PART I - PHYSICS

SECTION A - PHYSICS

1. A force of 5 newton acts on a body of mass 1kg. What is the acceleration produced in m/s^2?

   1) 5 2) 1.96 3) 0.51 4) 49

Ans. 1

$$a = \frac{F}{m} = \frac{5}{1} = 5 m/s^2$$

2. A wire of resistance $4\ \Omega$ is stretched to twice its original length. The change in resistance of stretched wire would be

   1) $4\ \Omega$ 2) 16Ω 3) 12Ω 4) 10Ω

Ans. 3

$$R = \frac{\rho L}{A} = \frac{\rho L^2}{V}$$

Volume V = constant

$$\therefore \frac{R_2}{R_1} = \left(\frac{L_2}{L_1}\right)^2 = 4$$

$$R_2 = 4R_1 = 4 \times 4 = 16\Omega$$

Change in resistance $R_2 - R_1 = 16 - 4 = 12\Omega$

3. If the initial speed of the car moving at constant acceleration is halved, then the stopping distance S becomes

   1) 2S 2) $\frac{S}{2}$ 3) 4S 4) $\frac{S}{4}$

Ans. 4

$$S = \frac{u^2}{2a}$$

$$\frac{S_2}{S_1} = \left(\frac{u_2}{u_1}\right)^2 = \frac{1}{4}$$

$$S_2 = \frac{S}{4}$$

4. When a cricketer catches a ball in 30s, the force required is 2.5 N. The force required to catch that ball in 50 s is

1) 1.5 N 2) 1 N 3) 2.5 N 4) 3N

Ans. 1

$$F = \frac{\Delta P}{\Delta t} = \frac{\text{Change in momentum}}{\text{time}}$$

$$\frac{F_2}{F_1} = \frac{\Delta t_1}{\Delta t_2} = \frac{30}{50}$$

$$F_2 = 2.5 \times \frac{30}{50} = 1.5 \text{ N}$$

5. Two cyclists approach in each other from opposite directions. One of them descends the hill with an initial velocity of 7.2 km/h and an acceleration of 0.30 m/s^2. The other climbs the hill with an initial velocity of 36 km/h and an acceleration of 0.20 m/s^2 directed against this velocity. What is the distance between the cyclists if they meet half a minute after the beginning of motion?

1) 210 m 2) 725 m 3) 405 m 4) 195 m

Ans. 3

$$u_1 = 7.2 \text{ km/h} = 2 \text{ m/s}$$

$$u_2 = 36 \text{ km/h} = 10 \text{ m/s}$$

$$s_1 = u_1 t + \frac{a_1 t^2}{2}$$

$$s_2 = u_2 t - \frac{a_2 t^2}{2}$$

$$s = s_1 + s_2 = (u_1 + u_2)t + (a_1 - a_2)\frac{t^2}{2} = (2+10) \times 30 + \frac{(0.3-0.2) \times 30^2}{2} = 360 + 45 = 405 \text{ m}$$

6. The force of gravity is a

1) strong force

2) conservative force

3) constant force

4) non conservative force

Ans. 2

7. A body will have zero acceleration when

1) The force acting on it decreases

2) Its velocity changes in direction

3) Its velocity changes in magnitude

4) Its velocity has constant magnitude and direction

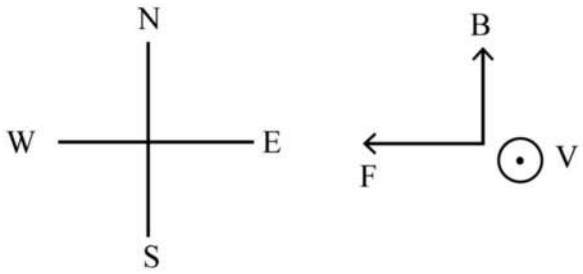
Ans. 4

$a \rightarrow$ rate of change of velocity

8. A positive charge is moving upward in a magnetic field which is towards north. The particle will be deflected towards

1) east 2) west 3) north 4) south

Ans. 2



By Fleming's left hand rule

9. A point object is placed at distance 10 cm from a convex lens of focal length 15cm. The magnitude of image distance from the lens is

