Monthly Progressive Test

Class: IX

Subject: PCMB

Solutions (Set-S)

Physics
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1. Ⓐ

   As $v = at$

2. Ⓒ

   $S(1/2)(a)(2t - 1) = (1/2)(2)(8 - 1) = 7$ m

3. Ⓒ

   $6 + (3/2)t^2 = ut$ Put $t = 2$ s $\Rightarrow u = 6$ m/s

4. Ⓐ

   Straight line with positive slope.

5. Ⓒ

   $S_n = (a/2)(2n - 1);\ S_{n+1} = (a/2)\{2(n + 1) - 1\} = (a/2)(2n + 1)$

6. Ⓑ

   $v - u = (1/2)(11) \times 10 = 55$ m/s as $u = 0$

7. Ⓑ

   at $t = 0$ s, $V = u$ (upward); at $t = T$ s, $V = 0$
   at $t = 2T$ s then $V = u$ (downward)

8. Ⓑ

   As $V = u - at$

9. Ⓐ

   As $V = at$

10. Ⓐ

Direction changes at every point on path.

11. Ⓓ

$H = u^2/2g = 100/20 = 5$ m

12. Ⓐ

As $F = ma$ ⇒ F is directly proportional to m when a is constant.

13. Ⓐ

A → true; R → true R is correct explanation of A.

14. Ⓑ

As $S\{(u + v)/2\} \times t$

15. Ⓑ

As to increase the velocity we require acceleration.

16. Ⓒ

As $[ML/T^2][L/M]$

17. Ⓑ

As 1 N = 10^5 dyne, 1 m = 100 cm

18. Ⓐ

As $[ML/T^2][T^2] = ML$

19. Ⓓ

Mole

20. Ⓐ

$[Power] = [ML/T^2] = [ML^2/T^2]$

21. Ⓑ

at $t = 0$, v is negative.

22. Ⓑ

As v is increasing and slope is positive.

23. Ⓒ

As $v = u + at$; $u = 0$ m/s; $a = 10$ m/s^2, $t = 2$ s

24. Ⓐ

(A) : $x = ut + \left(\dfrac{1}{2}\right)at^2$ $\Rightarrow$ $6t - \dfrac{1}{2}(2)t^2$ put $t = 6$ s $\therefore$ $x = 36 - 36 = 0$ m

25. Ⓐ

(A) : $V = 0$; $H = u^2/2g$

Chemistry

26. Ⓓ

Sodium chloride is highly soluble in water and forms a colourless solution. On the other hand, chalk powder, sand and starch are insoluble.

27. Ⓒ

Sulpher is highly soluble in carbon disulphide while iron is insoluble.

28. Ⓓ

White coloured ammonium chloride is solid and sublimes readily and hence its liquid state is not possible at room temperature. But it is highly soluble in water.

29. Ⓒ

On gentle heating, ammonium chloride sublimes and gets deposited at the cooler part of the funnel. But at that temperature, common salt cannot achieve either its boiling point or melting point and hence solid sodium chloride stays on the china dish.

30. