coded using 4 different codes.
Code 1 : PSBOHF
Code 2 : NQZMFD
Code 3 : QTCPIG
Code 4 : PTDRLK
Which of the given codes is used to write the word FISH or GKVL?
(a) Code 2 (b) Code 1
(c) Code 4 (d) Code 3

20. Use each of the following figures only once to form three groups. The three groups thus formed are.



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

21. Select the number from among the given options that can replace the questions mark (?) in the following table.

28	**63**	**94**
8	**18**	**?**
6	**9**	**13**

(a) 69 (b) 48
(c) 76 (d) 75

22. If Radha is sitting to the south of Krishna and Rahul is sitting to the east of Krishna, in which direction is Radha sitting with respect to Rahul?
(a) South-West (b) South- East
(c) North-East (d) North-West

23. Vijayan starts walking towards the 'South'. After walking 15 m, he turned to the 'Left' and walked 15 m. He again turned to the left and walked 15 m. How far and in which direction is he from his starting point?
(a) 30 m, east (b) 15 m, east
(c) 15 m, west (d) 15 m, south

24. 'X is the mother of Y' is represented by 'X < Y'
'X is the husband of Y' is represented by 'X > Y'
'X is the sister of Y' is represented by 'X @ Y'
'X is the son of Y' is represented by 'X $ Y'
Which of the following indicates the relationship 'R is the daughter of Q'?
(a) Q > K @ R $ H (b) R @ H > K < Q
(c) Q < K @ H $ R (d) R @ H $ K > Q

25. Select the combination of mathematical signs that when sequentially placed in the blanks of the given equation will balance the equation.
12_3_12_24
(a) ÷ + = (b) × = –
(c) × – = (d) × = ÷

26. Which computer generation replaced the IC (Integrated Circuit) with VLSI (Very Large Scale Integration) circuit?
(a) Fourth (b) First
(c) Second (d) Third

27. Which output device is used to transfer information from a computer to a picture on paper?
(a) Mouse (b) Plotter
(c) Touch panel (d) Punch card

28. Speech synthesizer is a part of _____.
(a) Arithmetic Logic Unit
(b) Output Unit
(c) Control Unit
(d) Memory Device

29. A/an ___ is the smallest illuminated area on a computer screen.
(a) Layer (b) Angle
(c) Pixel (d) Canvas

30. Which of the following is used a secondary storage system in a computer?
(a) Floppy (b) EPROM
(c) ROM (d) RAM

31. Which memory represents the external storage device?
(a) Secondary Storage Device
(b) Cache Memory
(c) ROM
(d) Primary Memory

32. Which among the following is a Sequential Access Memory?
(a) Optic Disk
(b) Magnetic Disk
(c) Magnetic Drum
(d) Magnetic Tape

33. What is TCP/IP in nature?
(a) It is a kind of router hardware.
(b) It is a protocol
(c) It is a kind of router software
(d) It is an email service

34. The layers of the TCP/IP protocol are:
(a) transport layer and network layer
(b) application layer, data link layer, transport layer and network layer
(c) data link layer, and network layer
(d) application layer, data link layer, transport layer, network layer and hardware layer

35. Which of the following is a well - known protocol for data communication over the Internet?
(a) HTTP (b) SMTP
(c) SNMP (d) TCP/IP

36. Which of the following keyboard shortcuts is used to create a new blank document in MS - Word 365?
(a) Ctrl + N (b) Shift + N
(c) Esc + N (d) Alt + N

37. Which of the following can be used to select a particular word in a MS - Word document?
(a) Left click on the word twice
(b) Right click on the word once
(c) Left click on the word thrice
(d) Left click once on the word

38. The 'Ctrl + W' keyboard shortcut is used for which of the following purposes in MS- Word 365?
(a) To cut the selected content to the Clipboard and paste the contents of the clipboard
(b) To copy the selected content to the clipboard
(c) To paste the contents of the Clipboard
(d) To close a document

39. Hangouts is a communications platform that combines video calling, voice calling and text-based messaging into a single service. It is developed by:
(a) Oracle (b) Google
(c) IBM (d) Apple

40. Which of the following statements is INCORRECT about plug-ins?
(a) Adobe Flash is an example of an application that is available as a plug-in Adobe Flash
(b) They are applications intended for use in a web browser
(c) Plug-ins are similar to Active X controls
(d) Plug-ins can be executed outside of a web browser

41. Which among the following is/are NOT types of website hosting?
A. Shared hosting
B. Dedicated server
C. Grill hosting
(a) None of the given options
(b) Only B
(c) Only A
(d) Only C

42. Which of the following is not a component of a search engine?
(a) Web crawler
(b) Database
(c) Web server
(d) Serve interface

43. Which of the following is used to open a new tab on a browser?
(a) Ctrl + T (b) Ctrl + A
(c) Ctrl + W (d) Ctrl + Y

44. If you use a font that is not supported by a browser then the original text.
(a) Supported by browser, text will be displayed using 'Arial' font only.
(b) It will be displayed with a distinctive back ground
(c) It will be displayed in the default font
(d) It will not be displayed

45. Which of the following is NOT a benefit of cashless payments?
(a) Independent of digital devices
(b) All of these
(c) Convenience
(d) More secure

46. The sum of two numbers is 27 and the difference of their squares is 243. What is the difference between the numbers?
(a) 42 (b) 9
(c) 72 (d) 3

47. If T = (93 + 15) ÷(3 × 4) – 24 + 8, then what will be the value of T?
(a) –4 (b) –7
(c) –2 (d) –5

48. **What will be the value if you multiply $\frac{2}{11}$ by the reciprocal of $-\frac{5}{14}$?**

(a) $\frac{28}{55}$ (b) $-\frac{28}{55}$

(c) $\frac{2}{3}$ (d) $-\frac{10}{153}$

49. **If 2 is added to the square of a positive fraction the value $4\frac{1}{4}$ is obtained. Find the fraction.**

(a) $2\frac{3}{4}$ (b) $1\frac{1}{4}$

(c) $2\frac{1}{4}$ (d) $1\frac{1}{2}$

50. **Find the HCF of 2349, 2835 and 3078.**

(a) 81 (b) 9

(c) 27 (d) 3

51. **A, B and C begin together to move around a circular stadium and they complete their revolutions in 42s, 63s and 84s respectively. After how much time will they come together at the starting point?**

(a) 152s (b) 252s

(c) 452s (d) 256s

52. **What is the compound ratio of 45 : 75, 3 : 5, 51 : 68 and 256 : 81?**

(a) $\frac{64}{75}$ (b) $\frac{32}{45}$

(c) $\frac{128}{75}$ (d) $\frac{75}{32}$

53. **Suresh purchases two books of ₹ 1,200, he sells one on 20% profit and second on 16% loss. If the selling price of both books is same then, find the estimated cost price of books.**

(a) ₹ 550 and ₹ 650 (b) ₹ 600 and ₹ 600

(c) ₹ 500 and ₹ 700 (d) ₹ 400 and ₹ 800

54. **Find the surface area of a hemispherical bowl of thickness 'd' and internal radius 'r'.**

(a) $\pi(4r^2 + 6rd + 3d^2)$ (b) $4\pi r^2 + 4\pi rd + 3d^2$

(c) $\pi(4r^2 + 3rd + d^2)$ (d) $4\pi r^2 + 6\pi rd + 3d^2$

55. **A, B and C can finish a work separately in 8, 9 and 12 days respectively. C starts working alone and after one day B joins him. A also joins them even three days after the start of the work. In how many days the entire work will be finished?**

(a) $3\frac{7}{29}$ (b) $3\frac{23}{29}$

(c) $4\frac{15}{23}$ (d) $1\frac{6}{23}$

56. **A train crossed a 110 m long platform in 13.5 seconds and a 205 m long platform in 18.25 seconds. What was the speed of the train?**

(a) 75 km/h (b) 72 km/h

(c) 69 km/h (d) 66 km/h

57. **The amount on a sum of ₹2,400 at 5% per annum compound interest, compounded annually, in 2 years will be:**

(a) ₹2,646 (b) ₹3,646

(c) ₹4,646 (d) ₹5,646

58. **Sabiha purchased 240 cups for her shop at ₹8 each. During transportation, 24 cups got damaged, and she sold the remaining cups at ₹12 each. Find her overall percentage profit.**

(a) 45% (b) 30%

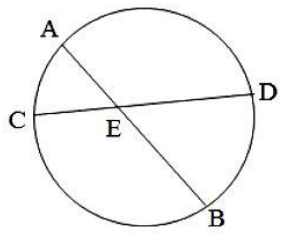
(c) 40% (d) 35%

59. **One of the roots of equation $x^2 - 24x + k = 0$ is $x = 2$ other value will be–**

(a) $x = 12$ (b) $x = -22$

(c) $x = 22$ (d) $x = -12$

60.



In above circle, given m $\overline{AE}$ = 4 cm, m $\overline{BE}$ = 15 cm and m $\overline{CE}$ = 2.5 cm. What will be the value of m $\overline{DE}$?

(a) 16.5 cm (b) 20 cm

(c) 24 cm (d) 30 cm

61. **The average of the results of 35 tests is 21. The average of the first 17 results is 19 and that of the last 17 is 22. What is the vlaue of the result of the 18^{th} test?**

(a) 42 (b) 36

(c) 38 (d) 34

62. **Find the square root**

$$\frac{((0.091)(0.11))}{((0.91)(1.331))}$$

(a) $\frac{1}{11}$ (b) $\frac{2}{11}$

(c) $\frac{4}{11}$ (d) $\frac{3}{11}$

63. **The ratio of the ages of P and D is 3 : 4 while the ratio of the ages of D and A is 5:6. After 15 years from now, the ratio of the ages of P and D will be 4:5. What is the sum of the present age of all three?**

(a) 180 years (b) 183 years

(c) 177 years (d) 175 years

64. **Two pipes, when working one at a time can fill a cistern in 2 hours and 3 hours, respectively while a third pipe can empty drain the cistern in 6 hours. All the three pipes were opened together when the cistern was $\frac{1}{6}$ filled. How long will it take for the cistern to be completely full ?**
(a) 1 hour 15 minutes
(b) 1 hour 30 minutes
(c) 1 hour 20 minutes
(d) 1 hour

65. **Seats for Mathematics, Physics and Chemistry in a school are in the ratio of 7:8:9. There is a proposal to increase the seats by 30%, 40% and 50% respectively. What will be the ratio of increased seats?**
(a) 91 : 112: 135 (b) 135 : 112 : 91
(c) 35 : 37 :91 (d) 112 : 91: 135

66. **Katal is the unit of_____.**
(a) catalytic activity (b) stress
(c) capacitance (d) entropy

67. **The actual weight of a person is determined by his:**
(a) Mass and the acceleration due to gravity
(b) Mass
(c) Mass and width
(d) Mass and height

68. **Which is the correct formula to find acceleration?**
(a) $a = \frac{v-u}{t}$ (b) $a = u + vt$
(c) $a = \frac{v+u}{t}$ (d) $a = \frac{v+u}{2}$

69. **If a box of mass 25 kg is pushed 15 m by a force of 'F' N, work done in the process is 480 J. Find F:**
(a) 16 (b) 32
(c) 25 (d) 50

70. **Watt/steradian is the unit of _____.**
(a) electric conductance
(b) permittivity
(c) radiant intensity
(d) permeability

71. **Current in $2\,\Omega$ resistor fed by two 6V voltage sources in parallel, internal resistances of sources are $1\,\Omega$ and $2\,\Omega$**
(a) 4 A (b) 6 A
(c) 2.25 A (d) 3.75 A

72. **Two bulbs marked "200 watt-200 volts" and "100 watt-200 volts" are joined in series to 200 volts supply. Power consumed in circuit is**
(a) 300 watt (b) 33 watt
(c) 66.66 watt (d) 150 watt

73. **The measure of ease with which magnetic flux can be admitted through a material or magnetic circuit is called_____.**
(a) Magnetic flux (b) Reluctance
(c) Conductance (d) Permeance

74. **The negative sign that occurs in the equation of induced EMF is a consequence of :**
(a) Faraday's first law
(b) Lenz's law
(c) Cork screw rule
(d) Faraday's second law

75. **In energy meter, if brake magnet is moved away from the spindle of the moving disc, the aluminium disc**
(a) Will run fast
(b) No effect
(c) Will run slow
(d) will come to a stop

76. **"Time-varying magnetic field will always produce an electric field".**
The given statement is true for:
(a) Maxwell's third equation
(b) Maxwell's first equation
(c) Maxwell's second equation
(d) Maxwell's fourth equation

77. **When two charges are separated a distance 'd' a part, there exists**
(a) an electromotive force
(b) an electromagnetic force
(c) a magnetic force
(d) none of these

78. **A charged particle of charge q is moving with a velocity v along the axis of a current carrying solenoid. The magnetic force on the particle is-**
(a) qVB (b) 0
(c) qV^2B (d) None of these

79. **To replace a faulty 10 millihenry choke, you could use :**
(a) Two 20 millihenry chokes in series
(b) Two 5 millihenry chokes in series
(c) Two 30 millihenry chokes in parallel
(d) Two 0.5 millihenry chokes in parallel

80. **Superconductors now a day found their application in various fields. This is due to the fact that they:**
(a) generate regions free from magnetic field
(b) manufacture bubble memories
(c) generate electrostatic field
(d) generate very strong magnetic field

81. **For temperature greater than 180°C in insulating materials, the insulation class is:**
(a) Class C insulation
(b) Class A insulation
(c) Class E insulation
(d) Class B insulation

82. **Conduction electrons have more mobility than holes because they–**
(a) Are lighter
(b) Have negative charge
(c) Need less energy to move them
(d) Experience collision frequency

83. **What is the characteristic that ideal diode should have?**
(a) Zero resistance in the forward as well as reverse bias
(b) Zero resistance in the forward bias and an infinitely large resistance in reverse bias
(c) Infinitely large resistance in reverse bias
(d) Infinitely large resistance in forward as well as reverse bias

84. **Small signal operation of a transistor is that in which signal excursions are**
(a) 5% around the Q point values
(b) 10% around the Q point values
(c) 1% around the Q point values
(d) 10-20% around the Q point values

85. **The gain-bandwidth product, thermal stability and relation between input and output of an FET as compared to a BJT is respectively:**
(a) High, low, linear
(b) Low, low, non-linear
(c) Low, high, linear
(d) Low, high, non-linear

86. **What is the PIV across each diode of a bridge rectifier with a secondary voltage of 20V rms?**
(a) 14.14 V (b) 20 V
(c) 28.28 V (d) 35 V

87. **In case of BJT amplifier, bias stability is achieved by**
(a) keeping the base current constant
(b) changing the base current in order to keep 'I_c' constant
(c) keeping the temperature constant
(d) keeping the I_E emitter current maximum

88. **The ratio of electron and hole mobility in a MOSFET decides the :**
(a) Aspect ratio of gate
(b) Propagation delay of gate
(c) Fan in of gate
(d) Speed of operation

89. **State the gain of RC phase shift oscillator for obtaining sustained oscillation.**
(a) $A = 1$ (b) $A \leq 29$
(c) $A \leq 1$ (d) $A \geq 29$

90. **Match the following:**

List-I	List-II
a. n- parameters	i. O/p voltage varies as the slope of i/p voltage
b. differentiator	ii. Noise division
c. half-wave rectifier	iii. Function of a Q point
d. integrator	iv. Series diode clipper

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

91. **A certain regulator has a no-load voltage of 5V and a full-load output of 4.93V. What is the load regulation?**
(a) 1.40% (b) 5.60%
(c) 4.20% (d) 2.80%

92. **Permanent magnet moving coil is _____ to small current and free from hysteresis and ____ by external fields.**
(a) insensitive; affected
(b) sensitive; not affected
(c) sensitive; affected
(d) insensitive; not affected

93. **Scale of Moving Iron instruments is :**
(a) Linear (b) Non uniform
(c) Exponential (d) Logarithmic

94. **Which of the following uses wiper sliding contact?**
(a) Diode (b) LED
(c) Potentiometer (d) Thermistor

95. **Arrange in sequence the different parts of the cathode Ray tube (CRT) From beginning to end.**
I. Accelerating anode
II. Horizontal deflection plate
III. Vertical deflection plate
IV. Focusing anode
V. Phosphorous screen
(a) I, IV, II, III and V (b) I, IV, III, II and V
(c) IV, I, II, III and V (d) IV, I, III, II and V

96. **In transducers, the ability to withstand overloads is termed as_____.**
(a) Ruggedness (b) Repeatability
(c) Accuracy (d) Reliability

97. **Convert the gray code 1011 to corresponding binary number.**
(a) 0100 (b) 1011
(c) 1010 (d) 1101

98. **Minimum number of two input NAND gate for execution F= X.Y.A.B**
(a) Will be 6 (b) Will be 3
(c) Will be 4 (d) Will be 5

99. **What kind of operation occurs in a J - K flip flop when both inputs J and K are equal to 1?**
(a) Preset operation (b) Reset operation
(c) Clear operation (d) Toggle operation

100. **One 8-bit SAR type ADC is working with 1 MHz clock. The maximum conversion time of the ADC will be approx :**
(a) 2 microseconds
(b) 8 microseconds
(c) 1000000microseconds
(d) 1 microsecond

SOLUTION : PRACTICE SET- 13

ANSWER KEY

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

SOLUTION

1. (b)
When a satellite reaches exactly 42.164 kilometers from the center of the earth (about 36,000 km from earth's surface), it enters a sort of "sweetspot" in which its orbit matches earth's rotation. This special, high earth orbit is called geosynchronous.

2. (a)
In the given options double fault is associated with Tennis. Double faults nears hitting a faults on the second service.

3. (b)
Thang-Ta, the art of sword and spear is the traditional martial art of Manipur in the North-east India. It integrates various external weapons-the sword, dagger etc with the internal practice of physical control through soft movements coordinating with the rhythms of breathing. It is also known as Huyen langlon (method of safe-guarding) in Manipur.

4. (b)
Ngawang Namgyal (1594-1651) was the Tibetan Buddhist monk who unified Bhutan as a Nation. Bhutan was established on 17 December, 1907. Bhutan is one of the those few countries which has been independent throughout his history, never occupied or conquered.

5. (c)
BSE SENSEX, first compiled **in 1986** was calculated on a 'Market Capitalization Weighted' methodology of **30 component** stocks representing large well established and financially sound companies across key sectors. Since **September 1, 2003** S & P **BSE SENSEX** is being calculated on a **free float market capitalization**. SENSEX is a stock market index of 30 well-established and financially sound company.

6. (a)
42nd Amendment Act, 1976 is one of the most important amendments to the Indian Constitution. It was enacted by the Indian National Congress headed by Indira Gandhi then. Due to the large number of amendments this act has brought to the Indian Constitution, it is also known as 'Mini-Constitution'.

7. (c)
The Panama Canal is one of the most important canals in the western region and it provides a link between the Pacific and Atlantic oceans across the Isthmus of Panama, a narrow strip separating the Caribbean from the Pacific ocean.

Major Canals of the World:-
Suez Canal - It is an artificial sea-level waterway in Egypt, connecting the mediterranean sea to Red sea.
The Kiel Canal connects the North Sea (canal entrance at the mouth of the Elbe River estuary) to the Baltic Sea at the Kiel Fjord.
Corinth Canal (Greece) connects the central Mediterranean Sea (via the Gulf of Corinth) to the Aegean Sea (via the Saronic Gulf).

8. (d)
Idukki Dam is built on the Periyar river. The Periyar River is the longest river in the state of Kerala, with a total length of 244 km.

- Hirakud Dam → Mahanadi
- Lal Bahadur Shastri Dam → Krishna River (Almatti Dam)
- Nagarjuna Sagar Dam → Krishna River
- Tehri Dam → Bhagirathi River

9. (d)
Qila Mubarak is situated in Bhatinda (Punjab). It was constructed in 6th century. It is one of the oldest forts made up of bricks. The famous Raziya Sultan was imprisoned here by Altunia.

10. (c)
Lord Dalhousie described the kingdom of Awadh as 'A cherry that will drop into our mouth one day". He said this in 1851. In 1856, Awadh was formally annexed to the British Empire under the terms of the Doctrine of Lapse on the grounds of alleged internal misrule.
Lord Dalhousie (1848-1856): Opened the first Railway line from Bombay to Thane in 1853 AD, initiated the Doctrine of Lapse, established Postal system, Passed Widow Remarriage Bill.

11. (d)

Group of given figures is as follows,

(1,5,7), (2,4,8) and (3,6,9)

Hence, option (d) is correct.