1) 15 cm 2) 20 cm 3) 6 cm 4) 30 cm

Ans. 4

$$\frac{1}{V}=\frac{1}{f}+\frac{1}{u}=\frac{1}{15}-\frac{1}{10}$$

$$V=\frac{15\times10}{10-15}=\frac{15\times10}{-5}$$

$$V=-30 \text{ cm}$$

$$|V|=30 \text{ cm}$$

10. An image is formed on the screen by a convex lens. When upper half part of lens is covered with black paper, then

1) half image is formed

2) full image is formed

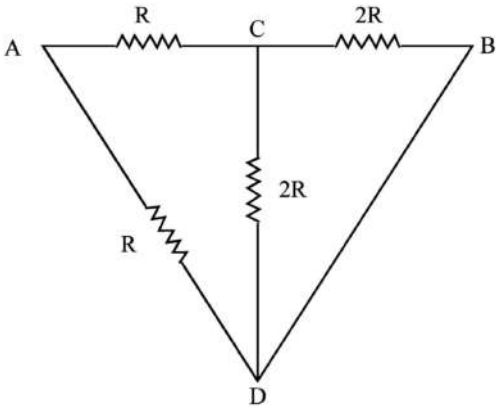
3) intensity of image will be enhanced

4) image will not be formed

Ans. 2

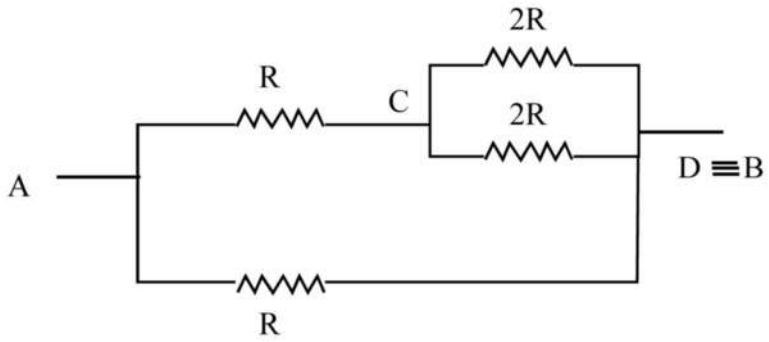
Full image with less intensity is formed

11. The effective resistance between points A and B is



1) R 2) $\frac{R}{3}$ 3) $\frac{2R}{3}$ 4) $\frac{3R}{5}$

Ans. 3



$$R_{AB} = \frac{2R \times R}{3R} = \frac{2R}{3}$$

12. The velocity of sound wave in a medium is $400ms^{-1}$. Its wavelength is 0.5m. The frequency of the wave is

1) 200 Hz 2) 400 Hz 3) 600 Hz 4) 800 Hz

Ans. 4

$$\nu = \frac{v}{\lambda} = \frac{400}{0.5} = 800\,Hz$$

13. Two laboratory thermometers are marked as 'A' and 'B'. The bulb of thermometer 'A' is wrapped in a white cloth and that of thermometer 'B' in black cloth. Both the thermometers are placed in sunlight for an hour. After one hour

1) Both the thermometers will read the same temperature

2) Thermometer 'A' will show higher temperature than 'B'

3) Thermometer 'B' will show higher temperature than 'A'

4) None of the above is correct

Ans. 3

White reflects radiations

Black absorbs radiations

14. The acceleration due to gravity on a planet is $1.96\ ms^{-2}$. If it is safe to jump from a height of 3m on the earth, the corresponding height on the planet will be $[g_{earth} = 9.8\ m/s^2]$

1) 3m 2) 15 m 3) 9m 4) 6m

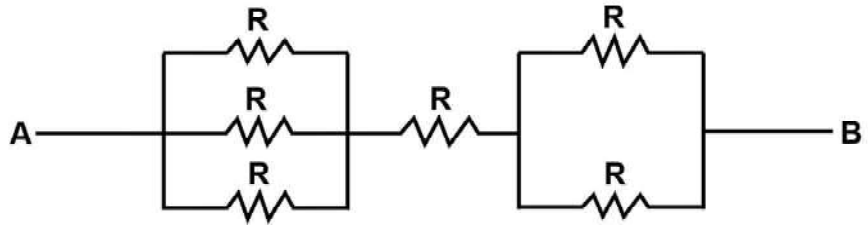
Ans. 2

$$h = \frac{V^2}{2g}$$

$$\frac{h_2}{h_1} = \frac{g_1}{g_2} = \frac{9.8}{1.96} = 5$$

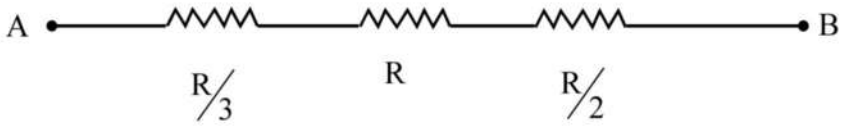
$$h_2 = 5h_1 = 5 \times 3 = 15\ m$$

15. Find the effective resistance between A and B



1) $\frac{11R}{6}$ 2) $\frac{6R}{11}$ 3) $\frac{9R}{11}$ 4) $\frac{11R}{9}$

Ans. 1



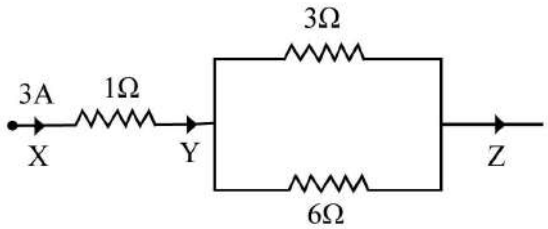
$$R_{AB} = \frac{R}{3} + R + \frac{R}{2} = \frac{11R}{6}$$

