Monthly Progessive Test

Class: X

Subject: PCMB

Academic Excellence Programme TECHNO ACE

Solution

Physics

1. Ⓐ

   Initial : object to image distance = 40 cm, final object to image distance = 60cm

   Therefore answer is 60 – 40 = 20 cm

2. Ⓑ

   $x°$ = 45°, therefore 45° – 30° = 15°

3. Ⓑ

   $2u$ m/s = 2 × 5 = 10 m/s

4. Ⓑ

   $2x$ = 4m => x = 2m

5. Ⓓ

   $R = 2f$ for curved mirror

6. Ⓐ

   Convex mirror is a diverging mirror

7. Ⓓ

   As it gives virtual, magnified image

8. Ⓒ

   Moon

9. Ⓐ

   As $\angle i = \angle r$

10. Ⓓ

$D = 180° - 2i = 120°$

11. Ⓐ

Valid at every point of reflection

12. Ⓓ

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

13. Ⓒ

Focus (as per definition of focal point)

14. Ⓐ

$\angle i = \angle r = 0°$

15. Ⓑ

Light follows reversibility

16. Ⓒ

Straight line and casting shadow

17. Ⓑ

If $f < u <$ 2f then $v > 2f$; image is magnified

18. Ⓒ

If $u = 2f$ then $v = 2f$; therefore $m = 1$

19. Ⓓ

Twice the angle of rotation of mirror = $2 \times 30° = 60°$

20. Ⓓ

It doesn't depend upon medium

21. Ⓒ

It doesn't depend upon medium

22. Ⓒ

If $u = 2f$ then $v = 2f$;

23. Ⓓ

$\left(\frac{1}{v}\right)+\left(\frac{1}{u}\right)=\frac{1}{f}$ if $u \to$ infinity then $v = f$

24. Ⓐ

If $u < f$: magnified and virtual image

25. Ⓑ

$\left(\frac{1}{v}\right)+\left(\frac{1}{-10}\right)=\left(\frac{1}{-20}\right) \Rightarrow v = 20$ cm

Therefore, magnitude of linear magnification is 2

Chemistry

26. Ⓐ

Calcium oxide (CaO) is also known as quick lime.

Slaked lime is calcium hydroxide $Ca(OH)_2$

27. Ⓒ

Ferrous sulphate crystal ($FeSO_4.7H_2O$) Green vitriol, is green colour

28. Ⓒ

Reaction of iron nails with copper sulphate solution is an example of displacement reaction

$Fe + CuSO_4 \rightarrow FeSO_4 + Cu\downarrow$

29. Ⓓ

A solution of sodium sulphate in water is colourless

$Na_2SO_4.10H_2O$ (Glauber's salt)

white crystal

30. Ⓓ

Digestion is the example of decomposition reaction as complex food is broken into simpler food in presence of enzymes.

31. Ⓓ

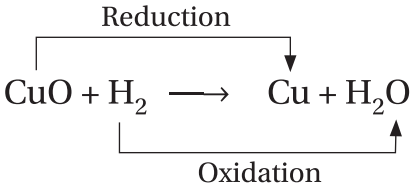
$AgNO_3(q)$	+	NaCl(aq)	$\rightarrow$	$AgCl\downarrow + NaNO_3$
silver white		common salt		(white precipitate)

32. Ⓐ

$ZnS + 2HCl \rightarrow ZnCl_2 + H_2S$

$x = 2$

33. Ⓑ



Here H_2 gas reduces CuO to Cu & itself oxidises into H_2O

34. Ⓑ

$Ca(OH)_2 + CO_2 = CaCO_3\downarrow + H_2O$

(Milky white ppt)

35. Ⓑ

The main constituent of natural gas is CH_4 (methane)

36. Ⓐ

When vegetable matters turn into composts then heat is released

37. Ⓓ

When lead nitrate is strongly heated:

$$2Pb(NO_3)_2 \xrightarrow{\Delta} \underset{\text{(yellow residue)}}{2PbO} + \underset{\text{(brown gas)}}{4NO_2\uparrow} + O_2\uparrow$$

38. Ⓑ

Calcium oxide (CaO) is widely used in the cement industry

39. Ⓓ

When silver chloride is exposed to sunlight grey coloured silver is produced along with Cl_2 gas

$$2AgCl(s) \xrightarrow{\text{sunlight}} \underset{\text{(Grey)}}{2Ag(s)} + \underset{\text{(Chlorine)}}{Cl_2(g)}$$

40. Ⓐ

Magnesium ribbon burns in air (oxygen) to give magnesium oxide

$2Mg + O_2 \rightarrow 2MgO$

41. Ⓑ

Colour of NaCl solution is colourless

42. Ⓓ

When Zinc reacts with dilute H_2SO_4 then along with $ZnSO_4$ the correct product is H_2

$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2\uparrow$

(dilute) (Hydrogen)

43. Ⓐ

When red hot iron reacts with steam iron is oxidised by steam

Oxidation

$3Fe + 4H_2O \longrightarrow Fe_3O_4 + 4H_2O\uparrow$

Reduction

44. Ⓐ

Rusting of iron is a chemical change

$4Fe + 3O_2 + 2xH_2O \rightarrow 2Fe_2O_3 . xH_2O$

(Rust)

45. Ⓓ

$\overset{+1-2+1}{NaOH} + \overset{+1-1}{HCl} \longrightarrow \overset{+1-1}{NaCl} + \overset{+1-2}{H_2O}$, is a neutrallisation reaction

46. Ⓓ

Respiration is considered as an exothermic reaction because energy is released.