12. (a)

Given that :

From Column I,

$(5)^1 + (6)^2 + (7)^3 = 5 + 36 + 343$

$= 384$

Again, from Column II,

$(4)^1 + (5)^2 + (6)^3 = 4 + 25 + 216$

$= 245$

Same as,

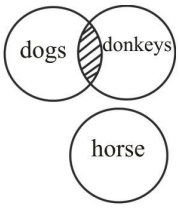
From Column III,

$(3)^1 + (4)^2 + (5)^3 = 3 + 16 + 125$

$= \boxed{144}$

13. (d)

Venn diagram according to statements is as follows,



Hence, only conclusion I follows.

14. (a)

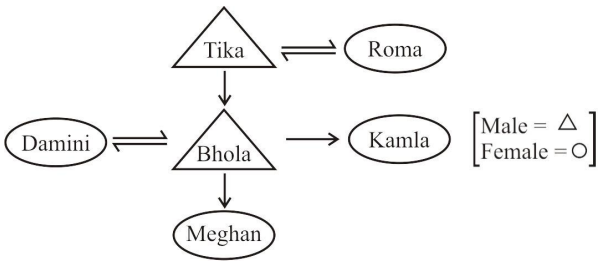
Out of the given pairs option (a) be the required answer. In which the given statement B is implicit in the statement D and both statement are logically related to the main statement.

15. (a)

In the given argument both assumption I and II are implicit.

16. (b)

On making a diagram according to the statements,



Hence, it is clear from above diagram that Damini is wife of Bhola.

17. (b)

♦ Every prime is not odd because 2 is prime and even number.

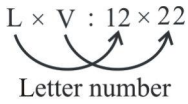
♦ Product of two prime number is not always a odd number

For example

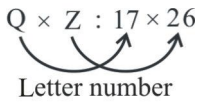
$2 \times 3 = 6$

18. (c)

Just as,



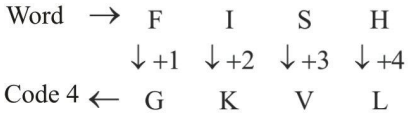
Same as,



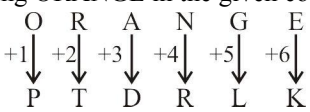
So, ? = 17 × 26

19. (c)

Just as,



On writing ORANGE in the given code language,



Hence, the word ORANGE has been written as PTDRLK via code 4.

20. (b)

According to the question, the appropriate group is as follows-

(1, 3), (2, 5, 4), (6, 7)

Hence, option (b) is correct.

21. (d)

Given that –

From Column I,

$28 + 8 = 36 = (6)^2$

Again, from Column II,

$63 + 18 = 81 = (9)^2$

Same as,

From Column III,

$94 + ? = (13)^2$

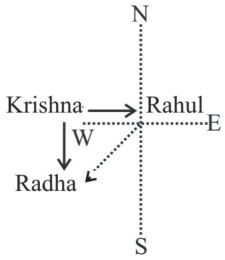
$94 + ? = 169$

$? = 169 - 94$

$? = 75$

22. (a)

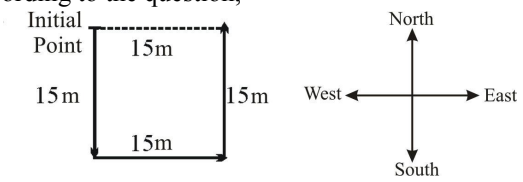
According to the question,



It is clear that Radha is sitting in the south-west direction with respect to Rahul.

23. (b)

According to the question,

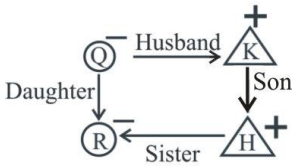


Hence, he is 15 meters east away from his initial point.

24. (d)

From option (d), R @ H $ K > Q

On drawing blood relation diagram,



Hence, it is clear from above that R is the daughter of Q.

25. (c)

On putting the signs from option (c),

(×, –, =)

$12 \times 3 - 12 = 24$

$36 - 12 = 24$

$24 = 24$

26. (a)

Fourth Generation computers were developed between 1976-1989 using VLSI which full form is Very Large Scale Integration. It is a circuit and this type of circuit has about 5000 transistors and more elements. The use of VLSI technology led to the creation of Microprocessors which reduced the size of the computer and increased capacity.

27. (b)

Plotter is an output device presenting hard copy like a printer. It is used to create high quality linegraph and picture. It is also used to transfer information from a computer to picture on paper.

28.(b)

A speech synthesizer is a computerized output device that accepts input, interprets data and produces audible language.

29. (c)

A pixel is a small dot that makes up a display or screen. It is also controllable part of a picture that is depicted on the screen. The word pixel is made up of picture (Pix) and element (Ex). Any screen is made like this by adding millions or millions of pixels per inch.

30. (a)

Floppy disk use in form of secondary storage system or medium. It can store electronic data, like a computer files. In early computers and not have CD-ROM drive or USB, Floppy disks were the only way to install a new program on a computer.

31. (a)

Secondary memory is non-volatile memory it retains data when power is switch off. We can use secondary memory to store large amount of data, audio, video and multimedia files.

- It store data for long term or permanently. It is cheaper as compared to primary memory.

32.(d)

In magnetic tape only one side of the ribbon is used for storing data. It is sequential memory which contains thin plastic ribbon to store data and coated by magnetic oxide. So the data read write speed is slower. DRAM works on sequential order like A, B, C, D is data, we have to go through BC to go from A randomly in optical disk.

33. (b)

TCP/IP, stands for Transmission Control Protocol/Internet Protocol, is a suite of communication protocols that underlies the internet and most local area networks. It provides the foundation for data transmission and connectivity in modern computer networks.

34. (d)

The TCP/IP suite of protocol can be understood in terms of layers (or levels). This figure shows the layers of the TCP/IP protocol. The names of the layers above are application layer, Transport layer, network layer, Network interface layer and hardware. TCP/IP defines how information travels from sender to receiver.

Layer	Protocol
Application layer	Applications
Transport layer	UDP/TCP
Network layer	Internet Protocol
Network Interface layer	Internet Interface
The hardware	Physical Network

The network interface layer is responsible for adding or removing any link layer protocol headers that are required for the message to reach its destination the network adapter device driver controls the network adapter card. A network interface is usually associated with a network adapter.

35. (d)

The full form of TCP/IP is Transmission Control Protocol/Internet Protocol. It is a set of rules and procedures that govern how the Internet works. Hyper Text Transfer Protocol (HTTP) is an application layer stateless protocol used for file transfer.

Simple Mail Transfer Protocol (SMTP) is used to send and receive e-mail. Simple Network Management (SNMP) is a popular protocol for network management

36. (a)

To quickly create a new blank file press Ctrl + N.

37. (a)

- To select a single word quickly double - click that word.
- To select a line of text, place your cursor at the start of line and press shift + down arrow.

38. (d)

Use of keyboard shortcuts in MS -Word 365 -

Ctrl + W → Close the currently open document.

Ctrl + X → Cut selected text.

Ctrl + Y → Redo the last action performed.

Ctrl + Z → Undo last action.

Ctrl + C → To copy the selected content to the clipboard.

Ctrl + V → To paste the contents of the clipboard.

39. (b)

Hangout is a free video chatting and messaging app developed by Google. It is available on Android and iOS platforms. But it is currently replaced by Google chat.

40. (d)

Out of the above options, (d) is incorrect because Adobe Flash Plug-ins available as application can't be executed outside the web browser. Adobe Flash Player (formerly known as Macromedia Flash Player and Shock web Flash in Internet Explorer, Firefox and Google Chrome) Flash player can run from a web browser as a browser plug-in or an supported mobile devices.

41. (d)

Web Hosting is a service that allows an individual or organization to post their website or webpage on the internet.

Types of web hosting–

1. Shared Web Hosting
2. Dedicated Hosting
3. Virtual Private Server (VPS)
4. Cloud Web Hosting
5. Grid Hosting

42. (c)

Search engine has three components, web crawler, database, and search interface, hence web server is not a search engine. Web Crawler, a search engine uses multiple web crawlers to crawl through the World Wide Web and collect information. It is basically a software also known as a bot or spider.

43. (a)

Ctrl + T is used to open a new tab on a browser.

Ctrl+T − to open a new tab on the browser.

Ctrl+A − Select all the text at once.

Ctrl+C − Copy the selected text.

Ctrl+Y − To redo the undo text.

Ctrl+O − Open an already created.

Ctrl+S − To save the file.

44. (c)

If you use a font which is not supported by the browser, then the original page will be displayed in the default font self.

45. (a)

Cashless payments are not independent from digital devices.

46. (b)

let us the numbers be x and y respectively.

Given,

$x + y = 27$———(i)

$x^2 - y^2 = 243$

$(x-y)(x+y) = 243$_____(ii)

Putting value of $(x + y)$ from eq^n (i) in eq (ii),

$(x-y) \times 27 = 243$

$$(x-y) = \frac{243}{27} = 9$$

So, difference between the numbers = $x-y = 9$

47. (b)

Given,

$T = (93 + 15) \div (3 \times 4) - 24 + 8$

$= (108) \div (12) - 24 + 8$

$= 108 \div 12 - 24 + 8$

$= 9 - 24 + 8$

$= 17 - 24$

$T = -7$

48. (b)

$$\text{Reciprocal of} -\frac{5}{14} = -\frac{14}{5}$$

$$\therefore \quad \frac{2}{11} \times \left(-\frac{14}{5}\right) = -\frac{28}{55}$$

49. (d)

Let the fraction is x.

According to the question,

$$x^2 + 2 = 4\frac{1}{4}$$

$$x^2 + 2 = \frac{17}{4}$$

$$4x^2 + 8 = 17$$

$$4x^2 = 17 - 8$$

$$4x^2 = 9, \quad x^2 = \frac{9}{4}$$

$$x = \frac{3}{2} = 1\frac{1}{2}$$

50. (a)

On finding HCF by division method,

$$2835\overline{)3078}(1$$
$$\underline{2835}$$
$$243\overline{)2835}(11$$
$$\underline{243}$$
$$405$$
$$\underline{243}$$
$$162\overline{)243}(1$$
$$\underline{162}$$
$$81\overline{)162}(2$$
$$\underline{162}$$
$$\times\times$$

$$81\overline{)2349}(29$$
$$\underline{162}$$
$$729$$
$$\underline{729}$$
$$\times\times\times$$

So, it is clear that the required HCF is 81.

51. (b)

Time taken by A, B and C to meet again at the starting point = LCM of 42, 63 and 84 = 252 seconds.

$$42 = 2\times3\times7$$
$$63 = 3\times3\times7$$
$$84 = 2\times2\times3\times7$$

LCM = 2 × 2 × 3 × 3 × 7

= 252s

52. (a)

45 : 75, 3 : 5, 51 : 68, 256 : 81

$$\text{Compound ratio} = \frac{\text{Product of } 1^{st} \text{ term}}{\text{Product of } 2^{nd} \text{ term}}$$

$$= \frac{45\times3\times51\times256}{75\times5\times68\times81} = \frac{3\times1\times51\times64}{5\times5\times17\times27}$$

$$= \frac{3\times3\times64}{5\times5\times27} = \frac{64}{75}$$

53. (c)

Let the cost price of one book be ₹ x

So, the cost price of other book = ₹ (1200 – x)

According to the question,

$$\frac{x\times120}{100} = (1200-x)\times\frac{84}{100}$$

$\Rightarrow$ 120 x + 84 x = 1200 × 84

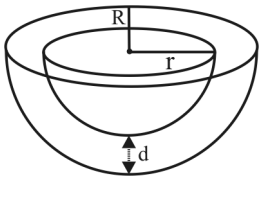
$\Rightarrow$ 204x = 1200 × 84

$\Rightarrow$ $x = \frac{1200\times84}{204}$

$\Rightarrow$ x = ₹494.11 ≈ ₹ 500

So, the cost price of other book = 1200 – 500 = ₹ 700

54. (a)



Internal radius of hemispherical bowl = r

Thickness (d) = R – r

External radius of hemispherical bowl = R = d + r

Surface area of hemispherical bowl

$= 2\pi R^2 + 2\pi r^2 + \pi(R^2 - r^2)$

$= 2\pi\{(d+r)^2\} + 2\pi r^2 + \pi\{(d+r)^2 - r^2\}$

$= 2\pi\{d^2+r^2+2dr\} + 2\pi r^2 + \pi\{d^2+r^2+2rd - r^2\}$

$= 2\pi d^2 + 2\pi r^2 + 4\pi rd + 2\pi r^2 + \pi d^2 + 2\pi rd$

$= 3\pi d^2 + 4\pi r^2 + 6\pi rd$

$= \pi(4r^2 + 6rd + 3d^2)$

55. (c)

Let C alone worked for x days

$$\frac{x-3}{8} + \frac{x-1}{9} + \frac{x}{12} = 1$$

$$\frac{9x-27+8x-8+6x}{72} = 1$$

$$23x - 35 = 72$$

$$23x = 72 + 35$$

$$23x = 107$$

$$x = \frac{107}{23}$$

$$x = 4\frac{15}{23}$$

Hence entire work will be finished in $4\frac{15}{23}$ days

56. (b)

Let the length of train = x m.

According to the question-

$$\frac{(110+x)10}{135} = \frac{(205+x)\times100}{1825}$$

$$\frac{(110+x)}{135} = \frac{(205+x)\times2}{365}$$

$$\frac{(110+x)}{27} = \frac{(205+x)\times2}{73}$$

$$8030 + 73x = 11070 + 54x$$

$$73x - 54x = 11070 - 8030$$

$$19x = 3040$$

$$\boxed{x = 160}$$

$$\text{Speed of train} = \frac{(110+160)\times10}{135} = \frac{270\times10}{135}$$

$$= 20 \text{ m/s} = \frac{20\times18}{5} = 72 \text{ km./hr.}$$

57. (a)

Given,

R = 5%

P = ₹ 2400

t = 2 years

$\therefore \quad A = P\left(1+\frac{R}{100}\right)^2$

$= 2400\left(1+\frac{5}{100}\right)^2$

$= 2400\times\left(\frac{21}{20}\right)^2$

$= 2400\times\frac{441}{400}$

$= ₹\ 2{,}646$

58. (d)

Cost price of 240 cups at the rate of ₹8 per cup

$= 240 \times 8 = ₹1920$

$\because$ 24 cups were damaged

Remaining cups $= 240 - 24 = 216$

Selling price of 216 cups at the rate of ₹12 per cup

$= 216 \times 12$

$= ₹2592$

$\because \quad \left(P\% = \frac{SP-CP}{CP}\times 100\right)$

Hence, Profit % $= \frac{2592-1920}{1920}\times 100\%$

$= \frac{67200}{1920} = 35\%$

59. (c)

$x^2 - 24x + k = 0$

One root x = 2 then putting the value of x in equation

$(2)^2 - 24 \times 2 + k = 0$

$4 - 48 + k = 0$

$k - 44 = 0$

$k = 44$

Substituting the value of k into the equation-

$x^2 - 24x + 44 = 0$

$x^2 - 22x - 2x + 44 = 0$

$x(x-22) - 2(x-22) = 0$

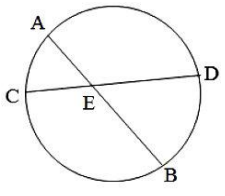
$(x-2)(x-22) = 0$

$x = 2$ and $x = 22$

(given)

So other root $= 22$

60. (c)



Given−

m $\overline{AE} = 4$ cm.

m $\overline{BE} = 15$ cm

m $\overline{CE} = 2.5$ cm

m $\overline{DE} = ?$

$\boxed{AE \times BE = CE \times DE}$

$4 \times 15 = 2.5 \times DE$

$DE = \frac{4\times 15}{2.5}$

DE = 24 cm.

61. (c)

Average of 35 tests $= 21$

Sum of 35 tests $= 35\times 21 = 735$

Average of 17 tests $= 19$

Sum of 17 tests $= 17\times 19 = 323$

Average of last 17 tests $= 22$

Sum of last 17 tests $= 17\times 22 = 374$

Value of 18^{th} tests $= 735 - 374 - 323 = 38$

62. (a)

$x = \frac{0.091\times 0.11}{0.91\times 1.331} = \frac{91\times 11}{91\times 1331} = \frac{1}{121}$

$\sqrt{x} = \sqrt{\frac{1}{121}} = \frac{1}{11}$

63. (c)

P : D and D : A

3 : 4 5 : 6

P : D : A

3 : 4

5 : 6

P:D:A =15 : 20 : 24

Let the present age of P, D and A is 15x, 20x and 24x respectively.

After 15 years

Age of P $= (15x + 15)$

Age of D $= (20x + 15)$

According to the question,

$\frac{15x+15}{20x+15} = \frac{4}{5}$

$75x + 75 = 80x + 60$

$5x = 15$

$\boxed{x = 3}$

Sum of present age of all three people

$= 15 \times 3 + 20 \times 3 + 24 \times 3$

$= 45 + 60 + 72 = 177$ years

64. (a)

Filled part of the cistern by all three pipes in 1 hour

$= \frac{1}{2} + \frac{1}{3} - \frac{1}{6}$

$$= \frac{3+2-1}{6} = \frac{4}{6} = \frac{2}{3} \text{ part}$$

$\therefore$ Remaining part of cistern $= 1 - \frac{1}{6} = \frac{5}{6}$

$\therefore$ Time taken to fill remaining part of cistern $= \frac{\frac{5}{6}}{\frac{2}{3}}$

$$= \frac{5}{6} \times \frac{3}{2} = \frac{5}{4} = 1\frac{1}{4} \text{ hours}$$

Time taken to fill cistern to completely = 1 h 15 mins.

65. (a)

Ratio = 7 : 8 : 9

Increase = 30%, 40%, 50%

Let the ratio $\rightarrow$ 70 : 80 : 90

According to the question,

Number of seats in Mathematics $= \frac{70 \times 130}{100} = 91$

Number of seats in Physics $= \frac{80 \times 140}{100} = 112$

Number of seats in Chemistry $= 90 \times \frac{150}{100} = 135$

Ratio of increased seats = 91 : 112 : 135

66. (a)

Katal is the unit of catalytic activity. It is equivalent to 1 mole/second.

67. (a)

The actual weight of a person is:-

Weight = mass of object × gravity

$\boxed{W = mg}$

68. (a)

By first equation of motion

$v = u + at$

$v - u = at$

$a = \frac{v-u}{t}$

69. (b)

given,

Mass = 25 kg

displacement = 15 meter

work = 480 J

work = force × displacement

480 = F × 15

$F = \frac{480}{15} = 32N$

70. (c)

Radiant intensity- The radiant energy that is emitted by a source per unit time per unit solid angle.

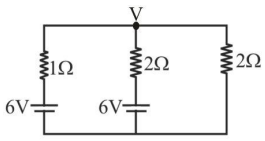
Watt/ steradian is the unit of 'radiant intensity.

Electrical conductivity:- Ability of materials to conduct electric current. The measurement is called ' Electrical conductivity' it is denoted by 'σ'.

Permeability :- permeability in the content of electromagnetism is the ability of magnetic lines of force to pass through a medium is called the magnetic permeability of the medium. It is denoted by 'μ'. The SI units of permeability is Henry/meter.

Permittivity:- Electrical permittivity is the content of electricity. It is the property of a substance which helps in general applying an electric field in that substance. But it tells the measure of 'resistance' displayed by that material.

71. (c):



At point V applying nodal-

$\frac{6-V}{1} + \frac{6-V}{2} = \frac{V}{2}$

$\frac{12-2V+6-V}{2} = \frac{V}{2}$

$18 - 3V = V$

$18 = 4V$

$V = \frac{18}{4} = 4.5V$

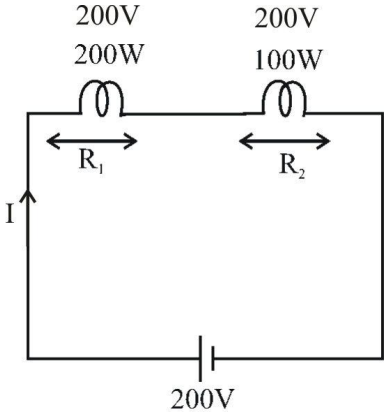
Current flow in 2Ω resistance

$I = \frac{V}{2} = \frac{4.5}{2} = 2.25A$

72. (c)

Given that - $P_1 = 200W$, $V_1 = 200V$,

$P_2 = 100$ W, $V_2 = 200V$



For bulb (i)

$$R_1 = \frac{V_1^2}{P_1} = \frac{200 \times 200}{200} = 200\Omega$$

For bulb (ii)

$$R_2 = \frac{V_2^2}{P_2} = \frac{200 \times 200}{100} = 400\Omega$$

Total resistance (R_T) = 200+400 = 600Ω

Total current (I_T) = $\frac{200}{600} = \frac{1}{3}A$

Power loss for bulb (i)

$$P_{B_1} = I^2R_1 = \left(\frac{1}{3}\right)^2 \times 200 = \frac{200}{9}$$

And power loss for bulb (ii)

$$P_{B_2} = I^2R_1 = \left(\frac{1}{3}\right)^2 \times 400 = \frac{400}{9}$$

Total power loss = $P_{B_1} + P_{B2} = \frac{200}{9} + \frac{400}{9} = \frac{600}{9}$

= 66.66 W

73. (d)

Permeance - Permeance is defined as a measure of the ease with which magnetic flux can be admitted through a material or magnetic circuit. Permeance is directly proportional to the magnetic flux and it is denoted by the P.

$$P = \frac{1}{S} = \frac{\mu_0\mu_r a}{\ell}(Wb/AT)$$

74. (b)

The negative sign that occurs in the equation of induced EMF is a consequence of "Lenz's law" According to Lenz's law the direction of the electric current induced in a conductor by a changing magnetic field is such that the magnetic field created by the induced current opposes changes in the initial magnetic field.