SECTION B - PHYSICS

16. The resistor of resistance 'R' is connected to 25V supply and heat produced in it is $25Js^{-1}$. The value of 'R' is in Ω is

Ans. 25 $R = \frac{V^2}{P} = \frac{25^2}{25} = 25\Omega$

17. In the following figure the ratio of current in 3Ω to current in 1Ω resistances is $\frac{2}{x}$. The value of x is



Ans. 3

3Ω and 6Ω are parallel. $\therefore$ Potential differences are equal

$I_1 3 = I_2 6$

$I_1 = 2I_2$

$I_1 = 2[3 - I_2]$

$3I_1 = 6$

$I_1 = 2A$

$\frac{I_1}{I} = \frac{2}{3}$

18. The radius of curvature of a convex mirror is 40 cm. Its focal length in cm is .....

Ans. 20

$$f = \frac{R}{2} = \frac{40}{2} = 20\,cm$$

19. Two lenses of power +6D and –4D are placed in contact. The focal length of the combination in cm is

Ans. 50

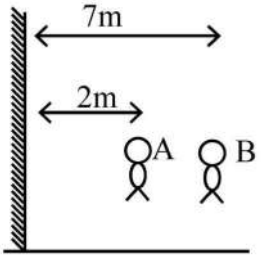
$$P = P_1 + P_2 = 6 - 4 = 2\ D$$

$$f = \frac{100}{P} = \frac{100}{2} = 50\ cm$$

20. A body of mass 2kg is dropped from a height 4m at a place where g = 10 m/s^2. Its kinetic energy in joule just before it strikes the ground is:

Ans. 80 $\quad K.E. = \frac{mv^2}{2} = \frac{m}{2}2gh = mgh = 2 \times 10 \times 4 = 80\ J$

21. Two children are standing infront of a plane mirror as shown. When the child A looks into the mirror, how far away from it will image of child B appear to be? [Answer should be in meter]



Ans. 9

22. A long straight wire carrying a current 3A produces a magnetic field B at certain distance. The current in ampere that flows through the same wire will produce a magnetic field $\frac{B}{3}$ at the same distance is:

Ans. 1 $\quad B = \frac{\mu_0 I}{2\pi r} = \frac{\mu_0 3}{2r}, \frac{B}{3} = \frac{\mu_0 I'}{2r}$

$$\frac{3\mu_0}{2r}\frac{1}{3} = \frac{\mu_0 I'}{2r} = I' = 1A$$

23. An object is dropped from a height of 125m. The time taken by it to reach the ground in seconds is ..... (Take g = 10ms^{-2})

Ans. 5 $\quad t = \sqrt{\frac{2h}{g}} = \sqrt{\frac{2 \times 125}{10}} = 5s$

24. Mass of an object at the surface of the earth is 60 kg. The mass of the same object in kg at the surface of the moon is : [$g_{moon} = g_{earth}/6$]

Ans. 60 Mass remains constant

25. The force acting normal to a surface of area $2m^2$ is 100 N. The pressure excerted by the force on the surface in N/m^2 is

Ans. 50 $P = \frac{F}{A} = \frac{100}{2} = 50\ N/m^2$

PART II - CHEMISTRY

SECTION - A

26. When the litmus solution is neither acidic nor basic its colour is

1) Green 2) Purple 3) Red 4) Blue

Ans. 2

Litmus solution is purple when neutral

27. Milk of magnesia is often used as

1) Substitute for cow's milk

2) Preservative for milk

3) An antacid

4) An antiseptic

Ans. 3

Magnesium hydroxide (milk of magnesia) is often used as an antacid

28. Which among the following is incorrect about the Rutherford model of atom?

1) There is a positively charged centre in an atom called the nucleus

2) Nearly all the mass of an atom reside in the nucleus

3) Electrons revolve round the nucleus in circular orbits

4) Size of the nucleus is not very small compared to the size of the atom

Ans. 4

Size of the nucleus is very small compared to the size of the atom

29. According to Bohr-Bury scheme, the total number of electrons that can accomodated in the outermost shell is

1) 8 2) 2 3) 10 4) 18

Ans. 1

According to Bohr-Bury scheme outer most shell can accomodate a maximum of 8 electrons

30. The most malleable metals among the following are

1) Iron(Fe) and Lead (Pb)

2) Copper (Cu) and Tin (Sn)

3) Gold (Au) and Silver (Ag)

4) Aluminium (Al) and Magnesium (Mg)

Ans. 3

Gold and silver are the most malleable metals

31. Which among the following is a conductor of electricity?

1) Diamond 2) Graphite 3) Iodine 4) Sulphur

Ans. 2

Graphite is a conductor of electricity

32. Which oxides among the following react with both acids as well as bases to produce salt and water?

1) Al_2O_3 2) CuO 3) Na_2O 4) SO_2

Ans. 1

Al_2O_3 is amphoteric

33. The following observations are given for four metals X, Y, Z and W

A) Metal X does not react with dilute HCl

B) Metal Y react with warm water

C) Metal Z does not react with water but displaces metal X from its aqueous salt solution

D) Metal W react with cold water.

