Monthly Progressive Test

Class: X

Subject: PCMB (G)

Solutions

Physics

1. Ⓓ

As u is infinity.

2. Ⓑ

2f

3. Ⓐ

u < f

4. Ⓓ

u = − x, v = 3u = − 3x

$$\frac{1}{v} - \frac{1}{-x} = \frac{1}{12}$$

$$-\frac{1}{3x} + \frac{1}{x} = \frac{1}{12} \implies \frac{2}{3x} = \frac{1}{12}$$

x = 8 cm

u = − 8 cm

v = − 24 cm

Distance between object and image = 16 cm

[1]

5. Ⓑ

u = + 10 cm v = ? f = + 20 cm

$$\frac{1}{v} - \frac{1}{10} = \frac{1}{20} \implies \frac{1}{v} = \frac{2}{20} + \frac{1}{20} = \frac{3}{20}$$

v = 6.67 cm

6. Ⓐ

u → infinity   v → f.

7. Ⓑ

= 10 – 6 = 4 volt

8. Ⓐ

Transparent

9. Ⓑ

2 surfaces

10. Ⓐ

Two convex surfaces

11. Ⓒ

One plane-one convex

12. Ⓐ

Converging lens

13. Ⓐ

A ⇒ True R ⇒ True and correct explanation.

14. Ⓑ

A ⇒ True R ⇒ True but not correct explanation as converging capability is known for positive power.

15. Ⓑ

Virtual

16. Ⓑ

45° – 30° = 15°

17. Ⓑ

$$\frac{4}{2} = 2 \text{ m}$$

18. Ⓓ me know,

R = 2f

19. Ⓑ

Denser to rarer.

20. Ⓐ

Rarer to denser.

21. Ⓐ

$$\frac{10}{2} = 5A.$$

22. Ⓒ

Ohm.

23. Ⓑ

Diopter.

24. Ⓐ

P(concave) is negative.

25. Ⓑ When they are incontact, then

$P = P_1 + P_2$

Chemistry

26. Ⓓ

Alkaline solutions make red litmus blue. Hence, p^H of the medium is 10.

27. Ⓒ

In case of indigestion some extra HCl comes to the stomach. To neutralize this acid, antacids are used.

28. Ⓑ

CH_3COOH is an organic acid hence it is weak.

29. Ⓑ

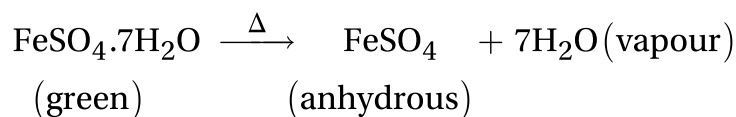Sodium bicarbonate is commonly known as baking soda

30. Ⓓ

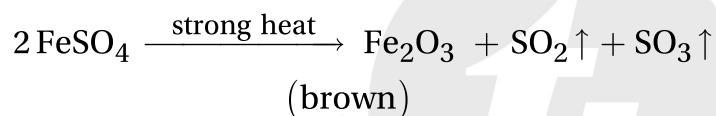The correct equation is $CaO + H_2O \xrightarrow{\text{room temperature}} Ca(OH)_2$

The reaction is highly exothermic and hissing sound is generated. $Ca(OH)_2$ gets dissolved in water.
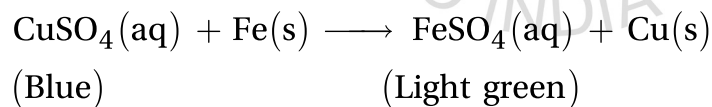
31. Ⓑ

Correct equation is

$$FeSO_4.7H_2O \xrightarrow{\Delta} \underset{\text{(anhydrous)}}{FeSO_4} + 7H_2O\,(\text{vapour})$$
$$\text{(green)}$$

So, water droplet is found at the mouth of the test tube

$$2\,FeSO_4 \xrightarrow{\text{strong heat}} \underset{\text{(brown)}}{Fe_2O_3} + SO_2\uparrow + SO_3\uparrow$$

The smell of SO_2 is of burning sulpher

32. Ⓒ

Correct equation is

$$\underset{\text{(Blue)}}{CuSO_4(aq)} + Fe(s) \longrightarrow \underset{\text{(Light green)}}{FeSO_4(aq)} + Cu(s)$$

33. Ⓐ

Correct equation is

$$3Fe + 4H_2O \longrightarrow Fe_3O_4 + 4H_2$$
$$\text{(steam)}$$
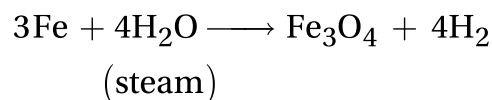
Iron is oxidised