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

75. (c)

Because of braking torque, it runs at steady state -

$$N \propto \frac{T_B}{d\phi_m^2} \Rightarrow N \propto \frac{1}{d}$$

⇒ To increase the speed of moving disc, permanent magnet is kept nearer to the spindle.

⇒ To decrease the speed of moving disc, permanent magnet is kept for away from the spindle.

76. (a)

According to Maxwell's third equation time varying magnetic field will always produce an electric field.

$$\oint \vec{E}.\vec{dl} = -\frac{d}{dt}\left(\int \vec{B}.\vec{dA}\right)$$

Ampere's law plus Maxwell's displacement current

$$\oint \vec{B}.\vec{dl} = \mu_0\left(I + \frac{d}{dt}\left(\varepsilon_0 \int \vec{E}.\vec{dA}\right)\right)$$

77. (a)

When two charges are separated a distance 'd' apart there exists an electromotive force. In case of a stationary charge, only the electric force act for the moving of charge then both electric and magnetic force are involved.

78. (b)

A charge particle 'q' moving with a velocity 'V' in a magnetic field B The magnetic force on charge particle is-

$$F = q\left(\vec{V} \times \vec{B}\right)$$

F = q VB sin θ

When charge q is moving with a velocity V along the axis of current carrying then magnetic force is zero.

F = qBV sin0º (sin 0º= 0)

[F = 0]

79. (b)

To replace a faulty 10 millihenry choke, you could use two 5 millihenry chokes in series.

80. (d)

Super conductor now a day found their application in various field. This is due to the fact that they generate very strong magnetic field.

Such substances or metal in which the value of resistivity decrease very rapidly at a certain temperature become zero. These substances or metal are called superconducting substances and this property is called superconductivity.

Superconductor generate high electromagnetic field so, they are used in magnetic resonance imagining and nuclear magnetic resonance.

81. (a)

Class C insulation material has temperature greater than 180ºC.

Insulation Class	Maximum temperature
Y	90ºC
A	105ºC
E	120ºC
B	130ºC
F	155ºC
H	180ºC
C	greater than 180ºC

82 . (c)

Electron require low energy for mobility as they suffer low resistance during their motion as compared to holes.

$$\mu_d = \frac{V_d}{E} cm^2 / V - sec.$$

83. (b)

The ideal diode should have zero resistance in the forward bias and an infinitive large resistance in reverse bias.

Diode behaves as ON switch in the forward bias and OFF switch in the reverse bias.

84. (a)

Small signal operation of a transistor is that in which signal excursions are 5% around the Q point values. Small signal operation of a transistor means AC input is applied. Large signal has 20% excursion valid.

85. (d)

Difference between BJT and FET are tabulated following given as-

Parameter	BJT	FET
gain × bandwidth	High	Low
Input impedance	Low	High and non-linear
Thermal stability	Low	High

86. (c)

$$V_{rms} = 20V$$

$$V_{rms} = \frac{V_m}{\sqrt{2}}$$

$$20 = \frac{V_m}{\sqrt{2}}$$

$$V_m = 20 \times \sqrt{2} = 20 \times 1.414$$

$$V_m = 28.28 \text{ V}$$

$$PIV = V_m$$

$$= 28.28 \text{ V}$$

87. (a)

To obtain biasing stability in BJT amplifier, the base current is kept constant.

Operating point stabilization is very important to get distortion free output.

88. (a)

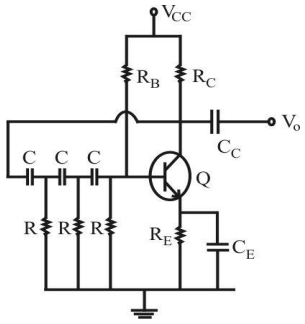
The ratio of electron and hole mobility in MOSFET tells the aspect ratio of the gate, where the aspect ratio is expressed as two numbers separated by a colour (x:y). Where X and Y do not represent the actual width and height, but the relationship between width and height.

89. (d)

The circuit of a phase shift oscillator. It consists of conventional single transistor amplifier and a RC phase shift network. The phase shift network consists of three sections R_1C_1, R_2C_2 and R_3C_3. At some particular frequency f_0 the phase shift in each RC section it 60º so that the total phase shift produced by the RC network is 180º

$$f_0 = \frac{1}{2\pi RC\sqrt{6}}$$

State the gain of RC phase shift oscillator for obtaining sustained oscillation $A \geq 29$.



90. (a)

- n - parameters → Function of a Q point
- Differentiator → O/P voltage varies as the slope of I/P voltage.
- Half wave rectifier → describes diode clipper
- Integrator → Noise division

91. (a)

Given that,

$V_{NL} = 50V$

$V_{FL} = 4.93V$

$$\% \text{ Load Regulation} = \frac{V_{NL} - V_{FL}}{V_{FL}} \times 100$$

$$= \frac{5 - 4.93}{4.93} \times 100 = 1.40\%$$

92. (b)

Permanent magnet moving coil is sensitive to small current and free from hysteresis and not affected by external fields. The instruments which use the permanent for creating the stationary magnetic field between which the coil moves is known as the permanent magnet moving coil or PMMC instrument. It operates on the principle that the torque is exerted on the moving coil placed in the field of the permanent magnet.

93. (b)

Scale of moving iron instruments is non linear.

$$\boxed{T_d \propto I^2}$$

Moving iron instrument-There are two type of instruments -

♦ Attraction type

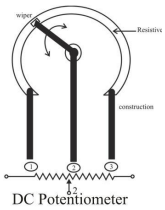
♦ Repulsion type

Torque expression - $\boxed{T_d = \frac{1}{2} I^2 \frac{dL}{d\theta}}$

- MI instruments are used for AC and DC.
- Cheaper than PMMC instruments.
- Widely used in laborateries.
- Scale is a non linear $(\theta \propto I^2)$
- Moving iron instrument used to under severe over load condition.
- Temperature error is reduced by using manganin materials.

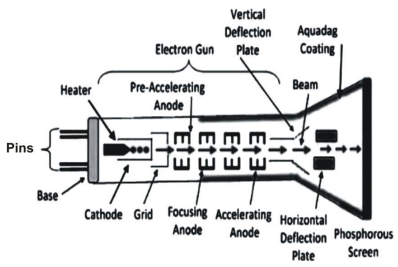
94. (c)

Wiper is used as a sliding contact in potentiometer.



DC Potentiometer

95. (d)



The correct sequence of CRT part-

(iv) Focusing anode

(i) Accelerating anode

(iii) Vertical deflection plate

(ii) horizontal deflection plate

(v) Phosphorous screen

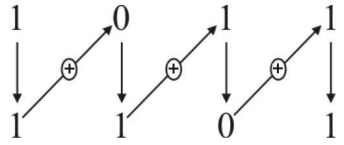
96. (a)

In transducer the ability to withstand overloads is termed as Ruggedness.

- **Repeatability-** It is the repetition of reading of an instrument taken over a period of time.
- **Accuracy-** It is the ability of the instrument to measure the accurate value. In other words, it is represents the closeness of the measured value to true value.
- **Reliability-** It is the ability of a product or system to perform its require functions, without failure for a specified time period and when used under specified conditions.

97. (d)

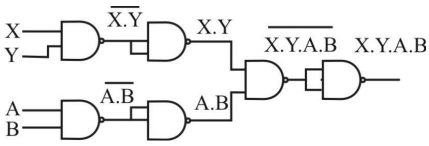
Representation of 1011 gray code in their binary number−



Gray code (1011) = 1101 binary code.

98. (a)

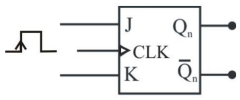
Minimum number of two input NAND gate for execution F= X.Y.A.B Will be 6.



99. (d)

In a J-K flip-flop when both input J and K are equal to 1, toggle operation will occurs.

J-K Flip-Flop Truth Table -



JK Flip-Flop

INPUTS			OUTPUT (Next State)	
J	**K**	CLK	$Q_{(t+1)}$	**Effect**
×	×	0	Q_t	No Change
0	0	↑	Q_t	No Change
0	1	↑	0	Reset
1	0	↑	1	Set
1	1	↑	$\overline{Q}_t$	Toggle

J-K flip-flop is called as universal flip-flop because this flip-flop like as D flip-flop, SR flip-flop, T flip-flop can be derived from it.

100. (b)

Given that, n = 8 bit, f_{clk} = 1 MHz

For n-bit SAR type ADC maximum conversion time = $n.T_{clk}$

$$T_{clk} = \frac{1}{f_{clk}}$$

$$T_{clk} = \frac{1}{1\times10^6} = 1\times10^{-6}$$

8-bit maximum conversion time $= 8 \times 1 \times 10^{-6}$

$= 8$ microseconds

PRACTICE SET - 14

1. What is the main objective of the Indian space program?

1. Mass communication and education through satellite
2. Surveying and managing natural resources through remote sensing, technology, environmental testing and meteorological forecasting.
3. Development of indigenous satellite and satellite launch vehicle.

(a) Only 1 (b) Only 2
(c) 1 and 2 both (d) 1, 2 and 3

2. Which of the following is NOT one of the Grand Slam tournaments of tennis?

(a) French Open (b) Canadian Open
(c) Wimbledon (d) Australian Open

3. Khandvi is a dish of which Indian state?

(a) Karnataka (b) Gujarat
(c) Odisha (d) Maharashtra

4. Who built the rock garden of Chandigarh?

(a) Tara Chand (b) Nek Chand
(c) Himanshu Parekh (d) Kamal Sagar

5. Which of the following is the correct explanation of the term' Capital Receipts'?

(a) The receipts of the government which result in the reduction of financial liabilities
(b) The receipts that do not lead to a claim on the government
(c) The receipts of the grants given to state governments and other parties
(d) The receipts of the government which create liability or reduce financial assets

6. Which of the following is not true with regard to the Attorney General of India?

(a) He is not a member of cabinet
(b) He has a right of audience in all courts in India
(c) He has a right of vote in the Parliament
(d) He has a right to speak in the House of Parliament

7. The world's largest drainage basin is:

(a) Amazon Basin (b) Ganga Basin
(c) Nile Basin (d) Mississippi Basin

8. Jayakwadi Hydroelectric Project (phase-1) is built on which river?

(a) Indus (b) Cauvery
(c) Godavari (d) Ganga

9. ..... is an Islamic finance term referring to the obligation that an individual has to donate a certain proportion of wealth each year to charitable causes.

(a) Mudarabah (b) Ijarah
(c) Zakat (d) Musharakah

10. In 1798, who became the Governor-General and built a massive palace, Government House, for himself in Calcutta?

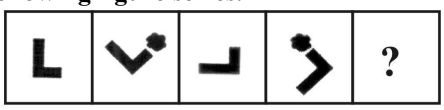
(a) Lord Clive (b) Lord Bentinck
(c) Lord Cornwallis (d) Lord Wellesley

11. Select the number from among the given options that can replace the question mark (?) in the following series.

9, 7, 28, 26, 65, 63, 126 124, ?

(a) 217 (b) 215
(c) 137 (d) 136

12. Select the option that will come next in the following figure series.



A B C D

(a) A (b) D
(c) B (d) C

13. Read the statement and conclusion carefully. Assuming that the information given in the statement is true, even if it appears to be at variance with commonly known facts, decide which of the given conclusion logically follows(s) from the statements :

Statements

All trees are forest

No forest is large

Conclusion :

I. No tree is large

II. All trees are large

(a) Either conclusion I or II follows
(b) Only conclusion I follows
(c) Neither conclusion I nor II follows
(d) Only conclusion II follows

14. Consider the following two events and select the correct option.

Event A : Meghna is going to get a prize and a medal today.

Events B : Meghna won the race competition today.

(a) Event A is the principal and immediate cause and B is its effect

(b) Event A and B are effects of independent causes

(c) Event B is the principal and immediate cause and A is its effect.

(d) Event A is the effect but Event B is not its immediate and principal cause

15. Argument:

The Supreme Court has decided that all rapists should be hanged till death

Assumption:

1. Women will get protection

2. The cases of rape can be reduced

(a) Neither 1 nor 2 is implicit

(b) Only assumption 2 is implicit

(c) Only assumption 1 is implicit

(d) Both 1 and 2 are implicit

16. A question is given, followed by three statements labeled I, II and III. Identify which of the statements is are sufficient to answer the question.

Question:

How is P related to C

Statements:

I: H is the only brother of S and P.

II. P is the wife of L, who is the son-in law of D.

III. D is the mother of S and T is the son-in-law of C.

(a) Data in statements II and III together are sufficient to answer the question.

(b) Data in statements I, II and III together are sufficient to answer the question.

(c) Data in statements I alone is sufficient to answer the question.

(d) Data in statement I, II and III together are not sufficient to answer the question.

17. The ratio of the velocities of the hour hand and minute hand of a clock is:

(a) 5 : 1 (b) 1 : 1

(c) 1 : 12 (d) 12 : 1

18. Select the option that is related to the third term in the same way as the second term is related to the first term.

WAITER : 242923 :: JUMPER : ?

(a) 312923 (b) 302923

(c) 252923 (d) 312623

19. If 67 = 1764 and 93 =729, then which of the given options will be the value of 74 = ?

(a) 847 (b) 784

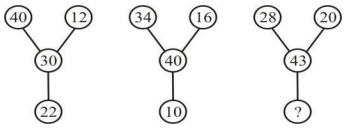
(c) 567 (d) 972

20. Rearrange the cluttered letters to form a meaningful word and find the odd one out.

(a) ACETREH (b) UETSTND

(c) YIBLRRA (d) KRTMAE

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



(a) 11 (b) 5

(c) 9 (d) 7

22. A bank is to the east of a shop. A college is to the north-west of the Bank. A bus stop is to the north of the shop and to the west of the college. In which direction is the college with respect to the shop?

(a) North (b) North-west

(c) East (d) North-east

23. According to the time by Rekha's watch, it is quarter past 9 and the hour-hand is pointing to the west. In which of the given directions will the minute-hand point AFTER 75 minutes?

(a) East (b) North

(c) South (d) West

24. Indicating to a woman, a man said, "Her father is the only son of my father." How is the man related to the woman?

(a) Father (b) Grandfather

(c) Brother (d) Son

25. Correct the mathematical symbols from the given alternatives change the sign by choosing the combination and get a balanced equation- 25*5*35*20*2?

(a) = × ÷ + (b) + = × ÷

(c) ÷ + = × (d) × ÷ + =

26. Which of the following is a 4th generation Programming language?

(a) C (b) Basic

(c) SQL (d) Mercury

27. There are two types of plotters, whose name are–

(a) spiral and flatbed

(b) flatbed and cone

(c) drum and flatbed

(d) drum and spiral

28. What type of device are computer speakers or headphones?

(a) Software (b) Storage

(c) Input (d) Output

29. **Which printer cannot print more than one character simultaneously?**
(a) Daisy wheel (b) Laser
(c) Dot matrix (d) Line

30. **The secondary storage devices can only store data but they cannot perform……**
(a) Arithmetic operations
(b) Logic operations
(c) Fetch operations
(d) All options are correct

31. **A Storage system for small amount of data is?**
(a) Magnetic Tape (b) Magnetic Card
(c) Punched Card (d) Optical Mark Reader

32. **Which of the following is not related to secondary memory?**
(a) Platter (b) Magnetic tape
(c) HDD (d) Magnetic disk

33. **What is the network byte order used in TCP/IP?**
(a) Middle Endian (b) Random
(c) Big Endian (d) Little Endian

34. **Which among the following wireless standard is used in 4G network technology?**
(a) GPRS (b) LTE
(c) VPN (d) WAP

35. **Which of the following technologies is the oldest?**
(a) NSFnet (b) ARPANET
(c) Interspace (d) Internet

36. **Which group in the Layout Tab of the Table tools menu is used to add and delete table rows and columns in MS Word 365?**
(a) Merge (b) Rows & Columns
(c) Cell Size (d) Draw

37. **Which of the following options in MS Word 365 is used to save an open document under a different name to a different location?**
(a) Layout-> Save (b) Home-> Save
(c) File-> Save as (d) View-> Save

38. **Find out whether the given statements are true or false with reference to MS Word 365.**
(i) Page size option is used to switch the page between portrait and landscape layout.
(ii) Bold, italic and regular are known as font styles.
(a) (i) False, (ii) True (b) (i) False (ii) False
(c) (i) True, (ii) True (d) (i) True, (ii) False

39. **Which of the following is web browser software?**
(a) Ubuntu (b) Linux
(c) Vivaldi (d) ChromeOS

40. **Which of the following is NOT an internet browser?**
(a) Panda (b) Safari
(c) Firefox (d) Chrome

41. **Which of the following HTML tags specifies a container for an external (non-HTML) application?**
(a) (b) <embed>
(c) <ins> (d) <nav>

42. **The software that allows you to read web pages and surf the internet is called a—**
(a) Web Crawler (b) Search Engine
(c) Web spider (d) Web Browser

43. **Which of the following search engines is launched by Microsoft?**
(a) Yandex (b) Bing
(c) Baidu (d) Google

44. **Which among the following is a web browser developed by Microsoft?**
(a) Firefox (b) Internet Explorer
(c) Windows Explorer (d) Netscape

45. **Which among the following is used as an identifier of mobile money?**
(a) MIMD (b) MISD
(c) MMID (d) MCID

46. **Find the value of the denominator of $\frac{1}{(5+\sqrt{3})}$ in rational number.**
(a) $\frac{(5-\sqrt{3})}{22}$ (b) $5+\frac{\sqrt{3}}{22}$
(c) $5-\frac{\sqrt{3}}{20}$ (d) $\frac{(5-\sqrt{3})}{20}$

47. **$74 - [85 \div \{49 - (41 - 3^5 \div \overline{9 \times 3})\}] = ?$**
(a) 59 (b) 79
(c) 49 (d) 69

48. **The difference of a fraction and its inverse is $\frac{9}{11}$. Then the difference of cubes of the fraction and its inverse will be:**
(a) $-\frac{1331}{2538}$ (b) $-\frac{2538}{1331}$
(c) $\frac{3996}{1331}$ (d) $\frac{729}{1331}$

49. **If a rod of length $208\frac{4}{5}$ is cut into equal pieces of length $23\frac{1}{5}$, then the total number of rods obtained is:**

(a) 5 (b) 7
(c) 8 (d) 9

50. **Find the greatest length which can be used to measure exactly three cloth pieces of length 1.26 m, 1.98 m and 1.62 m respectively.**
(a) 12 cm (b) 14 cm
(c) 16 cm (d) 18 cm

51. **Find the largest 3-digit number that is completely divisible by 10, 8 and 12.**
(a) 940 (b) 960
(c) 980 (d) 999

52. **The value of coins of ₹ 1, 50 paise and 25 paise is ₹ 93.75 and the ratio of their number is 3:4:5. Find the no. of coins of each type.**
(a) 42, 56, 70 (b) 45, 60, 75
(c) 40, 70, 75 (d) 46, 58, 75

53. **The income of A is 25% less than the income of B whose income is 40% more than that of C. The income of C is 20% less than that of D. By what percent is the income of A more than the income of C?**
(a) 8% (b) 5%
(c) 10% (d) 4%

54. **The dimensions of a metallic cuboid are 50 cm × 40 cm × 32 cm. This cuboid is melted and recast into a cube. Find the surface area of the cube.**
(a) 8,350 cm^2 (b) 7,150 cm^2
(c) 8,700 cm^2 (d) 9,600 cm^2

55. **A and B can complete a piece of work in 20 days. B and C can complete it in 30 days. A is twice as good as C in completing the work. Find in how many days will B alone complete it.**
(a) 60 days (b) 50 days
(c) 55 days (d) 65 days

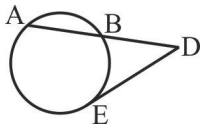
56. **A train departs at 5 am from Patna and arrives Bhopal at 9 am second train departs at 6:30 am from Bhopal and arrives at 10:00 am at Patna. Both train meet at what time?**
(a) 7:55 pm. (b) 7:55 am.
(c) 7:40 am. (d) 7:40 pm.