Choose the correct decreasing order of reactivity of these metals among the following

1) W > Z > X > Y 2) Y > W > X > Z 3) W > Y > Z > X 4) Z > X > Y > W

Ans. 3

W - react with cold water

Y - react with hot water

Z - displaces X from its salt solution

Y - does not react with dil.HCl

W - is the most reactive and Y the least

34. Match chemical reactions given in List-I with the type of chemical reactions given in List-II and select the correct answer using options given below:-

List-I (Chemical reaction)	List-II (Type of chemical reaction)
a) Formation of NH_3 from N_2 and H_2	i) Decomposition reaction
b) Calcination of Zinc carbonate	ii) Double displacement
c) Reaction of aqueous $BaCl_2$ with dilute H_2SO_4	iii) Combination
d) Rancidity of oils	iv) Redox
	v) Displacement

1) a $\rightarrow$ i; b $\rightarrow$ v; c $\rightarrow$ iii; d $\rightarrow$ iv
2) a $\rightarrow$ iii; b $\rightarrow$ iv; c $\rightarrow$ v; d $\rightarrow$ i
3) a $\rightarrow$ iv; b $\rightarrow$ iii; c $\rightarrow$ v; d $\rightarrow$ i
4) a $\rightarrow$ iii; b $\rightarrow$ i; c $\rightarrow$ ii; d $\rightarrow$ iv

Ans. 4

Formation of NH_3 from N_2 & H_2 - combination
Calcination of $ZnCO_3$ - decomposition
$BaCl_{2(aq)} + H_2SO_{4(aq)}$ - double displacement
Rancidity - Redox

35. Match List-I (Mixture) and List-II (Type) with List-III (Example) and select the most appropriate answer from the combinations given below

List-I (Mixture)	List-II (Type)	List-III (Example)
P) Liquid in gas	I) Emulsion	i) Mist
Q) Liquid in liquid	II) Aerosol	ii) Sponge
R) Gas in solid	III) Foam	iii) Face cream
	IV) Gel	iv) Butter

1) P $\rightarrow$ III, ii; Q $\rightarrow$ II, i; R-IV, iv
2) P $\rightarrow$ II, i; Q $\rightarrow$ I, iii; R $\rightarrow$ III, ii
3) P $\rightarrow$ I, iii; Q $\rightarrow$ II, i; R $\rightarrow$ III, ii
4) P $\rightarrow$ I, ii; Q $\rightarrow$ III, i; R $\rightarrow$ II, iii

Ans. 2 Liquid gas - aerosol - mist
Liquid in liquid - emulsion - face cream
Gas in solid - foam - sponge

36. Which of the following sets of reactions will not occur?

I) $MgSO_{4(aq)} + Fe_{(s)} \longrightarrow FeSO_{4(aq)} + Mg_{(s)}$

II) $CuSO_{4(aq)} + Fe_{(s)} \longrightarrow FeSO_{4(aq)} + Cu_{(s)}$

III) $MgSO_{4(aq)} + Cu_{(s)} \longrightarrow CuSO_{4(aq)} + Mg_{(s)}$

IV) $CuSO_{4(aq)} + Zn_{(s)} \longrightarrow ZnSO_{4(aq)} + CuS$

1) I and III 2) II and IV 3) I, II and III 4) I, III and IV

Ans. 4

The order of reactivity is Mg > Zn > Fe > Cu

Mg cannot be displaced by Fe or Cu. But Fe and Zn can displace Cu from $CuSO_4$

37. The reaction of which metal among the following with dilute hydrochloric acid is the most exothermic?

1) Magnesium (Mg) 2) Aluminium (Al) 3) Zinc (Zn) 4) Iron (Fe)

Ans. 1

Reaction of Mg with dil.HCl is the most exothermic

38. Which ionic compound among the following has highest melting point?

1) $MgCl_2$ 2) CaO 3) $CaCl_2$ 4) NaCl

Ans. 2

Melting point of CaO is the highest

39. Which among the following is incorrect?

1) Silver articles become black after sometime when exposed to air due to formation of a coating of silver sulphide

2) Copper reacts with moist carbon dioxide in the air and slowly looses its shiny brown surface and gains a green coat due to formation of basic copper carbonate

3) Iron when exposed to moist air for a long time acquires a coating of brown flaky substance called Rust

4) Gold when exposed to moist carbondioxide in air form a dull yellow deposit of Gold oxide

Ans. 4

Gold do not undergo corrosion in air

40. Which among the following is not an alloy?

1) Brass 2) Bronze 3) Galvanised iron 4) Solder

Ans. 3

Galvanised iron is not an alloy

SECTION B - CHEMISTRY

41. In the balanced equation $3Fe_{(s)} + xH_2O_{(g)} \longrightarrow yFe_3O_{4(s)} + 4H_{2(g)}$ the value of (x + y) is .....

