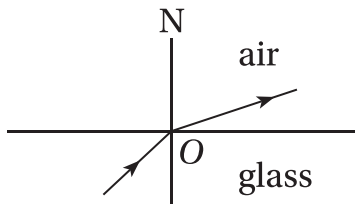


Physics

1. (B)



Denser to rarer

2. (A)

Rarer to denser

3. (C)

Wavelength and nature of medium.

4. (C)

Among them water is rarer medium.

5. (C)

$$n_g = \frac{C_0}{C_g} = \frac{3}{2} \quad n_w = \frac{C_0}{C_w} = \frac{4}{3}$$

$$n_{\text{air}} n_{\text{water}} \times n_{\text{water}} n_{\text{glass}} \times n_{\text{g}} n_{\text{air}} = 1$$

$$n_{\text{water}} n_{\text{glass}} = \frac{9}{8}$$

6. (D)

$$\mu_V > \mu_R, \text{ apparent depth} = \frac{\text{Real depth}}{\mu_g} = \frac{2}{3} \cdot \text{real thickness}$$

Similarly in pond (water $r_i = \frac{4}{3}$)

7. ©

$$\text{app. depth} = \frac{\text{Real depth}}{\mu} \Rightarrow 15 = \frac{20}{\mu} \Rightarrow \mu = \frac{4}{3}$$

8. Ⓓ

9. Ⓑ

10. Ⓐ

11. Ⓑ

$$\frac{3}{2} = \frac{3 \times 10^8}{y \times 10^8} \Rightarrow y = 2$$

12. Ⓐ

as air \rightarrow glass \rightarrow air

13. ©

 $i = e$ refer ans Q.12

14. ©

refer Q.11

15. Ⓓ

$$C \text{ (in diamond)} = \frac{3 \times 10^8}{2.42} = 1.24 \times 10^8 \text{ m/s}$$

16. Ⓐ

$$60 - 40 = 20 \text{ cm}$$

17. Ⓑ

$$45^\circ - 30^\circ = 15^\circ$$

18. Ⓓ

$$\text{As } R = 2f$$

19. Ⓓ

$$D = 180^\circ - 2i = 180^\circ - 60^\circ = 120^\circ$$

20. ©

independent of medium.

21. ©

$$\frac{\mu_b}{\mu_a} \times \frac{\mu_c}{\mu_b} \times \frac{\mu_a}{\mu_c} = 1$$

22. ©

$$\text{Shift} = t \left(1 - \frac{1}{\mu} \right) = 3 \times \left(1 - \frac{2}{3} \right) = 1 \text{ cm}$$

23. Ⓐ

$$\text{Real depth} = \mu \times \text{apparent depth} = \frac{3}{2} \times 2 = 3 \text{ cm}$$

$$\therefore 3 \text{ cm} + 3 \text{ cm} = 6 \text{ cm}$$

24. Ⓓ

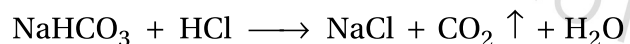
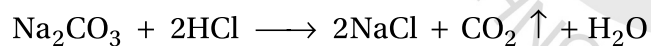
$$\frac{3}{2} \cdot \sin i = \frac{4}{3} \cdot \sin 90^\circ \quad \sin i = \frac{8}{9}$$

25. ©

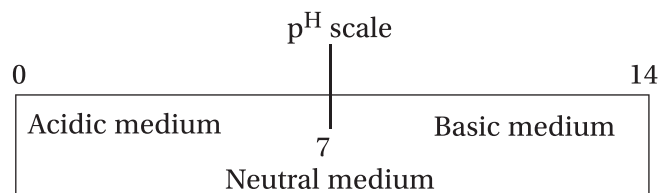
Alternate angle

Chemistry

26. Ⓑ

(Na₂CO₃—sodium carbonate and NaHCO₃—sodium bicarbonate)

27. ©

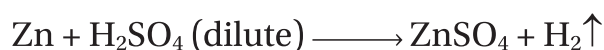


28. Ⓑ

29. Ⓐ

NaOH is a strong base. Hence, pH of the medium will be more than 7

30. Ⓓ



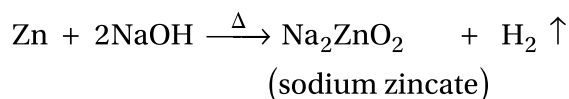
31. Ⓑ

HCl is an acid hence it turns blue litmus red

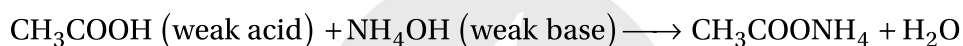
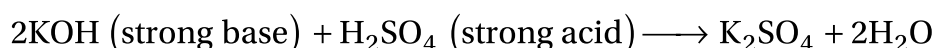
32. Ⓓ