57. **Khan lends an amount of ₹10,000 to Irfan at 10% per annum compound for 5 year, compounded annually. What is the compound interest accrued for the 4^{th} year?**
(a) ₹ 1,762 (b) ₹ 1,540
(c) ₹ 1,331 (d) ₹ 1,745

58. **A man sold two bicycles at a total profit of 20%. If he had bought them for ₹ 3500 each and the first one sold them at a profit of 5%, then what is the profit % he should have from the second?**
(a) 20% (b) 35%
(c) 25% (d) 30%

59. **If $\left(x^2+\frac{1}{16x^2}\right)=\frac{19}{2}$ then find the value of $\left(2x-\frac{1}{2x}\right)$**
(a) 6 (b) 12
(c) 32 (d) 41

60.



In the circle above chord $\overline{AB}$ is extended to meet the tangent $\overline{DE}$ at D. If $\overline{AB}$ = 12 cm and $\overline{DE}$ = 8 cm. Find the length of $\overline{BD}$.
(a) 6 cm (b) $\sqrt[4]{6}$ cm
(c) 5 cm (d) 4 cm

61. **What is the value of median, mode and mean of the given following numbers?**
9, 8, 3, 5, 1, 9, 8, 2, 9
(a) 9, 9, 6 (b) 9, 6, 9
(c) 8, 9, 6 (d) 8, 5, 6

62. **If $\frac{x}{\sqrt{243}}=\frac{\sqrt{2187}}{x}$, and x is positive, then what is the value of x ?**
(a) 29 (b) 27
(c) 23 (d) 21

63. **Four years ago, the ratio of the age of Ram to that of Shyam was 13 : 9. Eight years from now, their ages will be in the ratio 4 : 3. The difference (in years) between their present ages is:**
(a) 18 (b) 17
(c) 19 (d) 16

64. **One of the two water filling pipe in a tank works 1.5 times more efficiently than the other. If these two pipes works with such a draining pipe which alone can empty the tank in 12 hours, then the empty tank can be filled in 28 hours. How much time will be taken by the less efficient pipe to fill the tank?**
(a) 21 (b) 18
(c) 24 (d) 15

65. **The salaries of A and B are in the ratio 3 : 4. On increasing the salaries of both A and B by ₹ 3000 each, the new ratio of their salaries becomes 18 : 23. Find the salary of A after the increase.**
(a) ₹12,000 (b) ₹23,000
(c) ₹21,000 (d) ₹18,000

66. **One mile is approximately equivalent to _____ kilometers.**
(a) 0.8 (b) 1.2
(c) 1.4 (d) 1.6

67. **Among four substance M_1, M_2, M_3 and M_4 of different masses having the same volume. Which substance will have the least density If $M_2>M_3>M_1>M_4$ then.**
(a) M_1 (b) M_3
(c) M_4 (d) M_2

68. **If a ball is thrown up, which of the following does not change?**
(a) Acceleration (b) Speed
(c) Potential energy (d) Distance

69. **1 J equivalent .**
(a) 1 kg×1m (b) 1 HP×1m
(c) 1 N×1m (d) 1 N×1cm

70. **Which has higher temperature between boiling water or and water vapor?**
(a) Boiling of water (b) Vapour of water
(c) None of these
(d) Depends on heat supply

71. **Which of the following is not an example of a liner element?**
(a) Resistor (b) Thermistor
(c) Inductor (d) Capacitor

72. **Calculate the equivalent resistance if two resistors of 50Ω connected in parallel with a series resistor of 25Ω.**
(a) 50Ω (b) 12.5Ω
(c) 75Ω (d) 125Ω

73. **A generator develops 200 Volts and has an internal resistance of 100 Ohms. Power delivered to the load of 100 Ohms is:**
(a) 200 Watt (b) 150 Watt
(c) 100 Watt (d) 20 Watt

74. **An inductance of 1 H is realized using air core with 100 turns. What will be the inductance if the number of turns are doubled ?**
(a) 1 H (b) 0.5 H
(c) 2 H (d) None of these

75. **Calculate the power factor for a 3 phase load measuring 2kW and 1kW by using 2 wattmeter method.**
(a) 0.824 (b) 0.842
(c) 0.866 (d) 0.91

76. **Maxwell's third equation is derived from_____.**
(a) Gauss's law of magnetostatics
(b) Gauss's law of electrostatic
(c) Faraday's law of electromagnetic induction
(d) Ampere's circuital law

77. **Electric field intensity between the plates of a parallel plate condenser is E. If a dielectric medium of dielectric constant ε is introduced between the plates, the electric field intensity will become**
(a) εE (b) $\sqrt{\varepsilon E}$
(c) $\sqrt{\frac{E}{\varepsilon}}$ (d) $\frac{E}{\varepsilon}$

78. **If the relative permittivity of the medium increases, the electric intensity at a point due to a given charge-**
(a) Decreases (b) Increases
(c) Remains the same (d) None

79. **The magnetic flux ϕ (in Weber) linked with a single turn coil at an instant of time t (in second) is given by $\phi(t) = 2t^2-20t + 40$. The induced EMF in the coil at the instant t = 2 seconds is**
(a) 22V (b) 20V
(c) 12V (d) 10V

80. **The transition temperature of superconductivity material titanium is :**
(a) 1.17 K (b) 14 K
(c) 9.2 K (d) 0.49 K

81. **Which of the following options is a thermosetting polymer?**
(a) PVC (b) Nylon
(c) Teflon (d) Bakelite

82. **If a donor type impurity is added to the semiconductor, then at a given temperature, the Fermi Level:**
(a) Moves towards the center of the energy gap
(b) Moves towards the valence of the band
(c) Moves towards the conduction band
(d) Doesn't change

83. **A power diode has lightly doped N type substrate sandwiched between heavily doped P and N regions :**
(a) To increase reverse breakdown voltage
(b) To reduce ohmic loss under forward bias
(c) To decrease switching time of the power diode
(d) To improve transient behaviour of the diode

84. **The circuit consisting of two transistors connected in series with a dc supply voltage is called**
(a) Push pull
(b) Differential pair
(c) Stacked transistor
(d) Complementary symmetry

85. **Given : I_{DSS}=8 mA, V_{GS}= –1 V, V_p = – 4V, then the value of drain current for FET is :**
(a) 4.5 mA (b) 32 mA
(c) 0.5 mA (d) 2 mA

86. **Positive clipper can be easily converted into negative clipper by**
(a) Simply reversing diode
(b) Changing the polarity of the reference voltage
(c) Both (a) and (b)
(d) None of these

87. **The stabilization factor 'S_{ico}' of fixed bias circuit is-**
(a) $S_{ico} = (1 + \beta)$ (b) $S_{ico} = 1$
(c) $S_{ico} = \beta$ (d) None

88. **An FET is a better chopper than a BJT because it has**
(a) Lower offset voltage
(b) Higher series ON resistance
(c) Lower input current
(d) Higher input impedance

89. **FET phase-shift oscillator uses –**
(a) Voltage Series feedback
(b) Voltage Shunt feedback
(c) Current Series feedback
(d) Current Shunt feedback

90. **The function of buffer amplifier in transmitter is to provide**
(a) Impedance matching
(b) Frequency stability of oscillator
(c) Amplifier of R.F. signal
(d) None of these

91. **To increase the stability of output voltage of a stabilizer use**
(a) Number of zener diodes in series
(b) Diode and transistor in push pull mode
(c) Darlington pair
(d) OP-amplifier

92. **APMMC instrument is used as a voltmeter. How to connect a resistance with this instrument to increase its range?**
(a) Low resistance in shunt
(b) Low resistance in series
(c) High resistance in series
(d) High resistance in shunt

93. **A moving iron instrument gives correct reading when used at–**
(a) low frequency
(b) high frequency
(c) only one frequency
(d) all frequencies to a certain value

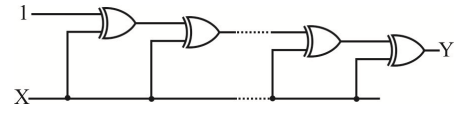
94. **What is a Q meter for**
(a) Meter for harmonic distortion measurement
(b) Power factor measurement
(c) quality factor measurement
(d) None of the above

95. **The sine wave output of function generator is fed to both the horizontal (X) and vertical (Y) inputs of CRO. What will be the pattern on the cathode ray screen?**
(a) Circle
(b) An ellipse
(c) Sinusoidal
(d) A straight line with 45^0 slope

96. **The principle of operation of LVDT is based on the variation of**
(a) Self inductance
(b) Mutual inductance
(c) Reluctance
(d) Permanence

97. **Logic XOR operation of $(4AC0)_H$ and $(B53F)_H$ results -**
(a) AACB (b) 0000
(c) FFFF (d) ABCD

98. **If the input to the digital circuit shown in the figure, consisting of a cascade of 20 XOR-gates is X, then the output Y is equal to**



(a) 0 (b) 1
(c) $\overline{X}$ (d) X

99. **Which of the following is correct?**
I. SISO has 1 data input
II. SIPO has 2 data inputs
III. PISO has 2 data inputs
(a) Only I (b) Only II and III
(c) Only III (d) Only I and III

100. **The resolution of D/A converter is approximately 0.4% of its full-scale range. It is :**
(a) A 8-bit converter
(b) A 10-bit converter
(c) A 12- bit converter
(d) A 16- bit converter

SOLUTION : PRACTICE SET- 14

ANSWER KEY

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

SOLUTION

1. (d)

The main objective of the Indian space program is

(1) Mass communications and education through satellite.

(2) Surveying and managing natural resources through remote sensing, technology, environmental testing and meteorological forecasting.

(3) Development of indigenous satellite and satellite vehicle.

2. (b)

Canadian Open is not a Tennis Grand Slam tournament.

Tennis Grand Slams

Grand Slam	Duration	Court Type
Australian Open	Mid-January	Hard Court
French Open	May & June	Clay
Wimbledon Open	June-July	Grass
US Open	August-September	Hard Court

3. (b)

Khandvi is a dish of Gujarat. It is one of the much-loved Gujarat snack. It is also known as Patuli or Dahivadi and made with gram flour. Some other traditional recipes of Gujarat are: Dhokla, Aam Shrikhand, Methi Ka Thepla, Dal Dhokli, Fafda, Upma, Dabeli, Khaman Dhokla etc.

4. (b)

Nek Chand Saini was a self-taught Indian artist, known for building the rock garden of Chandigarh. He was awarded with Padmashri by Indian government in 1984. He died in 2015 of cancer.

5. (d)

All those receipts of Government which create liability or reduce financial assets are termed as **Capital receipts**. While all those receipts that do not lead to a claim on the Government is termed as **Revenue receipts**.

6. (c)

Statement (c) regarding the Attorney General of India is not true. The Attorney General of India is the law officer of the Government of India. According to Article 88 of the Indian Constitution, the Attorney General of India is neither a member of the Parliament nor a member of the Cabinet but he shall have the right to speak and participate in Parliament and he does not have the right to vote. He represents the Government of India in all matters in the court.

7. (a)

The Amazon basin, located in northern South America, was the largest drainage basin in the world. The Amazon River and its tributaries drain an area nearly seven million square kilometers. The river system originates in the Andes Mountain of Peru and travels through Ecuador, colombia, Venezuela, Bolivia and Brazil before emptying into the Atlantic Ocean.

8. (c)

Jayakwadi Hydropower project is a river valley project located on the Godavari river near Jayakwadi village in Aurangabad district of Maharashtra. A reservoir is formed behind the dam known as Nathsagar Reservoir. A 12 MW capacity power house has been installed on this dam. This dam is also known with the name of Paithan dam.

Projects	Place
Ratle Hydroelectric Power Plant	Jammu & Kashmir
Periyar Hydroelectric power project	Kerala
Mahi Bajaj Sagar Dam	Rajasthan
Matatila Project	Uttar Pradesh
Paithan Hydroelectric Project	Maharashtra

9. (c)
Zakat, the third pillar of Islam, is a donation that Muslims regard as a mandatory act within their faith. Followers of Islam who have at least a minimum amount of wealth are required to give 2.5% of their liquid assets away to charity each year.

10. (d)
In 1798, Lord Welleseley became the Governor General. He built a massive Palace, called Government House for himself in Calcutta, a building that was expected to convey the authority of the British. Government house is now known as Raj Bhavan of Kolkata.

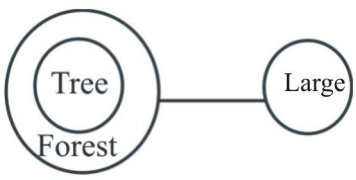
11. (a)
The given series is as follows-

9	7	28	26	65	63	126	124	217
↓	↓	↓	↓	↓	↓	↓	↓	↓
2^3+1	2^3-1	3^3+1	3^3-1	4^3+1	4^3-1	5^3+1	5^3-1	6^3+1

Hence option (a) is the right answer.

12. (d)
Answer figure 'C' will come at the place of question mark because figure is rotating clock-wise 45^0 Hence option 'd' is correct

13. (b)
The Venn diagram relation according to the statements is as follows –

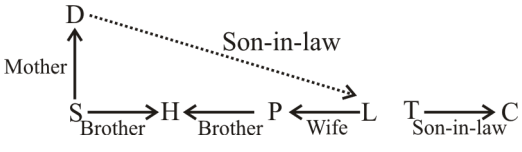


It is clear from the above Venn diagram that only conclusion I follows the statement logically.

14. (c)
Today, Meghna won the race competition so that she will get a prize and a medal.
Hence, Event B is the principal and immediate cause and Event A is its effect.

15. (b)
The Supreme Court has decided that all rapists should be hanged as to reduce the rape cases. Hence, only assumption II is implicit.

16. (d)
From statements I, II and III, we have-



Hence, Data in statement I, II and III together are not sufficient to answer the question.

17. (c)
♦ The hour niddle will rotate 1 time in 12 hours or travel a distance of $2\pi r$.
♦ The minute niddle will rotate 12 times in 12 hours or covers a distance of $12 \times 2\pi r$.
Let its velocities be V_1 and V_2 respectively, then,

$$V_1 = \frac{2\pi r}{12},\ V_2 = \frac{12\times 2\pi r}{12}$$

$$V_1 : V_2 = \frac{2\pi r}{12} : \frac{12\times 2\pi r}{12} \Rightarrow 1 : 12$$

18. (a)
Just as,

W A I T E R
↓ ↓ ↓ ↓ ↓ ↓
23+1 9+20 5+18
= 242923

Same as,

J U M P E R
↓ ↓ ↓ ↓ ↓ ↓
10+21 13+16 5+18

Therefore, ? = 312923

19. (b)
Just as,

$67 = (6\times 7)^2 = 1764$

And,

$93 = (9\times 3)^2 = 729$

Same as,

$74 = (7\times 4)^2 = 784$

20. (d)
On arranging the given words is as follows-
From option (a) ACETREH – TEACHER
From option (b) UETSTND – STUDENT
From option (c) YIBLRRA – LIBRARY
From option (d) KRTMAE – MARKET
It is clear that option (d) is different from other three, whereas all others are related to school.
Hence, option (d) is correct.

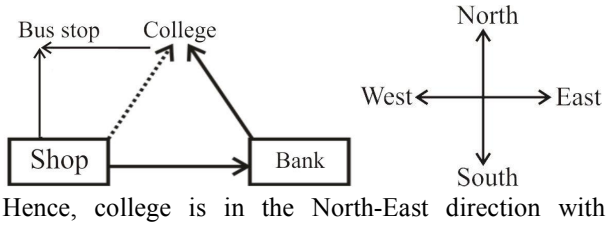
21. (b)
Just as,

From pattern - I → 40 – 22 + 12 = 30
From pattern - II → 34 – 10 + 16 = 40

Same as,

From pattern - III → 28 – ? + 20 = 43
48 – 43 = ?
? = 5

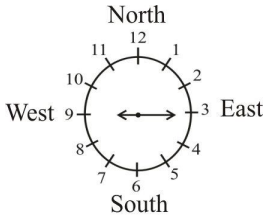
22. (d)
According to the question,



Hence, college is in the North-East direction with respect to shop.

23. (c)

Starting position,

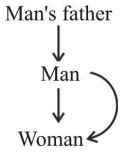


Second position-

Adding 75 minutes to 9:15, the minute hand at 10:30 will be in the South direction.

24. (a)

On drawing blood relation diagram according to the question,



Hence, the man is the father of women.

25. (c)

Given,

$25 * 5 * 35 * 20 * 2$

From option (c),

$25 \div 5 + 35 = 20 \times 2 \Rightarrow 40 = 40$

Left side = Right side

Hence, option (c) is correct.

26.(c)

Structured Query Language (SQL) is the fourth generation programming language used to manage relational database such as to store manipulate and retrieve data etc.

27. (c)

Plotter is a computer printer which is used to vector graphics. Mainly three types of plotters are:-

(i) Drum (ii) Flatbed (iii) Inkjet.

28. (d)

Computer speaker or headphone is an output device, which is used to convert electrical energy into sound energy.

29. (c)

Dot matrix printer is a slow impact printer that prints one character at a time.

30. (d)

Secondary storage device is also called auxiliary storage device. It is not part of internal computer. It is connected separately to the computer. These devices can only store data but cannot perform arithmetic operations, logical operations and fetch operations.

31. (b)

Magnetic card is used to store the required data in Credit Card, Debit Card and ATM card.

32. (a)

HDD, Magnetic tape and Magnetic disk are example of secondary memory while platter is output device.

33. (c)

The network addresses in a given network must all follow a consistent addressing convention. This convention know as network byte order, defines the bit-order of network addresses as they pass through the network. TCP/IP standard network byte order is big-Endian.

34. (b)

LTE (Long Term Evolution) wireless standard is used in 4G network technology. Which provides increased network capacity and speed for cell phones and other cellular devices as compared to 3G.

35. (b)

ARPANET is a wide area network invented by ARPA in 1969. This is an American Institution. APRANET was the word's first network in which TCP/IP model was used.

36. (b)

To add and delete table rows and columns in MS Word 365, the rows and columns group in the Layout tab of the table tools menu is used.

37. (c)

File save as option in MS - Word 365 is used to save an open document under a different name to a different location.

The shortcut key for save as option in MS -Word is F12.

38. (a)

In MS Word 365 page size option is used to change the paper size.

To switch the page between portrait and landscape layout.

(i) Click Page Layout → Page setup dialog box launcher.

(ii) In the page setup box, under orientation, click portrait or landscape.

(iii) Click the apply to box, and click selected text.

Bold, Italic and regular are known as font styles, hence statement (ii) is true.

39. (c)

The name of a freeware, cross-platform web browser with a built-in e-mail client is Vivaldi, while Ubuntu, Linux and ChromeOS are operating systems.

40. (a)

Panda is not an internet web browser. Several types of web browsers are:

1. Chrome
2. Opera
3. Safari
4. Mozilla Firefox
5. Internet Explorer

41. (d)
The HTML tag <nav> specifies a container for an external (Non-HTML) application. It also defines a navigation bar that contains a set of menu or a menu of hyperlinks. This hyperlink is also called a navigation link.

42. (d)
Web browser is an application software with the help of which is able to access the necessary information on the world wide web.

43. (b)
Bing search engine is launched by Microsoft.

44. (b)
Internet explorer is a web browser developed by Microsoft whose first version was released in 1995. Mozilla released the first versions was Firefox in 2002. The Netscape web browser was first released in 1994 by Netscape communications.

45. (c)
MMID − MMID is short for Mobile Money Identifier. MMID is a 7 digit number allotted by your bank for receiving funds through IMPS. The bank will a lot MIMD when you register your mobile number and account number in which you wish to receive funds. If you have more than one account, you will get a separate MIMD for each account.