Ans. 5

The balanced equation is $3Fe_{(s)} + 4H_2O_{(g)} \longrightarrow Fe_3O_{4(s)} + 4H_{2(g)}$

42. The number of atoms present in one formula unit of Lead nitrate is .....

Ans. 9

Lead nitrate is $Pb(NO_3)_2$

43. How many elements among the following displace copper from aqueous solution of copper sulphate?

i) Iron (Fe) ii) Zin (Zn) iii) Lead (Pb) iv) Silver (Ag)

Ans. 3

Fe, Zn and Pb are more reactive than copper

44. Bee sting leaves an acid which causes pain and irritation. Used of a mild base like baking soda on stung area gives relief. The mass of one formula unit of baking soda is ..... u (Given atomic mass of H = 1u, C =12u, O = 16u, S = 32u, Na = 23u, K = 39u, Ca = 40u)

Ans. 84

Sodium bicarbonate is $NaHCO_3$ formula unit mass = 23 + 1 + 12 + (16 × 3) = 84 u

45. The mass of an alpha particle is ..... u

Ans. 4

Alpha particles are Helium nuclei $\left({}^4_2He\right)$ mass of a particle = 4u

46. Atomicity of Argon molecule is 'x' and atomicity of phosphorus molecule is 'y'. Give the value of (x + y).

Ans. 5

Argon (Ar) is a monoatomic gas ie molecule of argon contain only one atom. But phosphorous molecule is tetra atomic (P_4) x = 1; y = 4

47. How many metals among the following do not react with oxygen even at high temperatures?

Silver (Ag), Copper (Cu), Iron (Fe), Aluminium (Al), Zinc (Z), Magnesium (Mg), Gold (Au), Sodium (Na), Potassium (K), Calcium (Ca)

Ans. 2

Ag & Au do not react with oxygen even at high temperatures

48. Consider the alloys, Brass, Bronze, Solder, Stainless steel, along with galvanised iron. The total number of different metals present in these five materials taken together is .....

Ans. 7

Cu, Zn Sn, Fe, Cr, Ni & Pb are the metals present

Brass - Cu & Zn

Bronze - Cu & Sn

Solder - Sn & Pb

Stainless steel - Fe, Cr, Ni

Galvanised iron - Fe, Zn

49. How many among the following do not show Tyndall effect?

i) Milk ii) Tincture iodine iii) Smoke

iv) Mist v) Fog

Ans. 1 Tincture iodine is a true solution

50. Atomic number (z) of Aluminium is 13 and that of Magnesium 12. If the valence of Aluminium in 'x' and that of Magnesium 'y'. Give the value of (x + y)

Ans. 5 E.C. of $_{13}Al = 2, 8, 3$

Valence 'x' = 3

E.C. of $_{12}Mg = 2, 8, 2$

Valence 'y' = 2

PART III - MATHEMATICS

SECTION A - MATHEMATICS

51. The marks of 8 students in a test are 20, 20, 24, 32, x, 40, 45, 48. If the median mark is 34, find x

1) 36 2) 34 3) 38 4) 35

Ans. 1 $\frac{32+x}{2} = 34;\ 32+x = 68,\ x = 68-32 = 36$

52. If $P(x) = x^2 - 5x + 3$ the value of $P(2)$

1) 1 2) –21 3) –3 4) 3

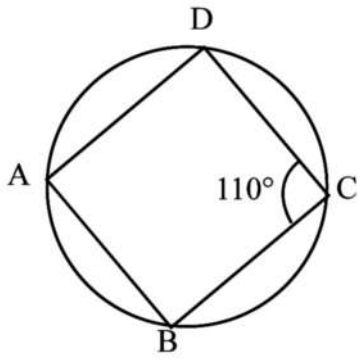
Ans. 3 $P(2) = 2^2 - 5 \times 2 + 3 = 4 - 10 + 3 = -3$

53. First term of an arithmetic sequence is 3 and common difference 4. What is its 10^{th} term?

1) 48 2) 39 3) 43 4) 52

Ans. 2 10^{th} term $= 3 + 9 \times 4 = 3 + 36 = 39$

54. In the figure, $\angle C = 110°$. Find the measure of $\angle A$.



1) 70° 2) 110° 3) 55° 4) 35°

Ans. 1 $\angle A + \angle C = 180,\ \angle A + 110 = 180,\ \angle A = 70°$

55. In $x^2 + 8x = 20$, find the value of the counting number x

1) 6

2) –2

3) 10

4) 2

Ans. 4 $2^2 + 8 \times 2 = 4 + 16 = 20$

56. The radius and height of a cone are 12 cm and 6cm respectively. What is its volume? (in cm^3)

1) $\frac{144}{3}\pi$

2) $864\ \pi$

3) 288π

4) 72π

Ans. 3 $\text{Volume} = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi \times 12 \times 12 \times 6 = 288\ \pi$

57. Which of the following lies on x-axis?

1) (2, 1)

2) (0, 2)