Consider the pH scale given in the hint of question number 27

33. Ⓒ



34. Ⓒ



35. Ⓓ

Milk of magnesia is an antacid contains $\text{Mg}(\text{OH})_2$

36. Ⓒ

Indicators are the compounds, which show different colours in acidic, basic and neutral mediums.

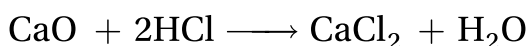
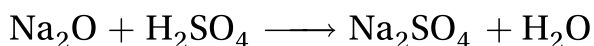
37. Ⓒ

Phenolphthalein shows following colour changes in different mediums

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

38. Ⓐ

Metallic oxide reacts with acid to form salt and water. Examples are given below



39. Ⓓ

Curd contains lactic acid and that can react slowly with the inner wall of the metallic container and hence the food can gradually becomes poisonous.

40. Ⓑ

In aqueous medium, NaHCO_3 breaks in the following fashion

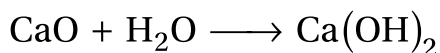


So, the medium is basic hence it can turn red litmus into blue

41. Ⓓ

Exothermic reaction are those, where heat is released during the reaction

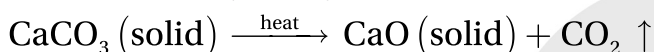
42. Ⓐ



In this reaction, both compounds are combining with each other and a single compound is formed

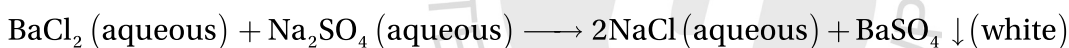
43. Ⓑ

CaCO_3 is a very stable compound and strong heating causes the decomposition of the compound very easily. Related equation is given below :



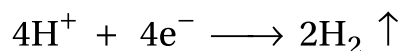
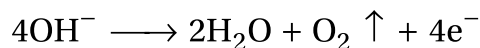
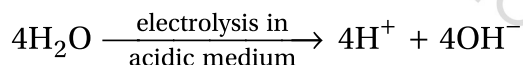
44. Ⓓ

Related equation is



45. Ⓒ

Related equations are given below



So, the correct products are hydrogen gas and oxygen gas

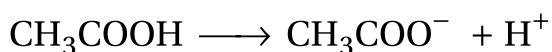
46. Ⓐ

Rancidity is prevented by adding some anti-oxidants in foods

47. Ⓑ

Rancidity is a chemical process and the rate of chemical reaction decreases by decreasing temperature.

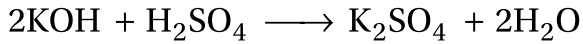
48. Ⓐ



As, only one H⁺ ion is released so, it is a monobasic acid

49. Ⓑ

Related equation is



50. Ⓐ

HCOOH is formic acid or methanoic acid

Mathematics

51. Ⓒ

$$\frac{3}{6} = \frac{-1}{-K} = \frac{8}{16} \Rightarrow \frac{1}{2} = \frac{1}{K} = \frac{1}{2} \Rightarrow K = 2$$

52. Ⓐ

$$a - b = 2$$

$$\frac{a + b = 4}{2a = 6}$$

$$\Rightarrow a = 3 \quad \therefore b = 1$$

53. Ⓓ

Let the two digit number be $10x + y$.

$$\therefore x + y = 9$$

Again, $10x + y + 27 = 10y + x$

$$\Rightarrow 9x - 9y = -27$$

$$\Rightarrow x - y = -3$$

$$x + y = 9$$

$$\frac{x - y = -3}{2x = 6}$$

$$2x = 6$$

$$x = 3 \quad \therefore y = 6$$

\therefore The number = 36

54. Ⓐ

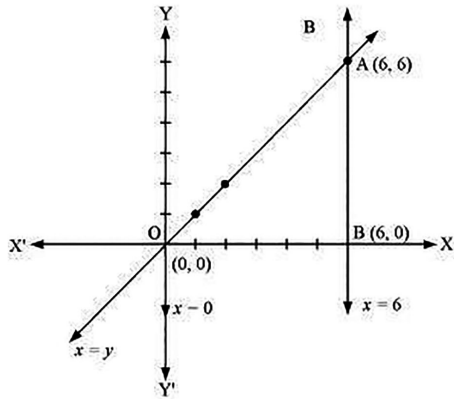
$$\frac{1}{3} = \frac{2}{K} \Rightarrow K = 6$$