46. (a)
According to the question-

$$\frac{1}{(5+\sqrt{3})}=\frac{(5-\sqrt{3})}{(5+\sqrt{3})(5-\sqrt{3})}$$

$$=\frac{(5-\sqrt{3})}{(5)^2-(\sqrt{3})^2}$$

$$=\frac{(5-\sqrt{3})}{25-3} \qquad =\frac{(5-\sqrt{3})}{22}$$

47. (d)
From the given expression,

$74 - [85 \div \{49 - (41 - 3^5 \div \overline{9\times 3})\}]$
$? = 74 - [85 \div \{49 - (41 - 3^5 \div 27)\}]$
$= 74 - [85 \div \{49 - (41 - 243 \div 27)\}]$
$= 74 - [85 \div \{49 - (41 - 9)\}]$
$= 74 - [85 \div \{49 - 32\}]$
$= 74 - [85 \div \{17\}]$
$= 74 - [85 \div 17]$
$= 74 - [5]$
$? = 74 - 5 = 69$

48. (c)
Let the fraction be $\frac{x}{1}$, then its inverse will be $\frac{1}{x}$,
According to the question,

$$\frac{x}{1}-\frac{1}{x}=\frac{9}{11}$$

$$\Rightarrow x-\frac{1}{x}=\frac{9}{11}$$

On cubing both side,

$$x^3-\frac{1}{x^3}=\left(\frac{9}{11}\right)^3+3\times\frac{9}{11} \quad \left[a^3-b^3=(a-b)^3+3ab(a-b)\right]$$

$$=\frac{729}{1331}+\frac{27}{11}$$

$$=\frac{729+(27\times 121)}{1331} \quad =\frac{729+3267}{1331}$$

$$\therefore x^3-\frac{1}{x^3}=\frac{3996}{1331}$$

49. (d)

Total length of the rod $=208\frac{4}{5}=\frac{1044}{5}$

According to the question,

The number of rods obtained $=\frac{\text{Total length of rod}}{\text{Length of one part}}$

$$=\frac{\frac{1044}{5}}{23\frac{1}{5}} \quad =\frac{\frac{1044}{5}}{\frac{116}{5}}$$

$$=\frac{1044}{5}\times\frac{5}{116} \quad =\frac{1044}{116} \quad =9$$

50. (d)
The required length = HCF of 126cm, 198cm and 162 cm.

$126\overline{)198}\,(1$ $\quad$ $18\overline{)162}\,(9$
126 $\quad$ 162
$72\overline{)126}\,(1$ $\quad$ $\times\times\times$
72
$54\overline{)72}\,(1$
54
$18\overline{)54}\,(3$
54
$\times\times$

So, the HCF = 18cm.
Hence, the greatest length = 18cm

51. (b)
LCM of 10, 12 and 8

2	10, 8, 12
2	5, 4, 6
2	5, 2, 3
3	5, 1, 3
5	5, 1, 1
	1, 1, 1

LCM = 2 ×2×2×3×5 = 120
The largest 3-digit number = 999

According to the question-

$$120\overline{)999}\ (8,\ 960,\ 39)$$

Hence, the required number = 999 – 39 = 960.

52. (b)

Let the number of coins of ₹1, 50 paise and 25 paise is 3x, 4x and 5x respectively

According to the question,

$$3x+\frac{4x}{2}+\frac{5x}{4}=93.75$$

$$\Rightarrow \frac{12x+8x+5x}{4}=93.75$$

$$25x=93.75\times 4$$

$$x=\frac{375}{25}\Rightarrow x=15$$

Number of coins of ₹ 1 =3×15=45

Number of coins of 50 paise =4×15=60

Number of coins of 25 paise =5×15=75

53. (b)

Let D's income be = ₹ 100

According to question,

Ratio of income

A		B		C	D
$112\times\frac{75}{100}$	= 84 :	$\frac{80\times 140}{100}$	= 112 :	80 :	100
21	:	28	:	20 :	25

$$\text{Required \%}=\frac{21-20}{20}\times 100=5\%$$

54. (d)

Volume of cuboid = $50\times 40\times 32$

$= 64000\ cm^3$

According to the question,

Volume of cube = Volume of cuboid

$(side)^3 = a^3 = 64000\ cm^3$

$a = 40\ cm$

$\because$ Surface area of cube = $6a^2$

$= 6\times(40)^2$

$= 6\times 1600$

$= 9600\ cm^2$

55. (a)

One day work of A and B = $\frac{1}{20}$ part

One day work of B and C = $\frac{1}{30}$ part

Let-

A completes the work in x days.

Then, C will do the work in 2x days. ($\because$ A is twice as good as C.)

And B completes the work in y days.

Hence, $\frac{1}{x}+\frac{1}{y}=\frac{1}{20}$ (1)

And $\frac{1}{2x}+\frac{1}{y}=\frac{1}{30}$

$$\frac{1}{y}=\frac{1}{30}-\frac{1}{2x} \quad \text{-----(2)}$$

From equation (1) and (2),

$$\frac{1}{x}+\frac{1}{30}-\frac{1}{2x}=\frac{1}{20}$$

$$\frac{1}{x}-\frac{1}{2x}=\frac{1}{20}-\frac{1}{30}$$

$$\frac{1}{2x}=\frac{3-2}{60}$$

$$x=30$$

By putting the value of x in equation (1),

$$\frac{1}{30}+\frac{1}{y}=\frac{1}{20}$$

$$\frac{1}{y}=\frac{1}{20}-\frac{1}{30}$$

$$\frac{1}{y}=\frac{1}{60}$$

$$\boxed{y=60\,\text{days}}$$

Hence, B alone will complete the work = y days

= 60 days.

56. (c)

Let the total distance = x km.

Speed of train running from Patna = $\frac{x}{4}$ km/h

Distance travelled in 1:30 hours = $\frac{x}{4}\times\frac{3}{2}=\frac{3x}{8}$ km

Remaining Distance = $x-\frac{3x}{8}=\frac{5x}{8}$ km

To cover the remaining distance–

Relative speed = $\frac{2x}{7}+\frac{x}{4}=\frac{15x}{28}$ km/hr

Time to meet = $\frac{\frac{5x}{8}}{\frac{15x}{28}}=\frac{5\times 28}{15\times 8}=\frac{7}{6}$ hours

Hence time to meet = 6:30 + 1: 10 = 7: 40 am

57. (c)

Given,

Principal (P) = ₹10000

Time (T) = 5 years

Rate (R) = 10%

$\therefore A = P\left(1+\frac{R}{100}\right)^T$

According to the question,

CI for 4th year

$=10000\left[\left(1+\frac{10}{100}\right)^4-\left(1+\frac{10}{100}\right)^3\right]$

$=10000\left[\left(\frac{11}{10}\right)^4-\left(\frac{11}{10}\right)^3\right]$

$=10000\left[\left(\frac{11}{10}\right)^3\times\left(\frac{11}{10}-1\right)\right]$

$=10000\left[\frac{1331}{1000}\times\frac{1}{10}\right]$

$=₹1331$

58. (b)

Total cost price = 3500 + 3500 = ₹ 7000

Selling price at a profit of 20% $=7000\times\frac{120}{100}=₹\ 8400$

Selling price of first bicycle at a profit of 5%

$=3500\times\frac{105}{100}$

S.P.$_I$ = ₹3675

Hence, the selling price of second bicycle = 8400 – 3675 = ₹4725

Profit = 4725 – 3500

= ₹ 1225

Profit % $=\frac{1225}{3500}\times100$

Profit % = 35%

59. (a)

$x^2+\frac{1}{16x^2}=\frac{19}{2}$

$\Rightarrow 4x^2+\frac{1}{4x^2}=\frac{19}{2}\times4$ (Multiply by 4 in both side)

$\Rightarrow (2x)^2+\frac{1}{(2x)^2}=38$ .....(i)

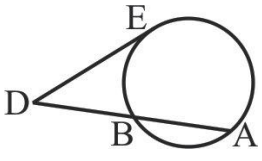
$\because \left(2x-\frac{1}{2x}\right)^2=(2x)^2+\frac{1}{(2x)^2}-2$

$=38-2=36$

$\Rightarrow 2x-\frac{1}{2x}=\sqrt{36}=6$

60. (d)

Suppose length of BD = x cm



formula-$(DE)^2$ = DB × DA

$(8)^2 = x \times (x + 12)$

$\Rightarrow$ $64 = x^2 + 12x$

$\Rightarrow$ $x^2 + 12x - 64 = 0$

$\Rightarrow$ $x^2 + (16 - 4)\,x - 64 = 0$

$\Rightarrow$ $x^2 + 16x - 4x - 64 = 0$

$\Rightarrow$ $x\,(x + 16) - 4\,(x + 16) = 0$

$\Rightarrow$ $(x + 16)\,(x - 4) = 0$

$\Rightarrow$ $x = -16$ (invalid)

$\Rightarrow$ $x = 4$ cm.

So, DB = 4 cm.

61. (c)

Arranaging the number in ascending oreder-

1, 2, 3, 5, 8, 8, 9, 9, 9

n = 9 (odd)

Median $=\left(\frac{n+1}{2}\right)^{th}$ term $=\left(\frac{9+1}{2}\right)^{th}$ term

$=5^{th}$ term = 8

Mean $=\frac{\text{sum of all numbers}}{\text{Total numbers}}$

$=\frac{9+8+3+5+1+9+8+2+9}{9}=\frac{54}{9}=6$

Mode = 9 (Most frequent)

Hence median, mode and mean is 8, 9, 6.

62. (b)

Given,

$\frac{x}{\sqrt{243}}=\frac{\sqrt{2187}}{x}$

$\Rightarrow \frac{x}{\sqrt{9\times9\times3}}=\frac{\sqrt{3\times9\times9\times9}}{x}$

$\Rightarrow \frac{x}{9\sqrt{3}}=\frac{27\sqrt{3}}{x}$

$\Rightarrow x^2=27\times9\times\sqrt{3}\times\sqrt{3}$

$x=\sqrt{27\times27}=27$

Hence, the value of x is 27.

63. (d)

Let four years ago, the age of Ram and Shyam be 13x and 9x years respectively.

According to the question,

$\frac{13x+4+8}{9x+4+8}=\frac{4}{3}$

$\frac{13x+12}{9x+12}=\frac{4}{3}$

39x + 36 = 36x + 48

3x = 48 – 36

$x=\frac{12}{3}$

x = 4

Difference of their present ages = (13x + 4) – (9x + 4)
= 4x = 4×4 = 16 years

64. (a)

Let working efficiency of filling pipe A = 1
then, the working efficiency of second Pipe B = 1.5
A : B = 1 : 1.5 = 10 : 15 = 2 : 3
the ratio of times of A and B will be inversely proportional to their efficiencies.
hence ratio of times = 3 : 2
hence the time of A is 3x and time of B is 2x.
According to the question-

$$\Rightarrow \quad \frac{1}{2x}+\frac{1}{3x}-\frac{1}{12}=\frac{1}{28}$$

$$\Rightarrow \quad \frac{5}{6x}=\frac{1}{28}+\frac{1}{12}$$

$$\Rightarrow \quad \frac{5}{6x}=\frac{12+28}{28\times 12}$$

$$\Rightarrow \quad \frac{5}{x}=\frac{40}{56} \qquad \boxed{x=7}$$

time taken to fill the tank with less efficient pipe = 3x
= 3 × 7 = 21 hours

65. (d)

Let the salaries of A and B are 3x and 4x respectively.
According to the question

$$\frac{3x+3000}{4x+3000}=\frac{18}{23}$$

⇒ 69x + 69000 = 72x + 54000
⇒ 3x = 15000
⇒ x = 5000
The salary of A after the increase = 5000 × 3 + 3000
= ₹18000

66. (d)

1 mile = 1.69344 Kilometers
Hence, option (d) is correct.

67. (c)

By formula, density = $\frac{\text{mass}}{\text{volume}}$

According to the ques, given that $M_2>M_3>M_1>M_4$ and volume is constant and by the formula M_4 has least density

68. (a)

When a ball is thrown upwards, its path, is parabolic, in such a situation its speed, potential energy and distance change but acceleration remains unchanged. The value of this acceleration is always equal to g (acceleration due to gravity).

69. (c)

If a force 1 Newton is applied on an object and it is displaced by 1 meter in the direction of force, then the work done by the force on the object will be 1 joule.

W= F×S
W = N–m
= Joule

In S.I system it is called absolute unit of work.

70. (c)

Temperature of boiling water and water vapor the temperature is constant (100°C) and heat is given to boiling water is spent in its state change (water to vapour) this heat does not change the temperature. That's why it is called latent heat.

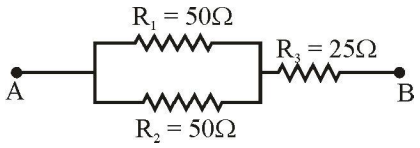
71. (b)

A thermistor is a temperature-sensitive resistor and also called NTC resistor. The characteristic of the thermistor is non-linear.

72. (a)

Given that-

$R_1 = 50\ \Omega$, $R_2 = 50\ \Omega$, $R_3 = 25\ \Omega$



∵ R_1 and R_2 connected in parallel
So, total resistance $R = R_1 || R_2$

$$\frac{1}{R}=\frac{1}{R_1}+\frac{1}{R_2}$$

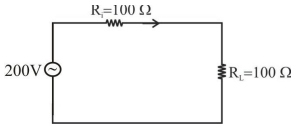
$$\frac{1}{R}=\frac{1}{50}+\frac{1}{50}$$

$R = 25\Omega$

Then, R and R_3 are connected in series-
Now,
Total Resistance $R_T = R + R_3$
$R_T = 25 + 25$

$$\boxed{R_T = 50\Omega}$$

73. (c)



Power dissipated in load resistance-

$$P_L = I^2 R_L$$

$$\because \quad I=\frac{V}{R_i+R_L}=\frac{200}{100+100}=1A$$

$$\therefore \quad \text{Dissipated Power } (P_L) = (1)^2 \times 100$$

$$P_L = 100W$$

74. (d)

Given-

$N_1 = 100$, $N_2 = 200$
$L_1 = 1H$, $L_2 = ?$

$$L \propto N^2 \frac{A}{\ell}$$

$L \propto N^2$ Where,

$N \rightarrow$ Number of turns

$\frac{L_1}{L_2} = \frac{N_1^2}{N_2^2}$ $A \rightarrow$ Area,

$\Rightarrow \quad \frac{1}{L_2} = \frac{(100)^2}{(200)^2}$ $\ell \rightarrow$ Length

$\frac{1}{L_2} = \frac{1}{4}$

$\Rightarrow \quad L_2 = 4H$

75. (c)

Given, W_1=2kW , W_2= 1kW

We know that,

$\tan\phi = \sqrt{3}\frac{(W_1 - W_2)}{W_1 + W_2}$

$\tan\phi = \sqrt{3}\frac{(2-1)}{2+1}$

$\tan\phi = \frac{1}{\sqrt{3}}$

Then, $\phi = 30^0$

Hence, $\cos\phi = \cos 30^o = \frac{\sqrt{3}}{2}$

$\cos\phi = 0.866$

76. (c)

Maxwell's third equation is derived from faraday's law of electromagnetic induction.

According to this when a close path are placed in different magnetic field. There are N-turn of operation of the coil. So each coil induces an alternative electromotive force.

It is given by Lenz's law-

$$\boxed{\nabla \times E = \frac{-\partial B}{dt}}$$

77. (d)

Electric field intensity between the plates of a parallel plate condenser is E,

$E \propto \frac{1}{\varepsilon_0}$

$\frac{E_1}{E_2} = \frac{\varepsilon_0 \varepsilon}{\varepsilon_0}$

$\frac{E}{E_2} = \varepsilon \quad [E_1 = E]$

$$\boxed{E_2 = \frac{E}{\varepsilon}}$$

78. (a)

Electric field intensity at a point in any medium due to charge (Q)-

$$\left[E = \frac{1}{\varepsilon_r}\right]$$

If, the relative permittivity of the medium increases the electric intensity at a point due to a given charge decrease.

79. (c)

Given

$\phi(t) = 2t^2 - 20t + 40$

Induced emf $e = -N\frac{d\phi(t)}{dt}$

$N = 1$

$e = -\frac{d\phi(t)}{dt}$

$e = -\frac{d}{dt}\left(2t^2 - 20t + 40\right)$

$e = -4t + 20$

$t = 2$ sec (Given)

$e = -4 \times 2 + 20$

$$\boxed{e = 12 \text{volt}}$$

80. (d)

Titanium is superconducting material when cooled below its critical temperature of 0.49K.

81. (d)

Bakelite is an example of a thermosetting Polymer. A thermosetting plastic is a Polymer that hard irreversibly when heated. It is a rigid type of plastic that is highly resistant to heat after it has cured during the compression molding process. Thermosetting Plastic are generally strong than thermo plastic material.

82. (c)

In an N-type of semiconductor, as the donor concentration increases, the fermi level moves towards the conduction band or the Fermi level moves away from the center of energy gap and the conductivity increases.

83. (d)

A power diode has lightly doped N type substrate sandwiched between heavily doped P and N region to improve transient behavior of the diode low frequency and low current conduction of power diode is like a good switch but high frequency and high current conduction is transient free.

84. (c)

The circuit consisting of two transistors connected in series with a dc supply voltage is called stacked transistor or stacked V^+.

85. (a)

Given-

$I_{DSS} = 8$ mA, $V_{GS} = -1$ V, $V_p = -4$V

$\because$ We know that-

$$I_{DS} = I_{DSS}\left(1-\frac{V_{GS}}{V_P}\right)^2$$

$$I_{DS} = 8\left(1-\frac{1}{4}\right)^2 = 8\times\left(\frac{3}{4}\right)^2$$

$$\boxed{I_{DS} = 4.5mA}$$

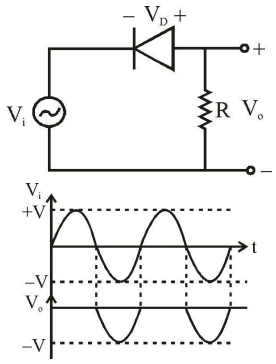
86. (c)

Positive clipper can be easily converted into negative clipper by both simply reversing diode and changing the polarity of the reference voltage.

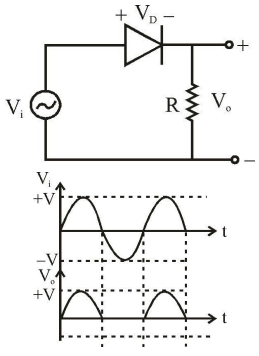
Clipper circuit-

A clipper circuit clips off or removes a portion from an A.C. signal without distorting or changing the remaining part of the waveform.

A clipper limits the voltage from rising above or below a certain point. A clipper is made of a diode and resistor. A clipper is also known as clipping circuit, voltage limiter and slicer etc.



Negative Clipper-



87. (a)

The stabilization factor 'S_{ico}' of fixed bias circuit is $S_{ico}= (1+\beta)$ where β = common emitter current gain.

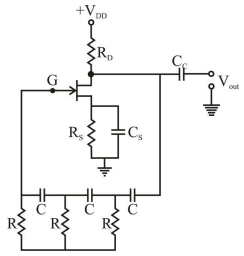
88. (a)

Field effect transistor (FET) is a transistor which uses electric field to control the conducting channel and exhibits no offset voltage at zero drain current. Hence it makes an excellent signal chopper. generally it has better thermal stability than BJT. So FET is a better chopper than BJT because FET has less offset voltage.

89. (a)

FET phase-shift oscillator uses voltage series feedback.

- The phase shift oscillator is a linear electric circuit that produces a sine wave output.
- It consists of an inverting amplifier element such as a transistor or op-amp with its output feedback to its input through a phase shift network consisting of resistance and capacitors in a ladder network.
- The feedback network shifts the phase of the amplifier output by 180º at the oscillation frequency to give positive feedback.



90. (a)

The function of buffer amplifier in transmitter is to provide impedance matching.

The advantage of voltage follower -

- Unity transmission gain.
- It has a high impedance of input.
- It has a low impedance of output.
- It removes loading impact.

91. (a)

To increases the stability of output voltage of a stabilizer use number of zener diode in series.

- A zener diode is also known as a breakdown diode, is a heavily doped semiconductor device that is designed to act in reverse bias diode.
- Zener diode is commonly used as a voltage regulator to maintain a constant DC output voltage.

92. (c)

A PMMC instrument is used as a voltmeter for extending the range of voltmeter a high values resistance connected in series with the voltmeter.

$$\boxed{M = \frac{V}{V_m}}$$

$$\boxed{R_s = R_m(M-1)}$$

93. (c)

A moving iron instrument gives correct reading when used at only one frequency.

- Moving iron instrument measure both ac and dc.
- It has non-uniform scale.
- Moving iron used to under severe over load conditions.

In M.I. type instrument-

For Ammeter-

to minimize error at high frequency in MI ammeter an inductive shunt resistance is connected in parallel with meter.

$$\tau_{sh} = \frac{L_{sh}}{R_{sh}} = \frac{L_m}{R_m}$$

For voltmeter-

A capacitor is connected in parallel with series multiplier (R_s)

$$C = 0.41\frac{L_m}{R_s^2}$$

i.e. in case of MI type voltmeter, error due to frequency will be zero.