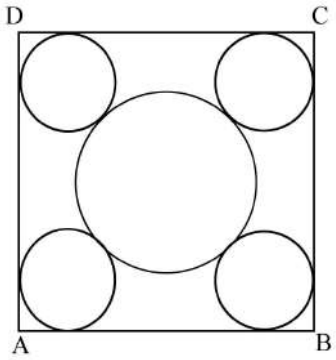
3) (1, 1)

4) (3, 0)

Ans. 4 $y = 0$ on the x-axis

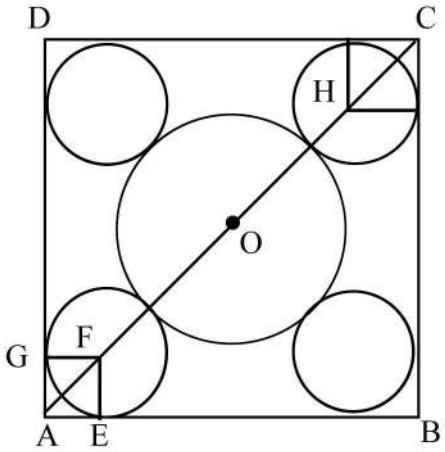
58. In a given square ABCD, there are 5 circles are inscribed as in the figure. If radii of 4 smaller circles are

2cm each and area of larger circle is sum of the area of all 4 smaller circles. Then the area of square ABCD is



1) $88+66\sqrt{2}$ 2) $66+88\sqrt{2}$ 3) $88+48\sqrt{2}$ 4) $48+88\sqrt{2}$

Ans. 3



Area of largest circle=$4\times\pi r^2=4\times\pi\times4=16\pi$

$\therefore$ radius of larger circle=4

$\therefore FH=2+4+4+2=12$ cm

in square AEFG, $AF^2=2^2+2^2=8$

$AF=2\sqrt{2}=CH$

$\therefore AC=2\sqrt{2}+12+2\sqrt{2}=12+4\sqrt{2}$

$$\text{Area of ABCD}=\frac{1}{2}AC^2=\frac{1}{2}\times\left(12+4\sqrt{2}\right)^2$$

$$=\frac{16}{2}\left[3+\sqrt{2}\right]^2=8\left[9+2+6\sqrt{2}\right]=8\left[11+6\sqrt{2}\right]=88+48\sqrt{2}$$

59. If $\frac{(x+a)^2-(x-a)^2}{(x+a)^2+(x-a)^2}=\frac{1}{2}$, then $(x+a)^2$ is

1) ax

2) 3ax

3) 4ax

4) 6ax

Ans. 4 $\frac{4ax}{2x^2+2a^2}=\frac{1}{2}\Rightarrow x^2+a^2=4ax$

$x^2+2ax+a^2=6ax$

$(x+a)^2=6ax$

60. A man bought a radio for Rs.1400 and sold, it for Rs. 1680. His profit percent is

1) 10%

2) 20%

3) 8%

4) 16%

Ans. 2 $\text{Profit percent}=\frac{\text{Profit}}{\text{cost price}}\times 100=\frac{280}{1400}\times 100=20\%$

61. Polynomial equivalent to $(x+1)^2-(x-1)^2$ is

1) x^2

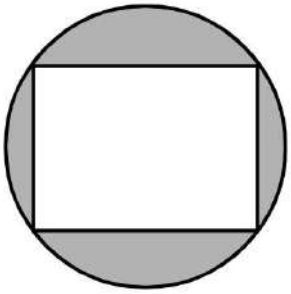
2) $2(x^2+1)$

3) $2x$

4) $4x$

Ans. 4 $(x+1)^2-(x-1)^2=x^2+2x+1-(x^2-2x+1)=4x$

62. A square having perimeter 28cm is inscribed in a circle as in the figure, then area of the shaded region is $\left(\text{Given that } \pi = \frac{22}{7}\right)$



1) 77 cm^2 2) 44 cm^2 3) 28 cm^2 4) 55 cm^2

Ans. 3 $4a = 28 \Rightarrow a = 7$

$\therefore$ diameter of circle $d = 7\sqrt{2}$

$$\text{Radius} = \frac{7}{\sqrt{2}}$$

$$\text{Area} = \pi r^2 = \frac{22}{7} \times \frac{49}{2} = 77 \text{ units}$$

$\therefore$ Area of shaded region = 77 – 49 = 28

63. Number of terms in the sequence 97, 94, 91 .....19 is

1) 27 2) 29 3) 31 4) 33

Ans. 1 $n = \frac{t_n - t_1}{d} + 1 = \frac{97-19}{3} + 1 = 27$

64. Largest two digit prime number is

1) 97 2) 91 3) 93 4) 89

Ans. 1

65. Maximum number of sheets having square shape and area $4cm^2$ can be made from a rectangular sheet of length 1 meter and width 26 cm, is