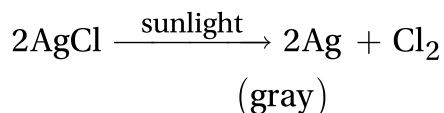**34.** Ⓑ

Correct equation is $CuO + H_2 \longrightarrow Cu + H_2O$

Copper is releasing oxygen and hence it is reduced and hydrogen is accepting oxygen hence it is oxidised

35. Ⓓ

Correct equation is $2Pb(NO_3)_2 \xrightarrow{\Delta} 2PbO + 4NO_2 + O_2$

36. Ⓓ

Correct equation is
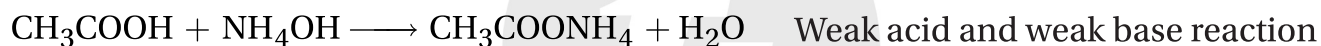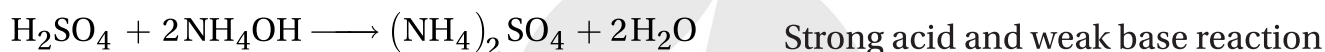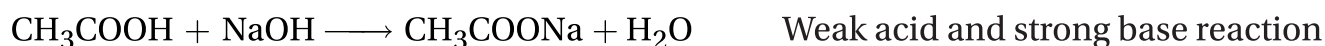
$2AgCl \xrightarrow{\text{sunlight}} 2Ag + Cl_2$
$\qquad\qquad\qquad (\text{gray})$

37. Ⓒ

The correct equations are given below

$CH_3COOH + NaOH \longrightarrow CH_3COONa + H_2O$ 　　Weak acid and strong base reaction

$H_2SO_4 + 2KOH \longrightarrow K_2SO_4 + 2H_2O$ 　　Strong acid and strong base reaction

$H_2SO_4 + 2NH_4OH \longrightarrow (NH_4)_2SO_4 + 2H_2O$ 　　Strong acid and weak base reaction

$CH_3COOH + NH_4OH \longrightarrow CH_3COONH_4 + H_2O$ 　　Weak acid and weak base reaction

38. Ⓒ

Curd contains acidic compounds and it reacts with the metals of the containers and hence curd is not placed in metal containers

39. Ⓐ

One reaction is given as an example $CaO + H_2SO_4 \longrightarrow CaSO_4 + H_2O$

40. Ⓑ

Acidic solution changes blue litmus into red and alkaline solutions turn red litmus into blue. Aqueous solution of $NaHCO_3$ is alkaline. Tomato juice, tamarind juice and oxalic acid solution are acidic

41. Ⓒ

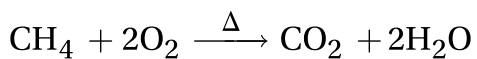$Na_2SO_4 \cdot 10H_2O$ is the chemical formula of Glauber salt

42. Ⓑ

As one $-OH$ group is present in the molecule so, it is a basic salt

43. Ⓑ

Methane (CH_4) is the main constituent of natural gas and it reacts with oxygen by

maintaining the equation

$$CH_4 + 2O_2 \xrightarrow{\Delta} CO_2 + 2H_2O$$

44. Ⓓ

During respiration, energy is released by the system and hence it is known as exothermic reaction

45. Ⓐ

Anti - oxidants protect the food from further oxidation and hence the food remains unchanged.

46. Ⓑ

The correct equation is $Na_2CO_3 + 2HNO_3 \xrightarrow{\text{room temperature}} 2NaNO_3 + CO_2 \uparrow + H_2O$

CO_2 is a colourless and odourless gas and $NaNO_3$ is soluble in water.
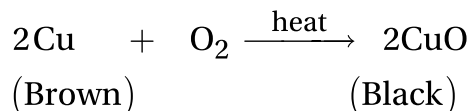
47. Ⓐ

p^H is the measure of the strength of the acid. Now, lower value of p^H indicates that the acid is strong

48. Ⓒ

Phenolphthalein itself is an acidic compound and hence it does not face any colour change in the acidic medium

49. Ⓐ

When copper is strongly heated in air then black coloured copper (II) oxide (CuO) is formed

$$2Cu \quad + \quad O_2 \xrightarrow{\text{heat}} 2CuO$$
$$(Brown) \qquad\qquad (Black)$$

50. Ⓒ

The correct equation is $2H_2O \xrightarrow[\text{electrolysis}]{\text{dilute acid}} 2H_2 + O_2$

This is a decomposition reaction

Mathematics

51. Ⓑ

21, 42, 63, 84, ..., 210.