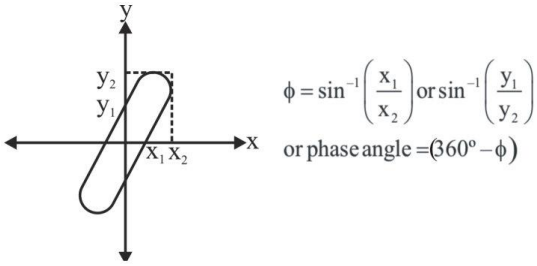
- In moving iron instruments controlling torque is provided by spring.

94.(c)

Q meter is an instrument that is designed to measure the value of quality factor directly and it is useful in measuring the characteristics of coils and capacitor. Q meter work on the principle of series resonance.

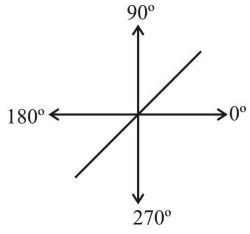
95. (d)

Lissajous Pattern is also used for finding the phase angle difference between the two input signals applied to vertical and horizontal plate.



$$\phi = \sin^{-1}\left(\frac{x_1}{x_2}\right) \text{ or } \sin^{-1}\left(\frac{y_1}{y_2}\right)$$

$$\text{or phase angle} = (360^\circ - \phi)$$



96. (b)

The principle of operation of LVDT is based on the variation of mutual inductance.

- Very high range for measurement of the displacement (12.5 mm to 250 mm)
- No frictional losses
- Low power consumption
- Rugged and simple construction

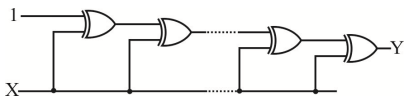
97. (c)

$$(4AC0)H \oplus (B53F)H$$

$$\begin{array}{cccc} 0100, & 1010, & 1100, & 0000 \\ 1011, & 0101, & 0011, & 1111 \\ \hline 1111, & 1111, & 1111, & 1111 \end{array}$$

So, XOR operation - (4AC0)H & (B53F)H =(FFFF)H

98. (b)



Truth table of XOR gate

Input		Output
A	B	A⊕B
0	0	0
0	1	1
1	0	1
1	1	0

When one of the input to an XOR gate is 1, then the output is simply the inverted value of the other input.

From the above given figure -

The output of the first XOR gate will be

$$1 \oplus X = \bar{1}.X + 1.\bar{X}$$
$$= 0 + \bar{X}$$
$$= \bar{X}$$

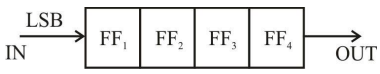
The output of second XOR gate will be -

$$\bar{X} \oplus X = \bar{\bar{X}}.X + \bar{X}.\bar{X}$$
$$= X + \bar{X}$$
$$= 1$$

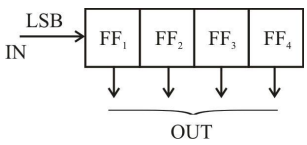
For 20 such XOR gates in cascade, the final output will be 1.

99. (a)

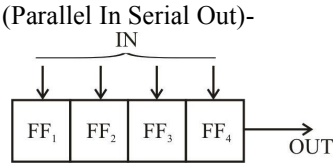
SISO (Serial In Serial Out)-



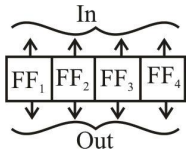
- SIPO (Serial In Parallel Out)-



- PISO (Parallel In Serial Out)-



- PIPO (Parallel In Parallel Out)-



Hence, it is clear that SISO has 1 data input.

100. (a)

$$\%\,\text{Resolution} = \frac{1}{2^n - 1} \times 100$$

$$0.4 = \frac{1}{2^n - 1} \times 100$$

$$2^n - 1 = \frac{100}{0.4} \Rightarrow 2^n = 251$$

$$\boxed{n \simeq 8\,\text{bit}}$$

PRACTICE SET - 15

1. Kalpana Chawla, the first woman of Indian origin went to space on ____ spacecraft?
(a) Columbia (b) Challenger
(c) Atlantis (d) Adventure

2. What is the boxing field called?
(a) Court (b) Ring
(c) Track (d) Diamond

3. Chainsoo is a famous food preparation of the state of _____.
(a) Uttarakhand (b) Arunachal Pradesh
(c) Maharashtra (d) Telangana

4. Who among the following stated the newspaper, 'Sambad Kaumudi'?
(a) Sisir Kumar Ghosh
(b) Ishwar Chandra Vidyasagar
(c) Rash Bihari Bose
(d) Raja Ram Mohan Roy

5. When is the primary deficit zero in the Government of India budget?
(a) When the fiscal deficit is equal to the revenue deficit
(b) When the fiscal deficit is equal to the interest payment
(c) When the net interest payments is equal to the revenue deficit
(d) When the revenue deficit is zero

6. A political party can be recognized as a national party if it secures ____ of the valid votes in any four states in general or state assembly elections and in addition it wins 4 Lok Sabha seats from any state or states.
(a) 9% (b) 8 %
(c) 7 % (d) 6 %

7. Which of the following rivers passes through from most countries?
(a) Denube (b) Ganges
(c) Brahmaputra (d) Rhine

8. The 'Mango Showers' phenomenon in India is related to which season?
(a) Summer (b) Rainy
(c) Winter (d) Autumn

9. In which language did the famous medieval literary genius Guru Basava compile his famuos literary works?
(a) Hindi (b) Tamil
(c) Kannada (d) Telugu

10. Indian Railway had contributed to the freedom struggle of India by bringing people of diverse cultures together'.
Who has the above statement?
(a) Subhash Chandra Bose
(b) Jawahar lal Nehru
(c) John Mathai
(d) Mahatma Gandhi

11. Select the combination of letters that when sequentially placed in the blanks of the given series will complete the series.
A_ _BD_CEB_ _CEB_
(a) CDAEAD (b) CEADAD
(c) CADADE (d) CDADEA

12. Select the alphanumeric-cluster form among the given options that can replace the question mark (?) in the following series.
F6, H12, J18, L24, ?
(a) N12 (b) N30
(c) M12 (d) M30

13. Read the given statement and conclusions carefully. Assuming that the information given in the statements is true even if it appears to be at variance with commonly known facts, decide which of the given conclusion logically follows from the statements.
Statements:
Some boys are handsome
No, handsome is employed
No, graduate is boy
Conclusions:
I. Some handsome are not graduates
II. No, employed is a boy
(a) Only conclusion II follows
(b) Neither conclusion I nor conclusion II follows
(c) Both conclusions I and II follows
(d) Only conclusion I follows

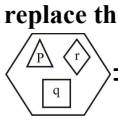
14. A question is given followed by two arguments. Decide which of the arguments is/are strong with respect to the question.
Question:
Does assigning class monitors harbour the feeling of jealousy among students?
Arguments:
(i) Yes, all class monitors start to behave arrogantly.
(ii) No, it teaches them equity by providing every student a chance to learn team spirit under a leader.
(a) Only argument (ii) is strong.
(b) Both the arguments are strong.
(c) None of the arguments are strong.
(d) Only argument (i) is strong.

15. **Argument: All the faculty members are instructed to reach the college by 9.00 A.M.**
Assumptions:
1. **Some faculty members do not come on time.**
2. **Faculty members will follow all the instructions in the notice.**

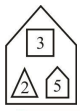
(a) Both 1 and 2 are implicit
(b) Only assumption 1 is implicit
(c) Only assumption 2 is implicit
(d) Neither 1 nor 2 is implicit

16. **You are given a question and two statements. Identify which of the statements is/are necessary/sufficient to answer the question.**
Question:
Who is father of M?
Statements:
I. P and Q are brothers.
II. Q's wife is the sister of M's wife.
(a) Statement I alone is sufficient.
(b) Statement I and II both are necessary
(c) Statement II alone is sufficient
(d) Statement I and II both are not sufficient.

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



⇒ 6{(3 + P) + (4 + q) + (4 + r)}



⇒ 5{(4 + 3) + (3 + 2) + (5 + 5)}

⇒ ?

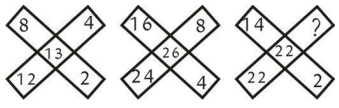
(a) 29 (b) 96
(c) 100 (d) 120

18. **Select the term that can replace the question mark (?) in the following analogy.**
STYLE : 81 : ARRIVAL :: CRACK : 36 : ?
(a) SMELL (b) RIDE
(c) ROSE (d) STREAM

19. **If Charger = 60 , then Topper = ?**
(a) 40 (b) 90
(c) 26 (d) 52

20. **Rearrange the cluttered letters to form a meaningful word and find the odd one out.**
(a) LOWELY (b) IFER
(c) THIWE (d) WRONB

21. **Study the given pattern carefully and select the number that can replace the question mark (?) in it.**

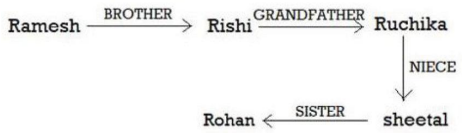


(a) 8 (b) 10
(c) 12 (d) 6

22. **Rahul left his school and walked 20 m straight towards the north, turned left and walked straight for another 20 m. He took a final left turn again and walked straight for 20 m to reach home. What is the shortest distance between the school and his home? (All turns are 90° turns only)**
(a) 20 m (b) 25 m
(c) 40 m (d) 30 m

23. **If the south-east direction moves two places and becomes north-east; and north-west moves two places to become south-west, what would be the direction that west would become, assuming all other directions make similar movements.**
(a) North-east (b) East
(c) North-West (d) South

24. **If 'A→B' means 'A is the mother (or any other relationship) of B', then using the given relationship chart, select the option that correctly depicts the meaning of 'Rohan→ Rishi'.**



(Context - Brother - Grandfather - Niece - Sister -)
(a) Rohan is the grandson of Rishi
(b) Rishi is the son of Rohan
(c) Rohan is the son of Rishi
(d) Rohan is the nephew of Rishi

25. **Select the correct set of symbols**
63 7 5 4 = 49
(a) ×, –, ÷ (b) +, ÷, –
(c) +, –, ÷ (d) ÷, × , +

26. **Which company manufactured the first microprocessor 4004?**
(a) ENOcean Private Company
(b) INTEL Corporation
(c) PLX Devices
(d) NVIDIA Corporation

27. **Which among the following is an output device in the context of computer system?**
(a) Magnetic scanner (b) Track ball
(c) Light pen (d) Plotter

28. **Which of the following is NOT an output device?**
(a) Plotter (b) Printer
(c) Monitor (d) Touch screen

29. **Daisy wheel printer is a types of _____**
(a) Laser (b) Dot matrix
(c) Manual (d) Impact

30. **1024 Terabyte is equal to which of the following?**
(a) 10 Petabytes (b) 1 Gigabyte
(c) 1 Petabyte (d) 1 Exabyte

31. **Which of the following is smallest storage?**
(a) Megabyte (b) Gigabyte
(c) Kilobyte (d) Nano byte

32. **Which of these units is the smallest unit of data storage in a computer?**
(a) 1 Gigabyte (b) 1 Pentabyte
(c) 1 Terabyte (d) 1 Megabyte

33. **Which of the following is not a component of a computer network?**
(a) NIC (b) Router
(c) Switch (d) USB

34. **Identify whether the following statements are true or false.**
i) Switching at the network layer on the internet uses the datagram approach to packet switching.
ii) The Internet Protocol version 4 (IPv4) is the delivery mechanism used by TCP/IP protocols.
iii) An IPv4 address is represented by 8 bytes.
(a) i-False, ii-True, iii-True
(b) i-True, ii-True, iii-False
(c) i-True, ii-False, iii-True
(d) i-False, ii-False, iii-True

35. **Which of the following is responsible for reassembling received packets at recipient computer?**
(a) IP
(b) TCP
(c) TCP and IP both
(d) Neither TCP and nor IP

36. **Which of the following is a portion of your document's text that is extracted from the same document and displayed as a graphic element on a page in MS - Word 365?**
(a) Comment (b) Block quote
(c) Footnote (d) Pull quote

37. **Which of the following options of MS - Word 365 is used to change the background color of selected text, paragraph or table cell?**
(a) Shading
(b) Text Highlight color
(c) Font Color
(d) Text Effects and Typography

38. **Which of the following tabs is the default tab in MS Word 365?**
(a) File (b) Design
(c) Home (d) Layout

39. **Which of the following statements is incorrect regarding the interent?**
(a) The standard Internet Protocol is used in internet is called Hyper Text Markup Language (HTML).
(b) There is no centralized administration for the internet for accessing and using whether for technical implementation or policies.
(c) Internet has millions of small domestic, education, commercial and government networks.
(d) Internet is a collection of computers that shares information.

40. **In order to transfer files between two computers located at distant places, whom should be they connected?**
(a) Internet (b) Hub
(c) Repeater (d) Modem

41. **__formally launched the first publicly available internet service for India in August 1995.**
(a) VSNL (b) Aircel
(c) Airtel (d) BSNL

42. **Which of the following is not a Web browser?**
(a) XHTML (b) FireFox
(c) MacWeb (d) Net Scape

43. **During a period of time, you visit the number of websites and pages are presented by-**
(a) Title bar (b) History list
(c) Menu bar (d) Status bar

44. **Alta Vista is a**
(a) Program (b) Software
(c) Browser (d) Search Engine

45. **The systematic process of solving an issue is called -**
(a) Feedback (b) Troubleshooting
(c) Update (d) Patching

46. **Calculate the total prime factors in the product of $\{(16)^7 \times (27)^6 \times 5^9\}$**
(a) 28 (b) 43
(c) 55 (d) 56

47. **$45 - [38 - \{80 \div 4 - (8 - 12 \div 3) \div 4\}] = ?$**
(a) 25 (b) 27
(c) 26 (d) 28

48. **What is the difference between the biggest and the smallest fraction among $\frac{2}{3}, \frac{3}{4}, \frac{4}{5}$ and $\frac{5}{6}$?**
(a) $\frac{1}{30}$ (b) $\frac{1}{6}$
(c) $\frac{1}{12}$ (d) $\frac{1}{20}$

49. When the numerator of a fraction increases by 6, the fraction increases by three-fourth. The denominator of the fraction is :
(a) 8 (b) 10
(c) 12 (d) 6

50. Find the greatest number by which when the numbers 158 and 215 are divided, it leaves remainders 4 and 5, respectively.
(a) 21 (b) 18
(c) 7 (d) 14

51. Find the smallest number which is exactly divisible by 6, 8, 12 and 16.
(a) 48 (b) 24
(c) 64 (d) 80

52. If a : b = c : d = e : f = g : h = 1 : 3 then find out the name of following
(pa + qc + re + sg) : (pb + qd + rf + sh)
(a) 1:3 (b) 1:2
(c) 1:5 (d) 1:4

53. If 40% of (a – b) is equal to 20% of (a + b), then b is what percentage of a?
(a) 25% (b) 35%
(c) 100/3% (d) 28%

54. The area of a rectangle is 9/20 times the area of a square. If the length and breadth of the rectangle are in the ratio 5 : 4, find the ratio of the perimeter of the rectangle and the square.
(a) 25:48 (b) 27:20
(c) 27:40 (d) 25:45

55. A father can complete a task in 8 days, while the son can do it in 7 days. If they work on alternate days, with the father starting, then in how many days will the task be completed?
(a) $7\frac{1}{2}$ (b) 6
(c) 7 (d) $6\frac{1}{2}$

56. Prithvi is going to Delhi by Rajdhani express, which is running late by six minutes. The driver increased its speed by 4 km/hr. The train reaches the next station which is 36 km far at the correct time. What is the original speed of the train?
(a) 20 km/hr (b) 36 km/hr
(c) 30 km/hr (d) 26 km/hr

57. The difference between simple interest and compound interest compounded a half yearly basis for 2 years at the rate of 10% per annum is ₹ 124.05. Find the amount.
(a) ₹ 8400 (b) ₹ 10000
(c) ₹ 8000 (d) ₹ 8200

58. A shopkeeper sold two items, one at 25% profit and second at 15% loss and earned profit of 35. If the price of the item sold at 25% profit is twice that of item sold at 15% loss, then find the sum of the cost price of both the items.
(a) 100 (b) 400
(c) 300 (d) 200

59. If $\frac{x}{2}+\frac{2}{y}=1$ and $\frac{y}{2}+\frac{2}{z}=1$, then the value of $\frac{z}{2}+\frac{2}{x}$ is:
(a) –1 (b) 1
(c) 0 (d) 2

60. If ABCD is a cyclic quadrilateral and ABC is an equilateral triangle find the angle of ∠CDA
(a) 45^0 (b) 90^0
(c) 120^0 (d) 60^0

61. A box contains 2 black, 6 green and 4 yellow balls. If 2 balls are picked up at random, the probability that both are green is:
(a) 1/6 (b) 1/22
(c) 3/11 (d) 5/22

62. Find the value of $\left[\left(\frac{5}{8}\right)^{-7}\times\left(\frac{8}{5}\right)^{-4}\times\left(\frac{1}{4}\right)^{-3}\right]^{-3}$
(a) $\left(\frac{5}{4}\right)^9$ (b) $\left(\frac{5}{4}\right)^7$
(c) $\left(\frac{32}{5}\right)^9$ (d) $\left(\frac{5}{32}\right)^9$

63. The age ratio of Jay and Jog is 5:2. The sum of their age is 63. What will be the ratio of their ages after 9 years?
(a) 5:2 (b) 2:1
(c) 3:2 (d) 4:3

64. Two inlet taps, in which one tap's capacity is 4.5 times more than the other, an outlet tap which can empty a tank in 9 hours, working together can fill an empty tank in 7.5 hours. How many hours will be taken by the less efficient pipe to fill the tank?
(a) 18 (b) 27
(c) 22.5 (d) 13.5

65. 8 : 4 :: 3.2 : x and 3 : 6 :: 6 : y. What is the ratio of x to y ?
(a) 3 : 8 (b) 2 : 15
(c) 4 : 19 (d) 1 : 3

66. Heat supplied to a system is measured in____.
(a) joules (b) amperes
(c) kilowatts (d) degrees kelvin

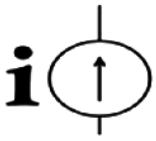
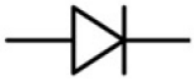
67. **If the volume of four bodies of equal mass are V_1, V_2, V_3 and V_4 respectively then which body will have greater density if $V_4 > V_2 > V_3 > V_1$ then**
(a) V_2 (b) V_3
(c) V_1 (d) V_4

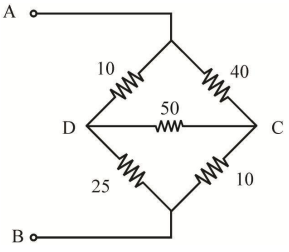
68. **A force of 1.5 Newton is applied on a body of mass 5kg for 2 second. the distance covered by the body is -**
(a) 2 m (b) 1.6 m
(c) 1.2 m (d) 0.6 m

69. **The S.I unit of power (watt) is equal to -**
(a) kg-meter –second^{-2}
(b) kg-meter^2 –second^{-2}
(c) kg-meter^2 –second^{-3}
(d) None of these.