55. Ⓓ

Intersecting or coincident

56. ⑥

$$\text{Area} = \frac{1}{2} \times 6^3 \times 6 \text{ sq. units} = 18 \text{ sq. units}$$



57. ④

$$\frac{2}{4} = \frac{3}{K} = \frac{5}{10} \Rightarrow \frac{3}{K} = \frac{1}{2} \Rightarrow K = 6$$

58. ⑥

$$x + Ky = 5$$

$$2 + K = 5 \Rightarrow K = 3$$

59. ③

$$\frac{7}{3} \neq \frac{-3}{\frac{K}{7}} \Rightarrow \frac{7}{3} \neq \frac{-21}{K} \Rightarrow K \neq -9$$

60. ①

Let father's age be x years and son's age be y years.

$$\therefore x + y = 65$$

$$2(x - y) = 50 \Rightarrow x - y = 25$$

$$x + y = 65$$

$$x - y = 25$$

$$\hline 2x = 90$$

$$x = 45 \quad \therefore y = 20$$

\therefore Age of father = 45 years

61. ③

$$\frac{x+1}{y+1} = \frac{4}{5} \Rightarrow 5x+5 = 4y+4$$

$$\frac{x-5}{y-5} = \frac{1}{2} \Rightarrow 2x-10 = y-5$$

$$\Rightarrow 2x - y = 5$$

$$5x - 4y = -1$$

$$\underline{8x - 4y = 20}$$

$$-3x = -21$$

$$x = 7 \therefore \text{fraction} = \frac{7}{9}$$

$$\therefore y = 9$$

62. ⑥

Let cost of one chair be ₹ x and cost of one table be ₹ y

$$\therefore 3x + 2y = 1850$$

$$5x + 3y = 2850$$

$$9x + 6y = 5550$$

$$\underline{10x + 6y = 5700}$$

$$-x = -150$$

$$x = 150$$

$$\therefore 2y = 1400 \Rightarrow y = 700$$

$$\therefore x + y = 150 + 700 = 850$$

63. ⑥

$$x + \frac{y}{2} = 5, \quad \frac{x}{2} + y = \frac{11}{2}$$

$$2x + y = 10, \quad x + 2y = 11$$

$$4x + 2y = 20$$

$$\underline{x + 2y = 11}$$

$$3x = 9$$

$$x = 3 \therefore y = 4$$

64. ⑥

$$\frac{2}{x} + \frac{3}{y} = \frac{9}{xy}, \quad \frac{4}{x} - \frac{9}{y} = \frac{3}{xy}$$

$$\Rightarrow 2y + 3x = 9 \quad 4y - 9x = 3$$

$$\Rightarrow 4y + 6x = 18$$

$$\underline{4y - 9x = 3}$$

$$15x = 15$$

$$x = \frac{\cancel{5}}{\cancel{15}} = 1$$

$$\therefore y = 3$$

65. (A)

$$\frac{x}{a} = \frac{y}{b}, ax + by = a^2 + b^2$$

$$\Rightarrow bx = ay \quad \Rightarrow a^2x + aby = a(a^2 + b^2)$$

$$\Rightarrow bx - ay = 0 \quad b^2x - aby = 0$$

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

$$x = a$$

$$\therefore y = b$$

66. (B)

$$\text{Let } \sqrt{3\sqrt{3\sqrt{3\sqrt{3}}}} \dots \infty = x$$

$$\Rightarrow x^2 = 3\sqrt{3\sqrt{3\sqrt{3}} \dots \infty}$$

$$\Rightarrow x^2 = 3x$$

$$\Rightarrow x = 3$$

67. (A)

$$\sqrt{14+6\sqrt{5}} + \sqrt{14-6\sqrt{5}}$$

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

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

68. (A)

$$8 = 2^3, 15 = 3 \times 5, 20 = 2^2 \times 5, 22 = 2 \times 11$$

$$\therefore \text{LCM} = 8 \times 3 \times 5 \times 11$$

$$\therefore \text{Least perfect square number} = 8 \times 2 \times 3 \times 3 \times 5 \times 5 \times 11 \times 11 = 435600$$

