

PHYSICS

1. (2) $v = 35 \text{ Km/h}$ $t = 12 \text{ min}$
 $= \frac{12}{60} \text{ hrs}$
 $d = v \times t$
 $= 35 \times \frac{12}{60} = 7 \text{ Km}$
2. (1) $a = \frac{v-u}{t}$
 $v-u = 36 - 18$
 $= 18 \text{ Km/hr} = 18 \times \frac{5}{18} \text{ m/s} = 5 \text{ m/s}$
 $a = \frac{5}{5} = 1 \text{ m/s}^2$
3. (1) Motion of a object in a circular path is said to be uniform circular motion if the motion of object with constant speed.
4. (3) By using linear conservation of momentum = momentum before reaction = momentum after reaction
 $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$
 $0 + 0 = \frac{10}{1000} \times 150 + 5 \times v_2$
 $v_2 = \frac{-1.5}{5}$
 $v_2 = -0.3 \text{ m/s}$
5. (2) More mass more inertia
 So Inertia of B > inertia of A
6. (4) $F = mg$
 $= 5 \times 9.8$
 $= 49 \text{ N}$
7. (1) S.I. unit of pressure = Pascal
8. (4) Relative density = $\frac{\text{Density of substance}}{\text{Density of water}}$
 $10.8 = \frac{\text{Density of Silver}}{1000 \text{ Kg/m}^3}$
 Density of Silver = $10.8 \times 10^3 \text{ Kg/m}^3$
9. (3) KWh is the commercial unit of energy
10. (2) $W = F.S.$
 $= 12 \times \frac{60}{100} = 7.2 \text{ J}$

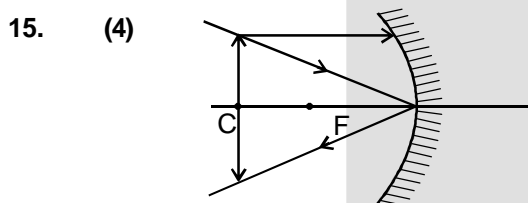
11. (2) $W = \text{Final K.E.} - \text{Initial K.E.}$

$$= 0 - \frac{1}{2} \times 2 \times 4 = 4\text{J}$$

12. (2) By persistence of sound time should be for hearing echo = $\frac{1}{10} = 0.1 \text{ sec}$

13. (4) Audible range = 20 Hz to 20 KHz

14. (1) $d = \frac{v \times t}{2}$
 $= \frac{300 \times 0.2}{2} = 30 \text{ m}$



at C

16. Power = $\frac{1}{f}$
 $= \frac{100}{50} = 2 \text{ diopeter}$

17. (1) $\mu = \frac{C_a}{C_g} = \frac{\text{Velocity of light in air}}{\text{Velocity of light in glass}}$

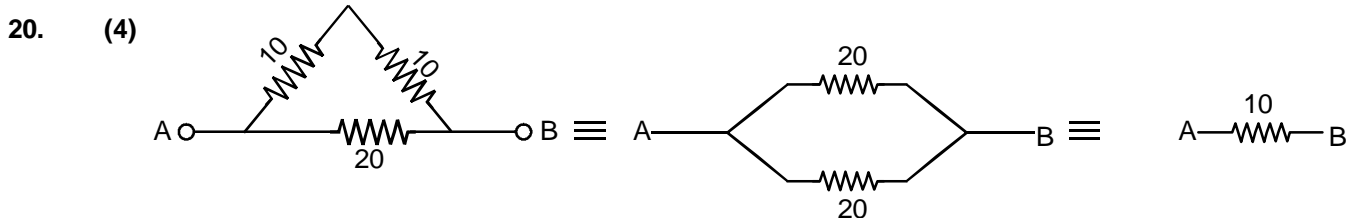
$$1.5 = \frac{3 \times 10^8}{C_g} = 2 \times 10^8 \text{ m/s}$$

18. (2) The phenomenon of white light splitting into its constituent colors is called dispersion.

19. (1) Scattering of red light is minimum

$$\text{Scattering} \propto \frac{1}{\lambda^4}$$

λ is maximum for red light



21. (3) $P = I^2 R$

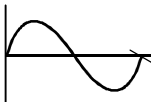
22. (4) $P = I^2 R$

$$\text{Energy dissipated in 1 sec} = \frac{100}{1} = 100 \text{ watt}$$

$$100 = I^2 \times 4$$

$$I^2 = 25$$

$$I = 5A$$

23. (4)  For complete 1 cycle time = $\frac{1}{50}$ sec , so to change direction = $\frac{1}{100}$ sec

24. Current is maximum in minimum resistive path so current is maximum in 10Ω resistance.

25. Oersted explained magnetic effect of current.

CHEMISTRY

1. (1) Isotopes
2. (3) MgO
3. (4) Emulsion
4. (4) Ag
5. (3) 17
6. (2) Scattering of light
7. (3) Copper & Silver are malleable
8. (1) Sulphide ore
9. (1) Oxidation reaction
10. (3) Presence of both hydrophilic and hydrophobic groups
11. (4) Ketone
12. (3) Litmus
13. (3) Between 4 – 7