70. **The heat capacities of two objects made of the same metal are in the ratio 3:4. the ratio of their mass will be**
(a) 3 : 4 (b) 3 : 7
(c) 4 : 3 (d) 4 : 7

71. **Resistance of a choke coil is _____**
(a) Low (b) Infinite
(c) High (d) Indefinite

72. **Find the odd one-**
(a) 
(b) 
(c) 
(d) 

73. **Find the resistance between terminals A and B in the electric circuit of below figure**


(a) 30Ω (b) 19Ω
(c) 50Ω (d) 100Ω

74. **2 Coils having self-inductance of 10mH and 15mH have an effective inductance of 40 mH when they are connected in series adding. What will be the equivalent inductance when they are connected in series opposition?**
(a) 25 mH (b) 20 mH
(c) 10 mH (d) 5 mH

75. **The moving coil in an electrodynamometer wattmeter is called :**
(a) Power coil (b) Current coil
(c) Meter coil (d) Pressure coil

76. **An SMD tantalum capacitor has a capacitance range of :**
(a) 100 µF to 100 nF (b) 0.1 µF to 100 nF
(c) 0.1 µF to 1000 pF (d) 0.1 µF to 100 µF

77. **The value of susceptibility of vacuum is**
(a) 0 (b) Infinite
(c) Unity (d) None of these

78. **The value of relative permittivity of vaccum is**
(a) 1 (b) 0
(c) 8.854×10^{-12} (d) ∞

79. **The inductance of a coil depends on turns, length, area of a coil and .....**
(a) Permeability
(b) Back emf
(c) Coefficient of coupling
(d) Resistance

80. **The current carrying capacity of aluminium is what percent of the carrying capacity of copper?**
(a) 15% (b) 30%
(c) 75% (d) 25%

81. **In an intrinsic semiconductor Fermi Level represents the energy, with probability of its occupation of**
(a) 0% (b) 25%
(c) 50% (d) 100%

82. **Doping materials are called impurities because they**
(a) decrease the number of charge carriers
(b) change the chemical properties of semiconductors
(c) make semiconductors less than 100 percent pure
(d) alter the crystal structure of the pure semiconductors

83. **The band gap energies for silicon and germanium photodiodes are 1.1 eV and 0.67 eV respectively, their cutoff wavelength respectively would be :**
(a) 1127.27 nm, 1850.75nm
(b) 1850.27 nm, 2167.91 nm
(c) 456.12 nm, 1127.27 nm
(d) 1315.45nm, 1850.75 nm

84. **Thermal runaway in BJT will take place if the quiscent point is such that-**
(a) $V_{CE} > 1/2\ V_{CC}$ (b) V_{CE}
(c) $V_{CE} < 2V_{CC}$ (d) $V_{CE} < 1/2\ V_{CC}$

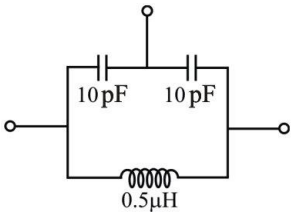
85. **The MOSFETs have lower turn off time and they can be operated at higher frequencies when compared to BJTs because-**
(a) The minority carrier storage time is absent in MOSFETs
(b) MOSFETs have higher input impedance
(c) MOSFETs are voltage controlled
(d) MOSFETs have positive temperature coefficient

86. **Clipper circuit uses an arrangement of _____ and _____ along with resistor to clip either negative or positive part of the input waveform.**
(a) diode, capacitor
(b) diode, inductor
(c) diode, voltage source
(d) inductor, voltage source

87. **In a two stage CE amplifier circuit, the ac collector resistance of the first stage depends on**
(a) the input impedance of first stage
(b) the input impedance of second stage
(c) load resistance only
(d) none of the above

88. **The (I_d-V_{gs}) characteristics of a MOSFET in the saturation region is:**
(a) Quadratic (b) Exponential
(c) Logarithmic (d) Hyperbolic

89. **A tuned circuit used in colpitts oscillator, the frequency of oscillations will be-**



(a) 1 MHz (b) 0.1 MHz
(c) 10 MHz (d) 100 MHz

90. **A Schmitt trigger has V_T + = 2.0 V and V_T – = 1.2 V. What is the hysteresis voltage of the Schmitt trigger?**
(a) 0.4 volts (b) 0.6 volts
(c) 0.8 volts (d) 1.2 volts

91. **Normal timer Circuit has**
(a) Resistor, Inductor and Capacitor
(b) Inductor and Capacitor
(c) Resistor and Inductor
(d) Resistor and Capacitor

92. **The multiplying power of shunt of a milliammeter is 4. If the circuit current is 600 mA, then the current through the meter is :**
(a) 250 mA (b) 240 mA
(c) 1500 mA (d) 150 mA

93. **PMMC ammeter have uniform scale because :**
(a) Of eddy current damping
(b) They are spring controlled
(c) Their deflecting torque varies directly as current
(d) Both spring controlled and having deflecting torque varies directly as current

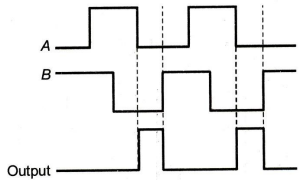
94. **The bridge which is used to measure values of resistance below 1 ohm is**
(a) Wheatstone bridge
(b) Kelvin's Bridge
(c) Maxwell's bridge
(d) Hay's bridge

95. **The time base signal in a CRO is**
(a) a sinusoidal signal
(b) a square wave signal
(c) a sawtooth signal
(d) a triangular wave signal

96. **A microphone is classified as _____ transducer.**
(a) Acoustical (b) Magnetic
(c) Optical (d) Thermal

97. **A 5 bit code is called**
(a) EBCDIC (b) BAUDOT
(c) MORSE (d) ASCII

98. **If the input signals (A and B) and output signal are as below then the circuit element is:**



(a) AND Gate (b) OR Gate
(c) NOR Gate (d) XOR Gate

99. **Propagation delay of logic gate**
(a) Increases the power dissipation
(b) Limit the maximum speed at which circuit can operate
(c) Increases the logic level for high state
(d) None of the above

100. **A 4-bit R/2R digital-to-analog (DAC) converter has a reference of 5V. What is the analog output (in V) for the input code 1010?**
(a) 1.125 V (b) 1.725 V
(c) 2.125 V (d) 3.125 V

SOLUTION : PRACTICE SET- 15

ANSWER KEY

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

SOLUTION

1. (a)
Kalpana Chawla was assigned as a mission specialist in November 1996 as STS-87 aboard the space shuttle columbia, becoming the first woman of Indian origin to fly into space IN 2003, chawla was one of the seven crew members who died in the space shuttle columbia disaster during its re-entry into the Earth's atmosphere.

2. (b)
A boxing ring often referred simply as a ring or the squared circle, is the space in which boxing match occurs.

3. (a)
Chainsoo is a famous food of Uttarakhand which is made up of Black Gram.

4. (d)

Some newspaper magazines and its authors-			
1819	Sambad Kaumudi	Bengali weekly newspaper	Raja Ram Mohan Roy
1780	Bengal Gazette	English newspaper	James Augustus Hicky
1822	Mirat-ul-Akhbar	Persian language journal	Raja Ram Mohan Roy
1912	Al-Hilal	Urdu weekly newspaper	Abul Kalam Azad
1913	Pratap	Hindi language newspaper	Ganesh Shankar Vidyarthi
1947	Navjivan	Weekly Hindi newspaper	M. K. Gandhi
1932	Harijan	Weekly journal	M.K. Gandhi
1919	Independent	Newspaper	Motilal Nehru
1919	Young India	Weekly English journal	M.K. Gandhi
1920	MookNayak	Marathi weekly newspaper	B.R. Ambedkar

5. (b)
Primary deficit is the difference between the government's income-expenditure gap and its interest payment on previous borrowings. Primary deficit can be calculated by finding the difference between current year's fiscal deficit and interest payment on the borrowings for the previous year. Thus if the fiscal deficit comes out to be equal to interest payment then Primary deficit is zero in the government budget. [Primary Deficit ⇒ fiscal Defict - Interest payment]

6. (d)
A Political party is recognised as a National Party only if it fulfils any one of the following three conditions:

- The party wins 2 percent of the seats in the Lok Sabha (as of 2014, 11 seats) from at least 3 different States; or
- At a General Election to Lok Sabha or Legislative Assembly, the party polls 6% of votes in four States and in addition it wins 4 Lok Sabha seats from any state or states; or
- A party gets recognition as State Party in four or more States.

7. (a)
The Denube River passes through most countries as Germany, Austria, Slovakia, Hungary, Croatia, Serbia, Bulgaria, Moldova, Ukraine via Romania. It starts from south Germany and runs into the Black sea through Romania. It is the second-longest river in Europe after the Volga with a lenght of 2,850 kilometers.

8. (a)
During the summer, in India, pre-monsoon showers are very common, especially in Kerala, Karnataka and parts of Tamil Nadu. They help in the early ripening of mangoes, hence often referred to as 'Mango showers.

9. (c)
Famous medieval literary genius 'Guru Basav' compiled his famous literary works in Kannada language. Guru Basava was a 12th century statesman, philosopher, poet, social reformer during the reign of the Kalyan/Kalachuri dynasty. 'Basav Puran' is Biographical epic poem of Guru Basava.

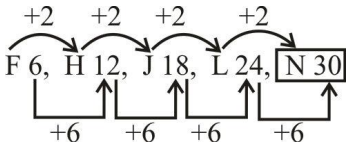
10. (d)
"Indian Railways contributed to the freedom struggle of India by bringing together people from diverse cultures." This statement is given by Mahatma Gandhi.

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

A<u>C</u>E<u>B</u>D / <u>A</u>CEB<u>D</u> / <u>A</u>CEB<u>D</u>

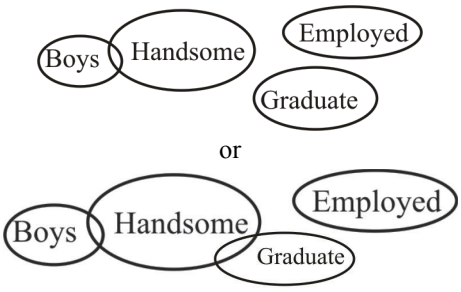
Hence, CEADAD will complete the series.

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



Hence, option (b) is correct.

13. (b)
According to the question, Venn diagram is as follows-

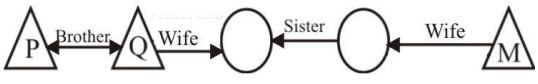


Hence, it is clear from above Venn diagram neither conclusion I nor II follows.

14. (a)
According to the given question "only argument (ii) is strong".

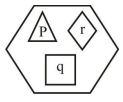
15. (a)
In the given statement assumption I and II are implicit.

16. (d)
From the statements I and II–



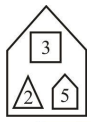
Thus, statement I and II both are not sufficient to answer the given question.

17. (b)
Just as,



$\Rightarrow 6\{(3 + P) + (4 + q) + (4 + r)\}$

And,



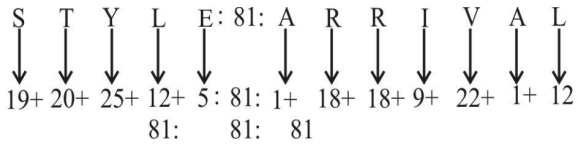
$\Rightarrow 5\{(4 + 3) + (3 + 2) + (5 + 6)\}$

Same as,

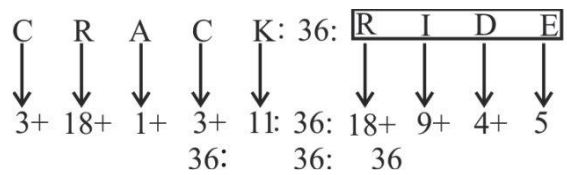
$\Rightarrow 4\{(6+4) + (5+3) + (4+2)\}$

$= 4[10 + 8 + 6] = 96$

18. (b)
Just as,



Same as,



19. (b)
Just as,
Charger $\rightarrow 3 + 8 + 1 + 18 + 7 + 5 + 18 = 60$
Similarly,
Topper $\rightarrow 20 + 15 + 16 + 16 + 5 + 18 = 90$

20. (b)
On arranging the the given words is as follows-

(a) LOWELY $\rightarrow$ YELLOW
(b) IFER $\rightarrow$ FIRE
(c) THIWE $\rightarrow$ WHITE
(d) WRONB $\rightarrow$ BROWN

Except of FIRE, all others are colours name.
Hence, option (b) is odd one.

21. (d)
Just as,
From pattern I

$$\frac{(8+2)+(12+4)}{2} = \frac{26}{2} = 13$$

From pattern II

$$\frac{(16+4)+(24+8)}{2} = \frac{52}{2} = 26$$

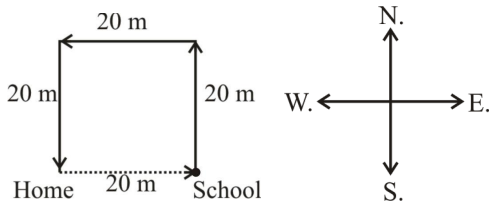
Same as,
From pattern III

$$\frac{(14+2)+(22+?)}{2} = 22$$

$$16 + 22 + ? = 44$$
$$? = 44 - 38$$
$$? = 6$$

22. (a)

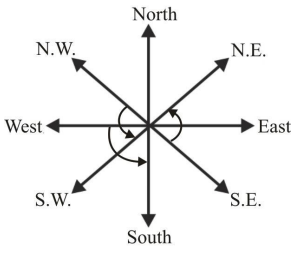
According to the question,



Hence, Shortest distance between school and his home is 20m.

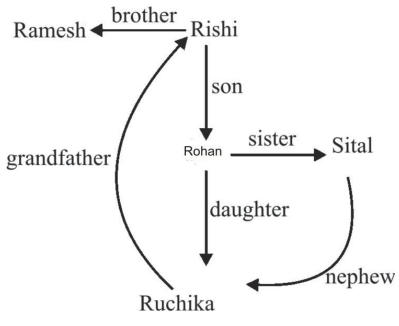
23. (d)

The changed direction is obtained by rotating 90^0 anticlockwise from the direction, thus rotating 90° clock wise from the west direction will give the south direction.



24. (c)

On drawing blood relation diagram according to the question,



It is clear from the above blood relation diagram that Rohan is the son of Rishi.

25. (d)

Given,

$$63\ 7\ 5\ 4 = 49$$

From option (a),

$$63 \times 7 - 5 \div 4 = 49$$

$$\Rightarrow 441 - \frac{5}{4} = 49$$

$$\Rightarrow \frac{1764-5}{4} = 49 \quad = \frac{1759}{4} \neq 49$$

From option (b),

$$63 + 7 \div 5 - 4 = 49$$

$$\Rightarrow 63 + \frac{7}{5} - 4 = 49$$

$$\Rightarrow \frac{315+7-20}{5} = 49$$

$$\Rightarrow \frac{302}{5} \neq 49$$

From option (c),

$$63 + 7 - 5 \div 4 = 49$$

$$\Rightarrow 70 - \frac{5}{4} = 49$$

$$\Rightarrow \frac{280-5}{4} = 49$$

$$\Rightarrow \frac{275}{4} \neq 49$$

From option (d),

$$63 \div 7 \times 5 + 4 = 49$$

$$\Rightarrow 9 \times 5 + 4 = 49$$

$$\Rightarrow 45 + 4 = 49$$

$$\Rightarrow 49 = 49$$

Hence option (d) is correct.

26. (b)

The first microprocessor 4004 was made by Intel company. This processor was invented in 1969 which is made up of a 4 bit processor and 2300 transistors.

27. (d)

Plotter is an output device. It is such a device as prints charts, graph, Image, linegraph etc on the hard copy. Drum pen plotter and Flatbed plotters, both are types of plotter. Along with the 3-D printing, it includes banner, poster printings etc. Monitor, printer, earphone, disk etc are examples of output device.

28. (d)

Plotter, Printer and Monitor are output devices whereas Touch screen is an input device.

29. (d)

Daisy wheel printer is a type of impact printer. It was invented by David S. Lee in 1969 but its commercial production started in 1972. All printers produce output in the form of hard copy.

30. (c)

In computing 1 Nibble equal to 4 bit

1 bit = 0 or 1
4 bits = 1 Nibble
8 bits = 1 Byte
1024 Bytes = 1 KB
1024 KB = 1 MB
1024 MB = 1 GB
1024 GB = 1 TB
1024 TB = 1 PB
1024 PB = 1 EB
1024 EB = 1 ZB
1024 ZB = 1 YB

31. (d)

10^{-9} Nanobyte = 1 byte
1024 Byte = 1 Kilobyte

32. (d)
Out of the above units, Megabyte is the smallest unit of data storage in a computer.

33. (d)
There are three computer networking devices such as NIC, Router, Switch where as a USB drive is a data storage device.
USB drive- A USB drive is a device used to store data that consists of flash memory and an integrated Universal Serial Bus (USB) interface included. Most USB flash drives are removable and rewritable. It is small, durable and reliable. There are bigger their storage space, the faster they will work.

34. (b)
The datagram approach to packet switching is used by switching at the network on the internet. In this network the two delivery mechanisms Internet Protocol versions IPv4 and IPv6 are used by TCP/IP protocols. The IPv4 address is a 32-bit number that is written in decimal digits of 8-bit fields. Each field is represented by 8-bit field that represents a byte. The IPv6 address is a 128-bit number.

35.(b)
TCP is a short form transmission control protocol. The function of TCP is to break the information and message in to pieces so that data can be delivered to the target through IP, after which TCP again converts the pieces of data same form.

36. (d)
Pull quotes are short sentences usually a quote from someone important to the story, but sometimes just a short, interesting sentence set off from body text to grap the reader's attention. Pull quotes should be short from a few words to a few lines.

37. (a)
Shading option or feature in MS - Word 365 is used to change the color behind the selected paragraph or table cell.

38. (c)
The Home tab is the default tab in Microsoft Word. It has five groups of related commands - clipboard, font, paragraph, styles and editing. It helps you change document settings like font size, adding, bullets, adjusting, styles and many other common features.

39. (a)
The internet is a global system for interconnected computer networks that use the internet protocol suite (TCP/IP) for communications between networks and devices. It includes private, public, educational, businness, networks while HTML is a language used to create webpages.

40. (a)
The Internet is the global system of interconnected computer network that uses the internet protocol suite (TCP/IP) to communciate between network and devices. It is a network of networks that consists of private, public, academic, business and government networks of local to global scope.

41. (a)
It was on August 15, 1995 Videsh Sanchar Nigam Limited formally launched the Internet for the Indian Public.

42. (a)
XHTML stands for Extensible Hyper Text Markup Language. This is a language used on the world wide web (WWW). It is a software language. It is a feature of HTML and XML language are included, where are all other browsers.

43. (b)
The number of websites you visit during a period of time, it displays the history list to all those who have viewed the page. History list stores the information of all those pages in the browser.

44. (d)
Alta Vista is a search engine developed in December 1995. A browser is an application program that allows HTML files to be opened on the internet.

45. (b)
The systematic process of solving an issue is called, Trouble shooting. Trouble shooting is a systematic approach to problem solving that is often used to find and correct issues with complex machines, electronics, computers and software systems.

46. (c)
Total prime factors $\{(16)^7 \times (27)^6 \times 5^9\}$

$$= \left(2^4\right)^7 \times \left(3^3\right)^6 \times 5^9$$
$$= 2^{28} \times 3^{18} \times 5^9$$
$$= 28 + 18 + 9 = 55$$

47. (c)
From the given expression,

$$45 - [38 - \{80 \div 4 - (8 - 12 \div 3) \div 4\}]$$
$$= 45 - [38 - \{80 \div 4 - 4 \div 4\}]$$
$$= 45 - [38 - \{20 - 1\}]$$
$$= 45 - [38 - 19]$$
$$= 45 - 19 = 26$$

48. (b)
$\frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}$

For equaling denominator we have to multiply and divide each fraction by LCM of 3, 4, 5 and 6 = 60.

$$\Rightarrow \frac{2}{3} \times \frac{60}{60}, \frac{3}{4} \times \frac{60}{60}, \frac{4}{5} \times \frac{60}{60}, \frac{5}{6} \times \frac{60}{60}$$

$$\Rightarrow \frac{40}{60}, \frac{45}{60}, \frac{48}{60}, \frac{50}{60}$$

Hence, biggest fraction $= \frac{5}{6}$

Smallest fraction $= \frac{2}{3}$

Required difference $= \frac{5}{6} - \frac{2}{3} = \boxed{\frac{1}{6}}$

49. (a)

If fraction is $\frac{x}{y}$

$\Rightarrow \quad \frac{x+6}{y} = \frac{x}{y} + \frac{3}{4}$

$\Rightarrow \quad \frac{x+6}{y} - \frac{x}{y} = \frac{3}{4}$

$\Rightarrow \quad \frac{6}{y} = \frac{3}{4}$

$\Rightarrow \quad y = 8$

50. (d)

According to the question,

First number = 158–4 = 154

Second Number = 215 – 5 = 210

154)210(1
154
56)154(2
112
42)56(1
42
14)42(3
42
××

Hence, the greatest required number = 14

51. (a)

The required number = LCM of 6, 8, 12 and 16

On finding the LCM by common division method,

2	6, 8, 12, 16
2	3, 4, 6, 8
2	3, 2, 3, 4
2	3, 1, 3, 2
3	3, 1, 3, 1
	1, 1, 1, 1

LCM = $2 \times 2 \times 2 \times 2 \times 3 = 48$

52. (a)

$\frac{a}{b} = \frac{c}{d} = \frac{e}{f} = \frac{g}{h} = \frac{1}{3}$

$\frac{pa}{pb} = \frac{qc}{qd} = \frac{re}{rf} = \frac{sg}{sh} = \frac{1}{3}$

$\frac{a}{b} = \frac{c}{d} = k \Rightarrow k = \frac{a+c}{b+d}$

$\because \quad \frac{pa+qc+re+sg}{pb+qd+rf+sh} = \frac{1}{3}$

(pa+qc+re+sg):(pb+qd+rf+sh)=1:3

53. (c)

According to the question,

(a – b) of 40% = (a + b) of 20%

$\Rightarrow \frac{(a-b)\times 40}{100} = \frac{(a+b)\times 20}{100}$

$\Rightarrow 40a - 40b = 20a + 20b$

$\Rightarrow 20a = 60b$

$\Rightarrow a = 3b$

$\frac{a}{b} = \frac{3}{1}$

Required percentage $= \frac{1}{3} \times 100$

$= \frac{100}{3}\%$

54. (c)

Let the length of rectangle is 5x and breadth is 4x

Area of rectangle = $5x \times 4x = 20x^2$

According to the question

$\text{Area of square} \times \frac{9}{20} = \text{Area of rectangle}$

$\text{Area of square} \times \frac{9}{20} = 20x^2$

$\text{Area of square} = \frac{400x^2}{9}$

$\text{Side of square} = \frac{20x}{3}$

$\frac{\text{Perimeter of rectangle}}{\text{Perimeter of square}} = \frac{2\times(5x+4x)}{4\times\frac{20x}{3}}$

$= \frac{18x\times 3}{80x} = \frac{27}{40}$

Required ratio = 27 : 40

55. (a)

Father's 1 day work $= \frac{1}{8}$ th part

Son's 1 day work $= \frac{1}{7}$ th part

(Father + Son)'s two days work $= \frac{1}{8} + \frac{1}{7} = \frac{15}{56}$

(Father + Son)'s 2 × 3 days work $= \frac{15}{56} \times 3 = \frac{45}{56}$

Remaining work $= 1 - \frac{45}{56} = \frac{11}{56}$

The remaining work after the work done by the father on 7th day

$= \frac{11}{56} - \frac{1}{8} = \frac{4}{56} = \frac{1}{14}$

$\because$ On 8th day son will do $\frac{1}{14}$ of the work in $\frac{1}{2}$ day

$\therefore$ Total time $= 7 + \frac{1}{2} = 7\frac{1}{2}$ days.