69. (C)

$$\because -\frac{1}{3} \text{ is one zero } \therefore (3x + 1) \text{ is one factor.}$$

$$3x^3 - 5x^2 - 11x - 3$$

$$= 3x^3 + x^2 - 6x^2 - 2x - 9x - 3$$

$$= x^2(3x + 1) - 2x(3x + 1) - 3(3x + 1)$$

$$= (3x + 1)(x^2 - 2x - 3)$$

$$= (3x + 1)(x - 3)(x + 1)$$

\therefore other zeroes are 3, -1

70. (B)

$$\alpha + \beta = -\frac{b}{a}, \quad \alpha\beta = \frac{c}{a}$$

$$\alpha^2\beta + \alpha\beta^2 = \alpha\beta(\alpha + \beta) = \frac{c}{a}\left(-\frac{b}{a}\right) = \frac{-bc}{a^2}$$

$$\alpha^2\beta \times \alpha\beta^2 = \alpha^3\beta^3 = \frac{c^3}{a^3}$$

\therefore Quadratic polynomials are

$$K \left[x^2 + \frac{bc}{a^2}x + \frac{c^3}{a^3} \right]$$

$$\Rightarrow \frac{K}{a^3}(a^3x^2 + abcx + c^3)$$

\therefore a quadratic polynomial = $a^3x^2 + abcx + c^3$

71. (C)

$$\frac{3}{K} = \frac{5}{10} \Rightarrow K = 6$$

72. (B)

$$\frac{2}{a+b} = \frac{3}{2a-b} = \frac{7}{21} = \frac{1}{3}$$

$$\Rightarrow a + b = 6, \quad 2a - b = 9$$

$$\frac{a+b=6}{}$$

$$3a = 15$$

$$a = 5$$

$$\therefore b = 1$$

73. (C)

$$3x + 2y = 13xy, \quad 4x - 5y = 2xy$$

$$\Rightarrow \frac{3}{y} + \frac{2}{x} = 13, \quad \frac{4}{y} - \frac{5}{x} = 2$$

$$\Rightarrow \frac{15}{y} + \frac{10}{x} = 65, \quad \frac{8}{y} - \frac{10}{x} = 4$$

$$\text{Adding, } \frac{23}{y} = 69 \Rightarrow y = \frac{1}{3}$$

$$\therefore 9 + \frac{2}{x} = 13 \Rightarrow x = \frac{1}{2}$$

74. ©

$$\frac{3}{6} = \frac{-5}{-10} \neq \frac{-11}{-7}$$

$$\Rightarrow \frac{1}{2} = \frac{1}{2} \neq \frac{11}{7}$$

75. Ⓑ

$$3x + 4y = 5, \quad x + 2y = 2$$

$$\frac{2x + 4y = 4}{}$$

$$x = 1 \quad \therefore \quad 2y = 1$$

$$y = \frac{1}{2}$$

$$\therefore x + y = \frac{3}{2}$$

Biology

76. Ⓓ

Trachea

77. Ⓐ

Absorb carbon dioxide present in the flask

78. ©

Larynx

79. Ⓑ

Larynx

80. Ⓑ

Xylem

81. Ⓓ

All of the above

82. Ⓓ

All of the above

83. Ⓒ

Glucose

Glucose is broken down in living cells, with or without oxygen, to release energy.

84. Ⓐ

Pulmonary respiration

85. Ⓓ

Alveoli

The thinness of the alveolar walls and of the surrounding blood capillaries facilitate the exchange.

86. Ⓒ

Bronchi

87. Ⓒ

120 days

88. Ⓒ

Capillaries

89. Ⓓ

WBCs

90. Ⓒ

Serum

91. Ⓑ

Bile

92. Ⓒ

Saprotrophs

93. Ⓑ

Gall bladder

94. Ⓓ

Holozoic

Nutrition occurs through the sequential steps - Ingestion, Digestion, Absorption, Assimilation and Egestion



95. Ⓐ

6

Equation of photosynthesis.

96. Ⓑ

Oesophagus

Oesophagus is a part of the digestive system.

97. Ⓓ

Lactic acid

98. Ⓒ

Blood pressure

99. Ⓑ

2

100. Ⓓ

Left ventricle

To be able to pump blood with a huge force into aorta to reach all parts of the body, simultaneously