1) 500 2) 650 3) 675 4) 600

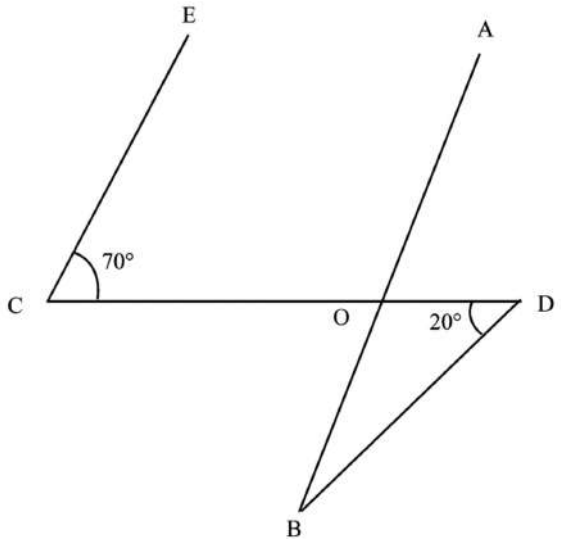
Ans. 2 No. of square sheets = $\frac{100 \times 26}{2 \times 2} = 50 \times 13 = 650$

SECTION B - MATHEMATICS

66. $\dfrac{(9)^{3/2}}{(81)^{1/2}}$ is equal to

Ans. 3 $\dfrac{9^{3/2}}{(9^2)^{1/2}} = \dfrac{9^{3/2}}{9^{2/2}} = 9^{3/2 - 2/2} = 9^{1/2} = 3$

67. In the figure, if EC||AB, $\angle ECD = 70°$, $\angle BDO = 20°$, find $\angle OBD$(in degree)



Ans. 50 $\angle ECD = \angle AOD = 70°$

$\angle BOD = 180 - 70 = 110°$

$\angle OBD = 180 - (110 + 20) = 180 - 130 = 50°$

68. The sum of first seven terms of an arithmetic sequence is 84. Find its 4^{th} term

Ans. 12 Sum = mid term × number of terms

$84 = 4^{th}\ \text{term} \times 7,\ 4^{th}\ \text{term} = \dfrac{84}{7} = 12$

69. Find $1 + 2 + 3 + ... + 20$

Ans. 210 $\frac{20\times 21}{2} = 210$

70. Find the value of x, if the mean of the data set 18, 16, 22, 13, x is 16

Ans. 11 $\frac{18+16+22+13+x}{5} = 16$

$\frac{69+x}{5} = 16 \Rightarrow 69 + x = 80;\ x = 80 - 69 = 11$

71. If $S = \frac{1}{\sqrt{6}+\sqrt{5}} + \frac{1}{\sqrt{7}+\sqrt{6}}$ then the value of $\left(\sqrt{7}+\sqrt{5}\right)S$ is

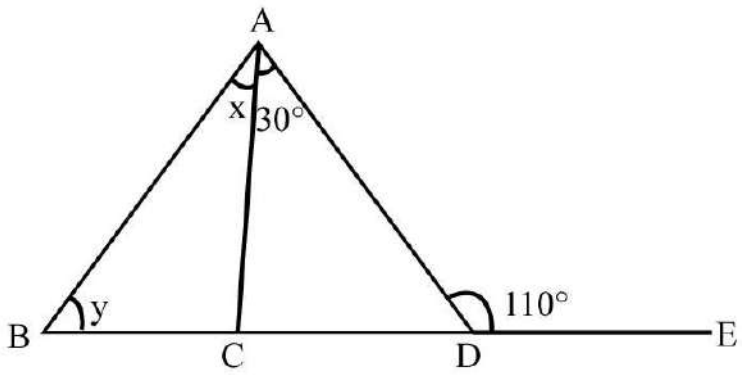
Ans. 2 $S = \frac{\sqrt{6}-\sqrt{5}}{6-5} + \frac{\sqrt{7}-\sqrt{6}}{7-6} = \sqrt{6}-\sqrt{5}+\sqrt{7}-\sqrt{6} = \sqrt{7}-\sqrt{5}$

$\therefore \left(\sqrt{7}+\sqrt{5}\right)S = \left(\sqrt{7}+\sqrt{5}\right)\left(\sqrt{7}-\sqrt{5}\right) = 7-5 = 2$

72. Number of terms in the expansion of $\left(x+\frac{1}{x}\right)^2 + \left(x-\frac{1}{x}\right)^2$ is

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

73. In the figure $\angle ADE = 110°$, $\angle CAD = 30°$, $\angle ABC = y$ and $\angle BAC = x$. If $x + y = k°$, then k is



Ans. 80 $\angle ADC - 180 - 110 = 70$

$\therefore X + (Y + 30) + 70° = 180$

$\Rightarrow X + Y = 80° \Rightarrow k = 80$

74. If $x = 2$ and $y = 3$ satisfy the equations $ax + by = 13$ and $x + cy = 8$, then the value of $4a + 6b + 5c =$

Ans. 36 $x = 2, y = 3 \Rightarrow 2a + 3b = 13, 2 + 3c = 8 \Rightarrow c = 2$

$\therefore 4a + 6b + 5c = 2(2a + 3b) + 5c = 2 \times 13 + 5 \times 2 = 36$

75. Value of $\frac{73^2 - 27^2}{51^2 - 49^2}$ is

Ans. 23 $\frac{73^2 - 27^2}{51^2 - 49^2} = \frac{(73 + 27)(73 - 27)}{(51 + 49)(51 - 49)} = \frac{100 \times 46}{100 \times 2} = 23$

