



Monthly Progressive Test

Class: X

Subject: PCMB

Solution

Physics

1. ©

Angle of deviation = $180^\circ - 2i$ where $i = 60^\circ$

2. ©

image is virtual, erect, magnified, behind the mirror

3. ©

At focus

4. ©

as object distance is large, image will form at focus

5. ©

as, $n_1 \sin i = n_2 \sin r$ of water with respect to air \times $n_2 \sin r = n_1 \sin i$ of air with respect to water = 1

6. ©

$\sin i = 1/(n_2/n_1) = 3/4 = 0.75$; $i = 49^\circ$

7. ©

apparent depth = $(d/\mu) + (d/2\mu)$

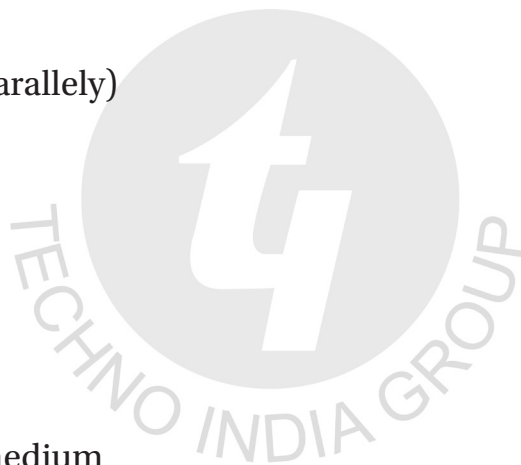
8. ©

Different

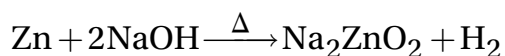
9. ©

True

10. (A)
Definition of absolute refractive index
11. (C)
r.i of water = $\frac{4}{3}$
12. (B)
speed of light in water = 2.25×10^8 m/s
13. (C)
True
14. (B)
Refraction
15. (A)
shifted slightly (parallelly)
16. (C)
Moon
17. (D)
 $180^\circ - 60^\circ = 120^\circ$
18. (C)
independent of medium
19. (C)
alternate angle
20. (D)
 $(\frac{3}{2}) \sin i = (\frac{4}{3}) \cdot \sin 90^\circ$ as per Snell's law
21. (B)
 2×10^8 m/s
22. (A)
 $(\frac{4}{3})(\frac{2}{3}) = \frac{8}{9}$
23. (A)
as, wavelength of red light > wavelength of violet light



33. ©



Na_2ZnO_2 is sodium zincate

34. Ⓓ

$\text{Mg}(\text{OH})_2$ is one of the major components of antacids

35. ©

Indicators show different colours in acidic, basic and neutral medium

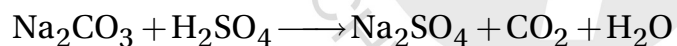
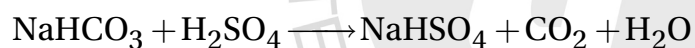
36. ©

Phenolphthalein shows the following colours in different medium

Acidic medium-colourless, basic medium-pink, neutral medium-colourless

37. Ⓓ

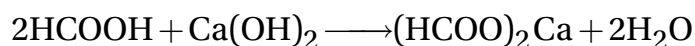
Both NaHCO_3 and Na_2CO_3 produce CO_2 gas with dilute H_2SO_4



38. Ⓐ

CaOCl_2 readily releases oxygen and hence it acts as an oxidising agent

When ant-string touches human body then formic acid enters and that can be neutralised by $\text{Ca}(\text{OH})_2$



39. Ⓓ

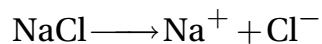
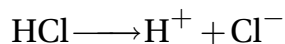
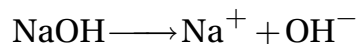
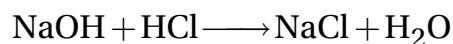
NaOH is stronger alkali than $\text{Mg}(\text{OH})_2$ and $\text{Mg}(\text{OH})_2$ is one of the components of antacids

40. Ⓑ

41. Ⓑ

CH_4 is a highly inflammable gas and the equation is $\text{CH}_4 + 2\text{O}_2 \xrightarrow{\Delta} \text{CO}_2 + 2\text{H}_2\text{O}$

42. Ⓓ

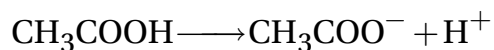


Form the above equations, it is clear that the charges of the cations and anions remain same. Hence, neither of them face oxidation or reduction.

43. Ⓓ

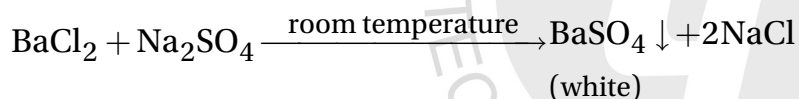
Curd starts to react with the inner wall of the container.