Let $t_n = 210$

$\Rightarrow 21 + (n-1) \times 21 = 210$

$\Rightarrow \cancel{21} + 21n - \cancel{21} = 210$

$\Rightarrow n = \dfrac{210}{21} = 10$

52. Ⓓ

$3 + 7 + 11 + 15 + 19 + ...$

$t_n = a + (n-1).d$

$= 3 + (n-1) \times 4$

$= 4n - 1$

53. Ⓑ
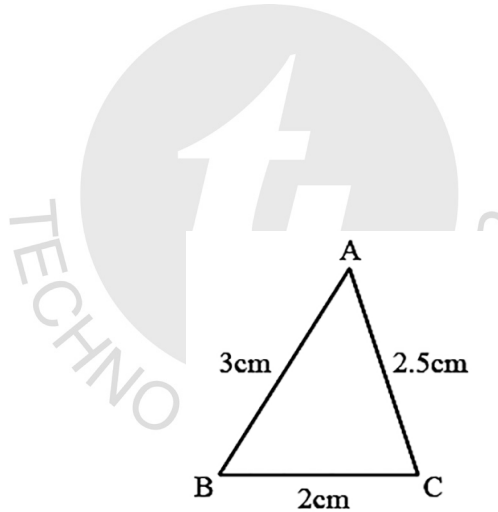
$\because \triangle ABC \sim \triangle DEF$

$\Rightarrow \dfrac{AB}{DE} = \dfrac{BC}{EF} = \dfrac{CA}{FD}$

$\Rightarrow \dfrac{3\,\text{cm}}{DE} = \dfrac{2}{4} = \dfrac{2.5\,\text{cm}}{FD}$

$\Rightarrow DE = 6\text{cm} \;;\quad FD = 5\text{cm}$

Perimeter of $\triangle DEF = 6\text{cm} + 4\text{cm} + 5\text{cm} = 15\text{cm}.$

54. Ⓓ

$\angle A = \angle F, \angle B = \angle E, \angle C = \angle D$

$\therefore \triangle ABC \sim \triangle FED$

55. Ⓐ

$AB = \sqrt{(x-1)^2 + (7-3)^2} = 5$

$\Rightarrow x^2 - 2x + 1 + 16 = 25$

$\Rightarrow x^2 - 2x - 8 = 0 \Rightarrow x = 4, -2$

But $x > 0 \therefore x = 4$

56. Ⓑ

(–5, 4), (9, –8)

Midpoint $\left(\dfrac{-5+9}{2},\dfrac{4-8}{2}\right)=\left(\dfrac{4}{2},\dfrac{-4}{2}\right)=(2,-2)$

57. Ⓓ

(a, b), (–a, –b)

$\begin{aligned}\text{Distance}&=\sqrt{(a+a)^2+(b+b)^2}\\&=\sqrt{4a^2+4b^2}\\&=\sqrt{4(a^2+b^2)}\\&=2\sqrt{a^2+b^2}\end{aligned}$

58. Ⓒ

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

$=\sqrt{9+4}=\sqrt{13}$

59. Ⓓ

Isosceles triangles

60. Ⓐ

$2\sqrt{2},\sqrt{2},0,.....$

First term $=2\sqrt{2}=a$

C.d $=\sqrt{2}-2\sqrt{2}=-\sqrt{2}=d$

$t_8=a+(8-1)d=a+7d=2\sqrt{2}+7(-\sqrt{2})=2\sqrt{2}-7\sqrt{2}$

$=-5\sqrt{2}$

61. Ⓐ

(A) : $a_n=7-4n$ ∴ $d=a_n-a_{n-1}=7-4n-7+4n-4=-4$ True

(R) : common difference (d) $=a_{n+1}-a_n$ True

62. Ⓐ

(A) :
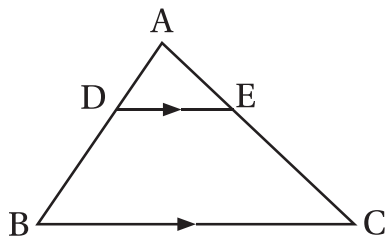
$$\frac{AD}{BD} = \frac{AE}{EC}$$

$$\Rightarrow \frac{x}{x-2} = \frac{x+2}{x-1}$$

$$\Rightarrow x^2 - 4 = x^2 - x$$

$$\Rightarrow x = 4 \quad \text{True}$$

(R) : True

63. Ⓐ

(4, 6)

64. Ⓒ

(10, 3)