IIT/AIIMS SCREENING TEST - 26-01-25

QUESTION BOOKLET CODE

A

P + C + M - ANSWER KEY

PHYSICS

1. 1
2. 3
3. 4
4. 1
5. 3
6. 2
7. 4
8. 2
9. 4
10. 2
11. 3
12. 4
13. 3
14. 2
15. 1
16. 25
17. 3
18. 20
19. 50
20. 80
21. 9
22. 1
23. 5
24. 60
25. 50

CHEMISTRY

26. 2
27. 3
28. 4
29. 1
30. 3
31. 2
32. 1
33. 3
34. 4
35. 2
36. 4
37. 1
38. 2
39. 4
40. 3
41. 5
42. 9
43. 3
44. 84
45. 4
46. 5
47. 2
48. 7
49. 1
50. 5

MATHEMATICS

51. 1
52. 3
53. 2
54. 1
55. 4
56. 3
57. 4
58. 3
59. 4
60. 2
61. 4
62. 3
63. 1
64. 1
65. 2
66. 3
67. 50
68. 12
69. 210
70. 11
71. 2
72. 2
73. 80
74. 36
75. 23

IIT/AIIMS SCREENING TEST - 26-01-25

QUESTION BOOKLET CODE

B

P + C + M - ANSWER KEY

PHYSICS

1. 4
2. 2
3. 4
4. 3
5. 3
6. 4
7. 2
8. 3
9. 3
10. 1
11. 1
12. 2
13. 2
14. 1
15. 4
16. 50
17. 80
18. 5
19. 60
20. 50
21. 25
22. 3
23. 20
24. 9
25. 1

CHEMISTRY

26. 4
27. 2
28. 2
29. 3
30. 3
31. 4
32. 3
33. 2
34. 3
35. 1
36. 1
37. 4
38. 1
39. 4
40. 2
41. 84
42. 4
43. 7
44. 1
45. 5
46. 5
47. 9
48. 3
49. 5
50. 2

MATHEMATICS

51. 1
52. 3
53. 4
54. 4
55. 1
56. 2
57. 2
58. 1
59. 3
60. 3
61. 1
62. 4
63. 2
64. 3
65. 4
66. 210
67. 11
68. 80
69. 36
70. 23
71. 3
72. 50
73. 12
74. 2
75. 2

IIT/AIIMS SCREENING TEST - 26-01-25

QUESTION BOOKLET CODE

C

P + C + M - ANSWER KEY

PHYSICS		CHEMISTRY		MATHEMATICS	
1.	3	26.	4	51.	4
2.	2	27.	1	52.	3
3.	4	28.	4	53.	4
4.	4	29.	1	54.	4
5.	1	30.	2	55.	4
6.	2	31.	1	56.	3
7.	4	32.	4	57.	3
8.	1	33.	3	58.	2
9.	3	34.	2	59.	1
10.	1	35.	2	60.	1
11.	4	36.	3	61.	2
12.	3	37.	3	62.	1
13.	2	38.	4	63.	3
14.	3	39.	1	64.	1
15.	2	40.	3	65.	2
16.	9	41.	5	66.	2
17.	1	42.	2	67.	2
18.	25	43.	5	68.	3
19.	3	44.	9	69.	50
20.	20	45.	3	70.	12
21.	5	46.	7	71.	80
22.	60	47.	1	72.	36
23.	50	48.	5	73.	23
24.	50	49.	84	74.	210
25.	80	50.	4	75.	11

IIT/AIIMS SCREENING TEST - 26-01-25

QUESTION BOOKLET CODE

D

P + C + M - ANSWER KEY

PHYSICS		CHEMISTRY		MATHEMATICS	
1.	3	26.	4	51.	4
2.	1	27.	4	52.	1
3.	1	28.	3	53.	2
4.	4	29.	3	54.	2
5.	2	30.	3	55.	2
6.	4	31.	4	56.	4
7.	2	32.	1	57.	1
8.	3	33.	2	58.	3
9.	2	34.	2	59.	3
10.	1	35.	4	60.	4
11.	2	36.	1	61.	4
12.	3	37.	2	62.	1
13.	3	38.	3	63.	3
14.	4	39.	1	64.	3
15.	4	40.	2	65.	1
16.	5	41.	7	66.	80
17.	60	42.	1	67.	36
18.	50	43.	5	68.	23
19.	9	44.	5	69.	2
20.	1	45.	2	70.	2
21.	50	46.	84	71.	210
22.	80	47.	4	72.	11
23.	25	48.	5	73.	3
24.	3	49.	9	74.	50
25.	20	50.	3	75.	12