14. (3) Number of H_2 atoms in 4g is = 6.022×10^{23} then number of H_2 atoms in 1g is = $\frac{6.022 \times 10^{23}}{4}$

then number of H_2 atoms in 40 g will be = $\frac{6.022 \times 10^{23}}{4} \times 40$

Number of He atoms in 40g He gas

15. (1) Mg
16. (3) $Ca(OH)_2$
17. (3) 18
18. (2) Diamond
19. (3) 13
20. (1) Valence electrons
21. (4) $(NH_2)_2CO$
22. (3) ${}^{14}_6C$
23. (1) Cu
24. (1) Sulphide
25. (3) Graphite

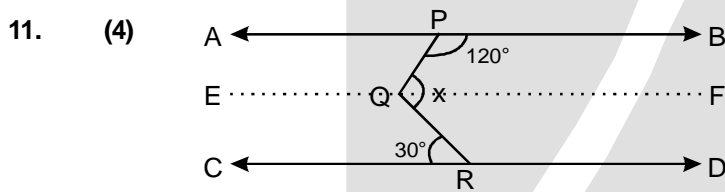
MATHEMATICS

1. (3) (i) 0.375555 (ii) 0.375375375 (iii) 0.3757575 (iv) 0.3750000
clearly option (3) is greatest
2. (3) $x = \sqrt[3]{2\frac{93}{125}}$ cube both sides
- $$x^3 = 2\frac{93}{125} \Rightarrow x^3 = \frac{343}{125}$$
- $$x \Rightarrow \sqrt[3]{\frac{343}{125}} \Rightarrow \frac{7}{5} = 1\frac{2}{5}$$
3. (1) $ax^3 + 3x^2 - 13$ divided by $(x - 2)$ then Remainder is $f(2)$
 $\Rightarrow 8a + 12 - 13 \Rightarrow 8a - 1$
 Similarly remainder in second case will be
 $f(2) = 16 - 10 + 9 \Rightarrow 6 + 9$
 Given $8a - 1 = 6 + 9$
 $7a = 7 \quad a = 1$
4. (2) For no solution $\Rightarrow \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$
- $$\Rightarrow \frac{K-1}{4} = \frac{4}{9(K+1)} \Rightarrow 9(K^2 - 1) = 16$$
- $$K^2 - 1 = \frac{16}{9} \quad K^2 = \frac{16}{9} + 1$$
- $$K^2 = \frac{25}{9} \quad K \Rightarrow \frac{5}{3}$$
5. (2) $\alpha = 7, \quad \alpha + \beta = 5, \quad \beta = -2$
 $x^2 - (\text{sum of the roots})x + \text{product of the roots}$
 $\Rightarrow x^2 - (\text{sum of the roots})x - 14 = 0$
 $\Rightarrow x^2 - 5x - 14 = 0$ (2)
6. (1) $\frac{2}{3}, K, \frac{5}{8}K$
- $$\Rightarrow K = \frac{\frac{2}{3} + \frac{5}{8}K}{2} \Rightarrow K = \frac{16 + 15K}{48}$$
- $$\Rightarrow 48K = 16 + 15K \Rightarrow 33K = 16 \Rightarrow K = \frac{16}{33}$$
7. (3) $S_n = 3n + n^2; \quad S_{n+1} = 3(3 - 1) + (n - 1)^2$
 $S_n - S_{n-1} = T_n$
 $\Rightarrow T_n (3n + n^2) - [(3n - 3) + (n^2 + 1 - 2n)]$
 $T_n = 2n + 2$
 $T_1 \Rightarrow 4, \quad T_2 \Rightarrow 6$
 $d \Rightarrow T_2 - T_1 \Rightarrow 2$

8. (3) $90 - 2x = x - 39$
 $3x = 129$
 $x = 43$

9. (2) $5 \sin A = 3 \Rightarrow \sin A = \frac{3}{5}$
 $\therefore (\sec A + \tan A) (1 - \sin A)$
 $= \frac{1 - \sin^2 A}{\cos A} = \cos A = \frac{4}{5}$

10. (1) $h, \sqrt{3}h \rightarrow$ shadow
 $\tan \theta = \frac{h}{\sqrt{3}h} = \tan 30 \Rightarrow \theta = 30^\circ$

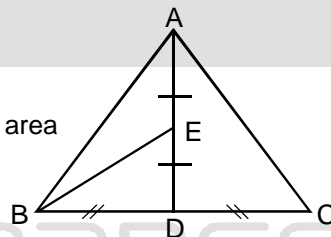


Draw a line $EF \parallel AB$
 $\angle POF = 60^\circ$
 $\angle FOR = 30^\circ$ (AA)
 $\angle POR = 60 + 30 = 90^\circ$