56. (b)

According to the question,

Let the real speed of train is x km/hr.

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$\frac{36}{x} - \frac{36}{x+4} = \frac{6}{60}$$

$$36\left(\frac{x+4-x}{x^2+4x}\right) = \frac{1}{10}$$

$x^2 + 4x - 1440 = 0$

$x^2 + 40x - 36x - 1440 = 0$

$x(x + 40) - 36(x + 40) = 0$

$(x + 40)(x - 36) = 0$

$x - 36 = 0 \Rightarrow x = 36$ km/h

57. (c)

Given

Interest Rate = R/2 = 10/2 = 5% (Half yearly)

Time = 2 Years = 4 Half yearly

Let Principal = P

$$P\left[\left(1+\frac{R}{100}\right)^{T} - 1\right] - \left(\frac{P \times R \times T}{100}\right) = 124.05$$

$$P\left[\left(1+\frac{5}{100}\right)^{4} - 1\right] - \left(\frac{P \times 5 \times 4}{100}\right) = 124.05$$

$$P\left[\frac{21\times21\times21\times21 - 20\times20\times20\times20}{20\times20\times20\times20}\right] - \left(\frac{P\times5\times4}{100}\right) = 124.05$$

$$P\left[\frac{194481-160000}{160000}\right] - \frac{P\times5\times4}{100} = \frac{12405}{100}$$

$$P\left[\frac{34481-32000}{160000}\right] = \frac{12405}{100}$$

$$P\left[\frac{2481}{1600}\right] = 12405$$

$$P = \frac{12405\times1600}{2481} = ₹8000$$

58. (c)

Let the cost price of the item sold at 25% profit = 2x

Cost of item sold at 15% loss = x

According to the question,

$$\frac{2x\times125}{100} + \frac{x\times85}{100} = 3x + 35$$

$$\frac{250x+85x}{100} = 3x + 35$$

$335x - 300x = 3500$

$35x = 3500$

$x = 100$

Hence, cost of second item = 2x = ₹200

Hence the required sum = 100 + 200 = ₹300

59. (b)

Given,

$$\frac{x}{2} + \frac{2}{y} = 1$$

$xy + 4 = 2y$

$2y - xy = 4$

$$y = \frac{4}{2-x} \qquad \text{_____(i)}$$

$$\frac{y}{2} + \frac{2}{z} = 1$$

$yz + 4 = 2z$ _____(ii)

On putting the value of y in equation (ii),

$$\frac{4}{(2-x)} \times z + 4 = 2z$$

$4z + 8 - 4x = 4z - 2xz$

$8 - 4x = -2xz$

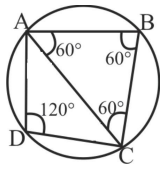
$4 - 2x = -xz$

$2x = 4 + xz$

$$1 = \frac{4}{2x} + \frac{xz}{2x}$$

or $$\frac{2}{x} + \frac{z}{2} = 1$$

60. (c)



$\because$ In any cyclic quadrilateral the sum of opposite angle of quadrilateral is 180º

Hence,

$\angle CDA + \angle ABC = 180^0$

$\angle CDA + 60° = 180^0$

$\angle CDA = 180^0 - 60^0 = 120^0$

61. (d)

Total balls = 2 + 6 + 4 = 12

$$\text{Probability of green balls} = \frac{6_{c_2}}{12_{c_2}} = \frac{\frac{6\times5}{2\times1}}{\frac{12\times11}{2\times1}}$$

$$= \frac{30}{12\times11}$$

$$= \frac{5}{22}$$

62. (d)

$$\left[\left(\frac{5}{8}\right)^{-7} \times \left(\frac{8}{5}\right)^{-4} \times \left(\frac{1}{4}\right)^{-3}\right]^{-3}$$

$$\Rightarrow \left[\left(\frac{8}{5}\right)^{7-4} \times 4^3\right]^{-3}$$

$$\Rightarrow \left[\frac{8^3}{5^3} \times 4^3\right]^{-3}$$

$$\Rightarrow \left[\frac{(32)^3}{5^3}\right]^{-3}$$

$$= \left[\left(\frac{5}{32}\right)^3\right]^3$$

$$= \left(\frac{5}{32}\right)^9$$

63. (b)

Let the present age of Jay and Jog is 5x and 2x years respectively.

According to the question,

$5x + 2x = 63$

$7x = 63$

$x = 9$

$\therefore$ Ratio of their ages after 9 years $= (5\times9+9) : (2\times9+9)$

$= 54 : 27$

$= 2 : 1$

64. (c)

Let pipe A fills a tank in x hours then pipe B will fill that tank in $\frac{x}{4.5}$ hours because the efficiency of B is 4.5 times more than A.

According to the question-

$$\left(\frac{1}{x}+\frac{4.5}{x}\right)-\frac{1}{9}=\frac{1}{7.5}$$

$$\frac{5.5}{x}-\frac{1}{9}=\frac{2}{15}$$

$$\frac{49.5-x}{9x}=\frac{2}{15}$$

$\Rightarrow 5(49.5 - x) = 6x \Rightarrow 247.5 - 5x = 6x$

$\Rightarrow 11x = 247.5$

$\Rightarrow x = \frac{2475}{110}$

$\Rightarrow x = 22.5$ hours

65. (b)

$8 : 4 :: 3.2 : x$ and $3 : 6 :: 6 : y$

$8 \times x = 4 \times 3.2$ $\quad$ $3 \times y = 6 \times 6$

$x = 1.6$ $\quad$ $y = 12$

Then,

$$\frac{x}{y}=\frac{1.6}{12}=\frac{16}{120}=\frac{2}{15}$$

$\therefore$ $x : y = 2 : 15$

66. (a)

Heat supplied to a system is measured in Joule or Calorie.

1 Calorie = 4.18 Joule

67. (c)

By the formula-

$$\text{density} = \frac{\text{mass}}{\text{volume}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\text{(i)}$$

(Mass is same for all bodies)

According to the equation (i), which body has less volume, has more density.

Hence, V_1 has density. (given: $V_4 > V_2 > V_3 > V_1$)

68. (d)

$F = Ma$

$$a = \frac{F}{M} = \frac{1.5}{5} = 0.3 \text{ m/sec}^2$$

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

$$S = 0\times2 + \frac{1}{2}0.3\times(2)^2$$

$S = 0 + 0.3 \times 2$

$\boxed{S = 0.6m}$

69. (c)

The rate of doing work is called power. The S.I unit of power is the watt.

$$1 \text{ Watt} = \frac{1 \text{ Joule}}{\text{second}} = \frac{1N\times m}{\text{second}} = \frac{kg\times m\times m}{\text{sec}^2\times\text{sec}}$$

$$1 \text{ Watt} = \frac{m^2\times kg}{\text{second}^3}$$

$\boxed{1 \text{ Watt} = 1 \text{ kg} - \text{m}^2\text{second}^{-3}}$

70. (a)

Heat capacity, $C = ms$

Then $\frac{C_1}{C_2}=\frac{m_1s_1}{m_2s_2}$

For material made of same metal $s_1 = s_2$

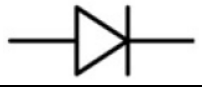
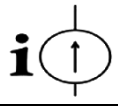
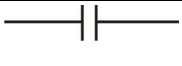
$\boxed{\frac{3}{4}=\frac{m_1}{m_2}}$

71. (a)

The resistance of a choke coil is low (0.5Ω).

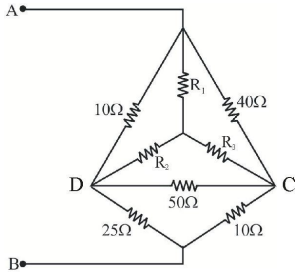
- The inductance of a choke coils is about 0.2 H.
- Choke coil works on the principle of self induction.
- A choke coil is an inductor used to block higher frequency.

72. (b)

Active source	Passive source
	
	
	

73. (b)

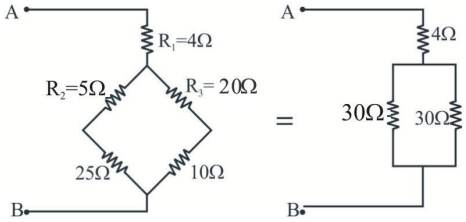
In the given circuit 10 Ω, 40Ω and 50Ω delta connection convert into star connection.



$$\therefore \quad R_1 = \frac{40\times10}{50+40+10} = 4\Omega$$

$$R_2 = \frac{10\times50}{50+40+10} = 5\Omega$$

$$R_3 = \frac{40\times50}{50+40+10} = 20\Omega$$



$$\therefore \quad R_{AB} = 4+30||30 = 4+\frac{30\times30}{30+30} = 4+15$$

$$R_{AB} = 4+15$$

$$\boxed{R_{AB} = 19\Omega}$$

74. (c)

Given−

$L_1 = 10mH, \qquad L_2 = 15mH$

$L_{eq} = 40mH$

According to question,

$L_{eq} = L_1 + L_2 + 2M$ (Additive)

$40 = 10 + 15 + 2M$

$$M = \frac{40-25}{2}$$

$M = 7.5$

$L_{eq} = L_1 + L_2 - 2M$ (Substractive)

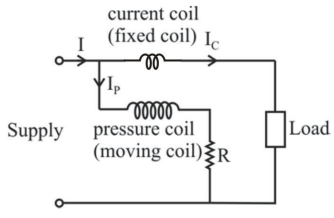
$L_{eq} = 10 + 15 - 2\times7.5$

$L_{eq} = 10 + 15 - 15$

$\boxed{L_{eq} = 10mH}$

75. (d)

Electrodynamometer wattmeter:-



Moving coil or Potential coil -

(i) The moving coil is connected across the load carries current proportional to voltage. It is also called potential coil or pressure coil.

(ii) A high non-inductive resistance is connected in series with potential coil (P.C.) to limit the current to a small value.

Fixed coil or Current coil -

(i) The fixed coils or current coil are connected in series with the load and carry the load current.

⇒ Both fixed and moving coil are air-cored.

76. (d)

An SMD tantalum capacitor has a capacitance range of 0.1μF to 100μF.

- It has voltage rating of 1V to 20V.
- It can operate over a higher temperature range.
- It has low ripple current rating.

77. (a)

The value of susceptibility of vacuum is zero because vacuum can not be magnetized. But relative permittivity of vacuum is one.

Susceptibility - It is defined how much, magnetism is developed in a material due to an external magnetic field.

78. (a)

Relative permittivity is the ratio of the permittivity of a substance to the permittivity of space or vacuum.

$$\boxed{\varepsilon_r = \frac{\varepsilon}{\varepsilon_0}}$$

Where, $\varepsilon_r \rightarrow$ relative permittivity

$\varepsilon \rightarrow$ absolute permittivity

$\varepsilon_0 \rightarrow$ Permittivity of vacuum

The value of relative permittivity of vacuum is 1.

79. (a)

Inductance of coil $(L) = \frac{\mu_0\mu_r N^2 A}{\ell}$ the inductance of a coil depend on turns, length, area of a coil and permeability.

80. (c)

The percentage current carrying capacity of Aluminum is 75 % of current carrying capacity of copper.

Current carrying capacity- Current carrying capacity of a conductor is defined as how much load a conductor can carry. When the current flows through the conductor a certain level of heat generates which can further increases up-to the melting temperature of the insulation or insulating material.

These factors are-
- Conductor size
- Ambient temperature
- Installation conditions.

81. (c)

Fermi energy is determined as the energy point where the probability of occupation of an electrons is exactly 50% or 0.5 i.e. $\frac{1}{2}$ for the intrinsic semi conductor,

since electrons and holes are always created in pairs, n = p = n_i.
Hence there are equal number of hole and electrons in valence band and conduction band respectively.

82. (d)
Doping materials are called impurities because they alter the crystal structure of the pure semiconductors.

- When a small amount of trivalent impurity like Aluminium (Al) is added to a pure silicon semiconductor, then it is called P-type semiconductor.
  Example of trivalent impurity-
  Al, B, Ga, In.
- When a small amount of pentavalent impurity like arsenic, antimony and phosphorus is added to a pure semiconductor then it is known as n-type semiconductor.

83. (a)
We know that-

Band gap energy $E_g = \frac{hC}{\lambda}$

Where, h - Plank's constant (6.63×10^{-34})
C - Speed of light $(3 \times 10^8$ m/s)

Wavelength $\lambda_{Si} = \frac{hc}{E_g} = \frac{6.63\times10^{-34}\times3\times10^8}{1.1\times1.6\times10^{-19}}$

$= 1130.11$ nm

$\boxed{\lambda_{Si} \simeq 1127.27\text{nm}}$

$\lambda_{Ge} = \frac{6.63\times10^{-34}\times3\times10^8}{0.67\times1.6\times10^{-19}}$

$= 1855.41$ nm

$\boxed{\lambda_{Ge} \simeq 1850.75\text{nm}}$

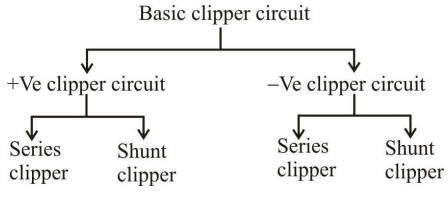
84. (a)
Thermal runaway in BJT will take place if the quiscent point is, $V_{CE} > \frac{V_{CC}}{2}$

- Thermal runaway in BJT avoided by

$$V_{CE} < \frac{V_{CC}}{2}$$

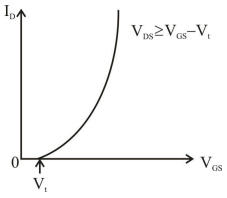
85. (a)
The turn off time of MOSFETs is less as compared to BJT because minority carrier storage time is absent in MOSFET and MOSFET operates at maximum frequencies.

86. (c)
Clipper circuit uses an arrangement of diode and voltage source along with resistor to clip either negative or positive part of the input waveform.



87. (b)
In a two stage CE amplifier circuit, the ac collector resistance of the first stage depends on the input impedance of second stage

88. (a)
The (I_d-V_{gs}) characteristics of a MOSFET in the saturation region is Quadratic.



$I_D = K(V_{GS} - V_{th})^2$

89. (d)

$$f = \frac{1}{2\pi\sqrt{L\left(\frac{C_1C_2}{C_1+C_2}\right)}}$$

$C_T = \frac{C_1C_2}{C_1+C_2} = \frac{10\times10}{10+10} = \frac{100}{20} = 5\text{pF}$

$L = 0.5\mu\text{H}$

$= \frac{1}{2\pi\sqrt{5\text{pF}\times0.5\mu\text{H}}}$

$= \frac{0.159}{\sqrt{5\times10^{-12}\times0.5\times10^{-6}}} = \frac{0.159}{\sqrt{5\times5\times10^{-19}}}$

$= \frac{0.159}{5\sqrt{10^{-19}}} = \frac{0.159\times10^9\times\sqrt{10}}{5} = \frac{159\times10^6\times3.16}{5}$

$= \frac{502.44\times10^6}{5} = 100\text{MHz}$

90. (c)
Given,
Upper threshold voltage (V_T+) = 2.0 V
Lower threshold voltage (V_T–) = 1.2 V
Hysteresis voltage of the Schmitt trigger

$= V_{T+} - V_{T-}$
$= 2.0 - 1.2$
$= 0.8$ Volt

91. (d)
A Timer can be used to make time difference on the triggering circuit. This time delay can be produce by the consumer. In general, a timer circuit contain of R and C combinations. e.g. IC 555 timer.

92. (d)
Given that,

M = 4
I = 600mA

$\boxed{M = \frac{I}{I_m}}$

Where,

I - Required full-scale range

I_m - Full scale deflection of current

M - Multiplying power

$$I_m = \frac{600 \times 10^{-3}}{4}$$

$I_m = 150mA$

93. (d)

PMMC ammeter have uniform scale because both spring controlled and having deflecting torque varies directly as current.

Deflecting torque $(T_d) = NBId\ell = GI$

$G = \text{Constant} = NB\ell d$

Spring control torque $(T_C) = K\theta$

(K = Spring constant)

For final steady deflection, $T_C = T_d$

$$\theta = \left(\frac{G}{K}\right) I$$

$$\boxed{I = \left(\frac{K}{G}\right)\theta}$$

$$\boxed{I \propto \theta}$$

Advantages of PMMC-

- It has a linear scale.
- The power consumption is very low.
- It has high torque to weight ratio of moving parts.
- Field strength varies from 0.1 wb/m^2 to 1 wb/m^2

94. (b)

Kelvin's bridge is used measure values of resistance below 1 ohm.

Measurement of low resistance (below 1 ohm)

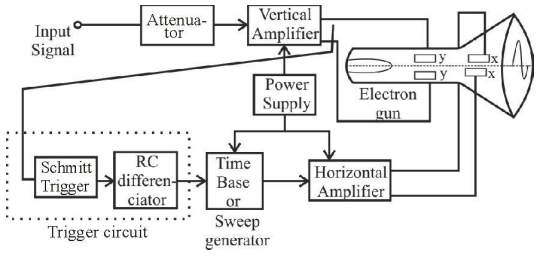
- Kelvin's double bridge method
- Ammeter Voltmeter method
- Potentiometer method

95. (c)

The time base signal in a CRO is a sawtooth signal.

CRO is a very fast X-Y plotter that shows the input signal versus time.

Applications - The CRO are used to analyze the waveforms, transient phenomena and other time-varying quantities from a very low-frequency range to the radio frequency.



96. (a)

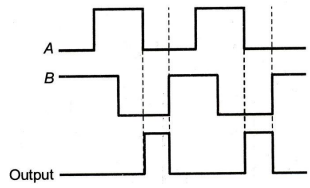
A microphone is classified as acoustical transducer. It converts sound into an electrical signal. The two most common transducer types are dynamic and condenser another microphone employ a diaphragm a voice coil and a magnet.

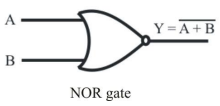
97. (b)

A 5 bit code is called BAUDOT

98. (c)

Given that figure -





Truth Table

A	B	A+B	$\overline{A+B}$
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

In an NOR gate all inputs must be low to provide a high output.

99. (b)

Propagation Delay of logic gate, limit the maximum speed at which circuit can operate.

$$\boxed{t_{pd} = \frac{t_{PHL} + t_{PLH}}{2}}$$

(a) t_{PLH}= Delay time in going from High logic to Low logic.

(b) t_{PHL} = Delay

To eliminate to propagation delay, all flip-flop are provided with a common clock.

Generally propagaton delay ae represented in nano second.

100. (d)

Given that −

n = 8 bit

Digital input = $(1010)_2$

Decimal equivalent of binary = $(10)_{10}$

Reference voltage V_{ref} = 5V

Analog output voltage

$$= \frac{V_{ref}}{2^n} \times \text{Decimal equivalent of binary}$$

$$= \frac{5}{2^4} \times 10$$

Analog output voltage = 3.125 V

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