65. Ⓓ

(13, 6)

66. Ⓓ

$a = 2^3 \times 3$

$b = 2 \times 3 \times 5$

$c = 3^n \times 5$

LCM $(a, b, c) = 2^3 \times 3^2 \times 5^1$ $\boxed{\therefore\ n = 2}$ (as in LCM we take max power)

67. Ⓑ

Product of roots = 1

$$\Rightarrow \frac{K}{5} = 1$$

$$\Rightarrow K = 5$$

68. Ⓒ

$3x - y + 8 = 0$

$6x - ky + 16 = 0$

$$\frac{3}{6} = \frac{-1}{-k} = \frac{8}{16}$$

$\boxed{k = 2}$

69. Ⓓ

T	U
y	x
x	y

$\longrightarrow$ $\boxed{x + y = 9}$ $\longrightarrow$ (i)

$10y + x \rightarrow$ original number

$10x + y \rightarrow$ new number

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

$\Rightarrow 9y + 27 = 9x \Rightarrow \boxed{y + 3 = x} \rightarrow$ (ii)

Solving (i) and (ii):

$y + 3 + y = 9$

$\Rightarrow 2y + 3 = 9$

$\Rightarrow 2y = 6$

$\Rightarrow \boxed{y = 3}$

$\boxed{x = 6}$

Original number $= 10y + x = 10 \times 3 + 6 = 36$.

70. Ⓒ

Graph cuts the X axis at $(-4, 0)$ and $(2, 0)$.

$\therefore$ roots are -4 and 2.

71. Ⓑ

Mid point $= \left(\dfrac{2 + 8}{2}, \dfrac{3 + 15}{2} \right) = (5, 9)$

72. Ⓐ

$$(2, 3) \xrightarrow[\;C\;]{\;2:3\;} (8, 15)$$

$$\left(\frac{6+16}{2+3}, \frac{9+30}{2+3} \right) \text{ using intersection formula}$$

$$= \left(\frac{22}{5}, \frac{39}{5} \right)$$

73. Ⓓ

$$A(2, 3), \quad M(5, 9)$$

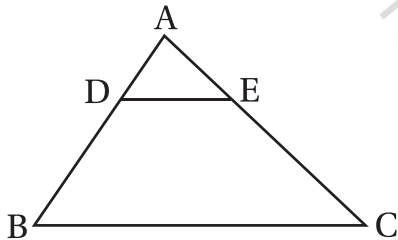$$AM = \sqrt{(2-5)^2 + (3-9)^2} = \sqrt{(-3)^2 + (-6)^2} = \sqrt{9+36} = \sqrt{45}$$

74. Ⓐ

(A) : $PQ = \sqrt{(-1-1)^2 + (0-0)^2} = \sqrt{(-2)^2 + 0^2} = \sqrt{4} = 2$ true

(R) : is true

75. Ⓓ

(A) :

$$\frac{AD}{BD} = \frac{5.7}{9.5} = \frac{3}{5}$$

$$\frac{AE}{EC} = \frac{4.8}{8} = \frac{\cancel{48}^{\,3}}{\cancel{80}_{\,5}} = \frac{3}{5}$$

$$\therefore \frac{AD}{BD} = \frac{AE}{EC} \Rightarrow DE \| BC$$

$\therefore$ (A) is false

(R) : is true

Biology

76. Ⓑ

Lizard and bird

77. Ⓑ

Vasopressin

78. Ⓐ

Pituitary

It controls the development and working of the other endocrine glands

79. Ⓐ

Forebrain

80. Ⓒ

Uric acid

81. Ⓒ

Anuria

82. Ⓐ

Two cerebral hemispheres

83. Ⓐ

2,4-D

84. Ⓑ

Both A and R are true but R is not the correct explanation of A

85. Ⓒ

A is true, R is false

Diabetes is caused by deficiency of insulin

86. Ⓑ

Negatively geotropic and positively phototropic

87. Ⓓ

None

It is a nastic movement

88. Ⓒ

Chemotropism

89. Ⓒ

Thigmotropism

90. Ⓐ

Auxin

91. Ⓐ

Acidic

92. Ⓒ

Starch into maltose

93. Ⓐ

Pulmonary respiration

94. Ⓓ

Left ventricle

To generate sufficient force to pump blood into the aorta

95. Ⓒ

Xylem elements get stained showing ascent of sap through them

96. Ⓑ

Loop of Henle

97. Ⓐ

Urinary bladder is full

98. Ⓒ

Urea

99. Ⓑ

Both A and R are true but R is not the correct explanation of A

100. Ⓒ

Effector organ.