47. Ⓐ

When quick lime reacts with water then calcium hydroxide is formed

$CaO + H_2O \rightarrow Ca(OH)_2$

(quick lime) (calcium hydroxide)

It is a combination reaction

48. Ⓑ

$CaCO_3 \xrightarrow{heat} CaO + CO_2\uparrow$

When $CaCO_3$ is heated CaO & CO_2 is formed. This is an example of thermal decomposition.

49. Ⓓ

When barium chloride reacts with sodium sulphate the white precipitate of barium sulphate is formed

$$\underset{(aq)}{BaCl_2 + Na_2SO_4(aq)} \rightarrow \underset{(white\ ppt)}{BaSO_4\downarrow} + 2NaCl$$

50. Ⓒ

Electrolytic decomposition of water in presence of dilute acid produces hydrogen (H_2) and oxygen (O_2)

$$2H_2O \xrightarrow[acid]{electrolysis} \underset{(Hydrogen)}{2H_2\uparrow} + \underset{(Oxygen)}{O_2\uparrow}$$

Mathematics

51. Ⓓ

$a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and $LCM(a, b, c) = 2^3 \times 3^2 \times 5$

So, $n = 2$

52. Ⓑ

$196 = 2^2 \times 7^2$, sum of exponents $= 2 + 2 = 4$

53. Ⓓ

$144 = 2^4 \times 3^2$, exponent of $2 = 4$

54. Ⓒ

500 cannot be the HCF because LCM 1200 is not divisible by 500

55. Ⓑ

$2(-a)^2 + 2a(-a) + 5(-a) + 10 = 0 \Rightarrow 2a^2 - 2a^2 - 5a + 10 = 0 \Rightarrow a = 2$

56. Ⓒ

$(-4)^2 - (-4) - (2k + 2) = 0 \Rightarrow 16 + 4 - (2k + 2) = 0 \Rightarrow k = 9$

57. Ⓑ

Product of roots =1 as one root is reciprocal of other.

So, $\frac{k}{5}=1 \Rightarrow k=5$

58. Ⓒ

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

59. Ⓐ

(ii) & (iii)

60. Ⓓ

HCF of any two prime numbers = 1

61. Ⓒ

$\frac{13}{625}=\frac{13}{5^4}$ so, it has terminating decimal expansion

62. Ⓒ

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

63. Ⓐ

$k(1)^3-4k(1)^2+4k(1)-1=0 \Rightarrow k=1$

64. Ⓐ

$x^2-5x-14$

65. Ⓑ

$\alpha+\beta=\frac{7}{6},\alpha\beta=\frac{-3}{6}=\frac{-1}{2},(\alpha+1)(\beta+1)=\alpha\beta+\alpha+\beta+1=\frac{-1}{2}+\frac{7}{6}+1=\frac{10}{6}=\frac{5}{3}$

66. Ⓑ

$48=2^4\times3,\ 72=2^3\times3^2,\ 108=2^2\times3^3$, LCM $=16\times27=432$

Time between 7a.m. to 7.30 a.m. $=30\times60$ seconds $=1800$ seconds

$\frac{1800}{432}=4.17(\text{approx})$. So, 4 times

67. Ⓓ

GCD of 2002 and k = 4, but 2002 is not divisible by 4. So, it is not possible

68. Ⓒ

132-62 =70, 237-132= 105, 237-62 = 175

70 = 5 × 7 × 2, 105 = 5 × 7 × 3, 175 = 5 × 5 × 7 GCD = 35

69. Ⓐ

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

LCM = 8 × 3 × 5 × 11 = 1320

The least perfect square number = 8 × 2 × 3 × 3 × 5 × 5 × 11 × 11 = 435600

70. Ⓓ

Numbers are 12 and 16. LCM = 48

71. Ⓑ

At most two zeros

72. Ⓒ

$(x - 2)^2 + 4 \geq 4$ for all real values of x. f(x) cannot be zero for any real value of x.

So, number of zeros = 0

73. Ⓑ

The graph of polynomial intersects x-axis.

74. Ⓓ

Sum of zeros $= -\frac{b}{a}$

75. Ⓒ

$ax^2 + bx + c = ax^2 + (a + c)x + c = ax^2 + ax + cx + c = ax(x + 1) + c(x + 1) = (x + 1)(ax + c)$

So, one zero $= -\frac{c}{a}$

Biology

76. Ⓐ

Sunlight

77. Ⓒ

$NADPH_2$

78. Ⓒ

6C

79. Ⓑ

20

80. Ⓓ

J shaped

81. Ⓑ

Protein

82. Ⓒ

Removal of undigested food

83. Ⓐ

Acidic

84. Ⓑ

Fatty acids and glycerol

85. Ⓒ

Starch into maltose

86. Ⓒ

Light energy to chemical energy

87. Ⓒ

Saprotrophs

88. Ⓒ

Nicotinamide adenine dinucleotide phosphate

89. Ⓒ

Buccal cavity

90. Ⓑ

Bile

91. Ⓐ

Carbohydrates

92. Ⓓ

Vitamins

93. Ⓑ

Gall bladder

94. Ⓓ

Croton

95. Ⓓ

Iodine

96. Ⓒ

Parasites

97. Ⓒ

Absorption

98. Ⓓ

Holozoic

99. Ⓓ

Amino acids

100. Ⓐ

6