44. Ⓐ

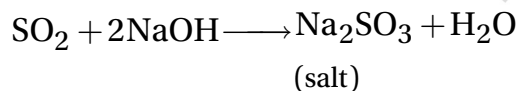


As the compound is releasing only one H^+ ion so, it is a monobasic acid

45. Ⓓ



46. Ⓑ



47. Ⓑ

Blue vitriol - $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$

Baking soda - NaHCO_3

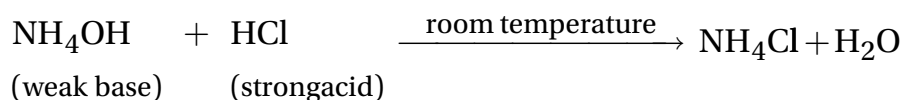
Washing soda - $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$

Gypsum - $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$

48. Ⓑ

$\text{Pb}(\text{OH})\text{Cl}$ is a basic salt as one - OH group is present in the molecule

49. Ⓐ



50. ©

Glauber salt : $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$

Mathematics

51. ©

$$(4K)^2 - 4 \cdot 16 \cdot 9 = 0$$

$$K^2 - 36 = 0$$

$$K = \pm 6$$

52. (A)

$$2a + 3 = 0 \quad 2 + b = 0 \Rightarrow b = -2$$

$$a = -3/2 \quad ab = -\frac{3}{2} \times -2 = 3$$

53. (A)

$$\frac{\lambda - 4}{4} = 1$$

$$\Rightarrow \lambda - 4 = 4$$

$$\Rightarrow \lambda = 8$$

54. (B)

$$x^2 + 4kx + k^2 - k + 2 = 0$$

$$\therefore 16k^2 - 4(k^2 - k + 2) = 0$$

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

$$\Rightarrow (k + 1)(3k - 2) = 0$$

$$\Rightarrow k = -1, \frac{2}{3}$$

55. ©

$$ax^2 + bx + c = 0$$

$$\alpha, 3\alpha$$

$$3\alpha^2 = \frac{c}{a} \quad \dots (1)$$

$$4\alpha = -\frac{b}{a} \quad \dots (2)$$

$$a^2 = \frac{b^2}{16a^2}$$

$$a^2 = \frac{c}{3a}$$

$$\therefore \frac{b^2}{16a^2 a} = \frac{c}{3a}$$

$$\Rightarrow \frac{b^2}{ac} = \frac{16}{3}$$

56. Ⓓ

$$4 - 2a + 12 = 0$$

$$\Rightarrow 2a = 16$$

$$\Rightarrow a = 8$$

$$a^2 - 4.1.q = 0$$

$$4q = a^2 = 64$$

$$\therefore q = 16$$

57. Ⓑ

$$\text{Let } y = \sqrt{6 + \sqrt{6 + \sqrt{6 + \dots}}}$$

$$y^2 = 6 + y \quad (y \text{ is positive})$$

$$\Rightarrow y^2 - y - 6 = 0$$

$$\Rightarrow y^2 - 3y + 2y - 6 = 0$$

$$\Rightarrow (y - 3)(y + 2) = 0$$

$$y = 3, y = -2$$

58. Ⓑ

$$\text{For } ax^2 + bx + c = 0,$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

59. Ⓐ

$$\alpha + \beta = \frac{1}{\alpha\beta}$$

$$\Rightarrow -\frac{b}{a} = \frac{a}{c} \Rightarrow -bc = a^2 \Rightarrow a^2 + bc = 0$$

60. (B)

For $ax^2 + bx + c = 0$,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

For real and distinct roots discriminant D should be positive ($D = b^2 - 4ac$)

61. (C)

 $y = 0$ at two points $(-4, 0)$ and $(2, 0)$

62. (A)

$$(2y - 1)^2 = 0 \text{ or } y = \frac{1}{2} \text{ and } \frac{1}{2}$$

 \therefore difference of the roots = 0

or Discriminant = 0

$$\therefore \alpha = \beta \Rightarrow \alpha - \beta = 0$$

63. (A)

$$\alpha + \beta = \frac{7}{4}, \alpha\beta = \frac{3}{4}$$

$$\begin{aligned} \frac{\alpha^2 + \beta^2}{\alpha\beta} &= \frac{(\alpha + \beta)^2 - 2\alpha\beta}{\alpha\beta} \\ &= \frac{(\alpha + \beta)^2}{\alpha\beta} - 2 \\ &= \frac{(7/4)^2}{(3/4)} - 2 \\ &= \frac{\cancel{4}}{3} \times \frac{49}{\cancel{4} \times 4} - 2 = \frac{49 - 24}{12} \\ &= \frac{25}{12}. \end{aligned}$$

64. (C)

$$\alpha = 3 + \sqrt{5}, \therefore \beta = 3 - \sqrt{5}$$

$$\therefore x^2 - (\alpha + \beta)x + \alpha\beta = 0$$

$$\Rightarrow x^2 - 6x + (9 - 5) = 0$$

$$\Rightarrow x^2 - 6x + 4 = 0$$

65. Ⓐ

$$D = 2^2 - 4(-3)(-8) = 4 - 96 = -92$$

66. Ⓑ

$$\begin{aligned} 2(-a)^2 + 2a(-a) + 5(-a) + 10 &= 0 \\ \Rightarrow 2a^2 - 2a^2 - 5a + 10 &= 0 \\ \Rightarrow 5a &= 10 \\ \Rightarrow a &= 2 \end{aligned}$$