12. (1) $\text{ar}(\triangle BEO) = \frac{1}{2} [\text{ABD}]$

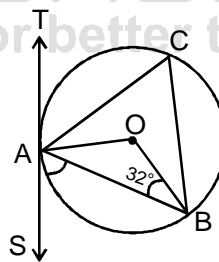
Median divides the triangle into two parts of equal area

$\text{ar}(\triangle BED) = \frac{1}{4} [\text{ABC}]$

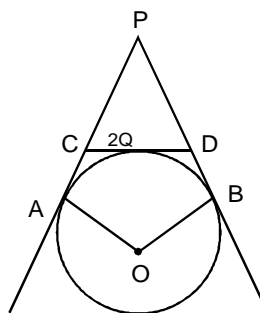


13. (3) TAS tangent and OA radius
 $OA \perp TS$
 $\angle OAS = 90^\circ$
 $\angle OAB = 32^\circ$

($\triangle OAB$ isosceles triangle)
 So $\angle SAB = 90 - 32 = 58^\circ$

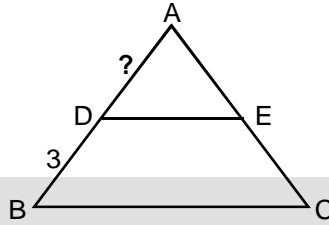


14. (4) $PB = 10$
 $CQ = ?$
 $PA = PB = 10$
 $PC = PA - CQ$
 $= 10 - 2 = 8$



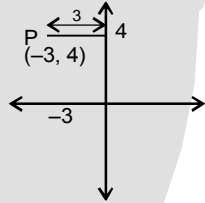
15. (1) $\frac{AD}{PB} = \frac{2}{3} \Rightarrow \frac{AD}{AB} = \frac{2}{5}$
 (by area theorem in similar triangle)

$$\frac{\text{ar}(\triangle ADE)}{\text{ar}(\triangle ABC)} = \left(\frac{2}{5}\right)^2 = \frac{4}{25}$$



16. (3) P(-3, 4)

abscissa = (3)
 = 3



17. (2) Coordinate of the point on y axis (0, 4)
 A(-4, 3) B(6, 5) P(0, y)
 PA = PB

$$\sqrt{(4)^2 + (y-3)^2} = \sqrt{(6)^2 + (y-5)^2}$$

$$16 + y^2 - 6y + 9 = 36 + y^2 - 10y + 25$$

$$4y = 36$$

$$y = 9$$

So P(0, 9) Ans.

18. (1) $\frac{22 \times 100 \times 100 \times 3.5}{7 \times 2200 \times 2000 \times 16} = \frac{1}{4} = 0.25 \text{ cm}$ [No option is there]

19. (3) Perimeter = 16.4 cm

$$\Rightarrow \frac{\pi r \theta}{180} + 29 = 16.4 \quad \Rightarrow \frac{\pi r \theta}{180} = 6 \quad \Rightarrow \frac{\pi r^2 \theta}{360} = \frac{6 \times 5.2}{2}$$

$$\Rightarrow \text{Area of sector} = 15.6 \text{ cm}^2$$

20. (1) $r_1 = 3 \text{ cm}$ $r_2 = 4 \text{ cm}$ $r_3 = 5 \text{ cm}$

(1) Volume of all the three spheres = $\frac{4}{3} \pi (3^3 + 4^3 + 5^3)$

$$= \frac{4}{3} \times 126\pi$$

$$\text{Height of cone} = \frac{1}{3} \pi \times 6^2 \times h = \frac{4}{3} \times 126\pi$$

$$h = \frac{4 \times 126}{36} = 24$$

$$h = 24 \text{ cm}$$

21. (2) Slant height = $\sqrt{h^2 + (r_1 - r_2)^2}$ $l = 5 \text{ cm}$

$$2\pi r_1 = 12\pi$$

$$2\pi r_2 = 6\pi$$

$$r_1 = 6$$

$$r_2 = 3$$

$$\sqrt{h^2 + (6-3)^2} = 5$$

$$h^2 + 9 = 25$$

$$h^2 = 16$$

$$h = 4$$

22. BONUS

23. (3) Median = $\frac{x+x-2}{2} = 16$
 $2x - 2 = 3^2$
 $2x = 34$
 $x = 17$

24. (3) $P(A) = \frac{4}{26} = \frac{1}{5}$ (1, 4, 9, 16)

25. (4) $P(A) = \frac{\text{No. of favourable events}}{\text{Sample space}}$, favourable events = (6 + 3), (3 + 6), (5 + 4), (4 + 5)
 $\Rightarrow \frac{4}{36} \Rightarrow \frac{1}{9}$

* * * * *

Resonance
Educating for better tomorrow