67. Ⓒ

$$(-4)^2 - (-4) - 2k - 2 = 0 \Rightarrow k = 9$$

68. Ⓒ

$$6x - ky + 16 = 0, 3x - y + 8 = 0$$

$$\text{or } 3x - \frac{ky}{2} + 8 = 0$$

$$\therefore -\frac{k}{2} = -1$$

$$\Rightarrow k = 2$$

69. Ⓓ

Number (xy) is $10x + y$

$$x + y = 9 \quad \dots (1)$$

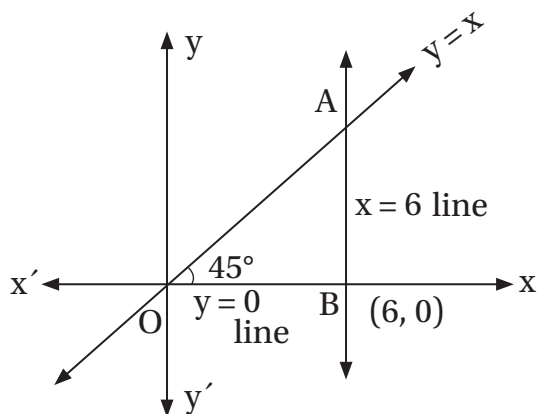
$$10x + y + 27 = 10y + x$$

$$\Rightarrow y - x = 3 \quad \dots (2)$$

by solving (1) & (2) we get $x = 3, y = 6$

Therefore number is 36.

70. Ⓑ



by solving $y = x$ and $x = 6$, we get $AB = 6$

∴ Area of triangle OAB

$$= \frac{1}{2} \times 6 \times 6$$

$$= 18 \text{ sq unit.}$$

71. Ⓐ

$$(x - 5)(45 - x - 5) = 124$$

$$\Rightarrow x^2 - 45x + 324 = 0$$

72. Ⓑ

$$(x - 2)^2 + 1 = 2x - 3 \text{ can be written as}$$

$$x^2 - 4x + 4 + 1 = 2x - 3$$

$$\Rightarrow x^2 - 6x + 8 = 0$$

It is in the form of $ax^2 + bx + c = 0$

73. Ⓒ

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

$$\Rightarrow x^3 + 6x^2 + 12x + 8 = x^3 - 4$$

$$\Rightarrow 6x^2 + 12x + 12 = 0$$

$$\Rightarrow x^2 + 2x + 2 = 0$$

$$D = (2)^2 - 4(1).2$$

$$= 4 - 8 = -4$$

74. Ⓓ

$$\text{We can write } x^2 + x + 8 = x^2 - 4$$

$$\Rightarrow x = -12$$

75. Ⓐ

$$x(x + 1) = 306$$

$$x^2 + x - 306 = 0$$

$$\Rightarrow x^2 + 18x - 17x - 306 = 0$$

$$\Rightarrow x(x + 18) - 17(x + 18) = 0$$

$$\Rightarrow (x - 17)(x + 18) = 0$$

$$x \neq -18 \text{ therefore } x = 17$$

∴ two integers are 17, 18

76. (A)

Concentration of solutes in the cell sap is high

Higher concentration of water outside the cell, in the soil, results in entry of water into the root hair by osmosis.

77. (C)

Xylem elements get stained showing ascent of sap through them

Xylem channels are routes through which ascent of sap occurs.

78. (C)

Sucrose

79. (A)

Increase

Lower atmospheric pressure will increase the rate of evaporation of water vapour from the leaf surface.

80. (A)

When there is high humidity in the atmosphere

Higher humidity will decrease the rate of evaporation of water vapour from the leaf surface.

81. (D)

Potometer

82. (B)

Soil is wet and air is dry

The higher rate of transpiration will be compensated by the higher rate of water absorption from the soil.

83. (D)

All of these

84. (B)

Xylem

85. (A)

Xylem vessel system

Vessels and tracheids

86. Ⓓ
Capillary water
87. Ⓓ
Cohesion Theory
Force of attraction between water molecules ensures the continuity of the chain of water molecules rising through the xylem vessels.
88. Ⓑ
Ascent of sap
Continuous loss of water as water vapour causes ascent of sap through the xylem
89. Ⓑ
Roots to leaves
90. Ⓐ
Food
91. Ⓒ
Parasites
92. Ⓓ
Amino acids
93. Ⓑ
Oesophagus
Oesophagus is a part of the human digestive system.
94. Ⓓ
Lactic acid
95. Ⓒ
Blood pressure
96. Ⓑ
Lipase and glycerol, respectively
97. Ⓑ
2
Anaerobic respiration causes incomplete breakdown of glucose.



98. Ⓑ

Between the left atrium and left ventricle

99. Ⓑ

Trachea and bronchi

To prevent them from collapsing when no air flow occurs through them.

100. Ⓐ

Unidirectional

From roots to leaves

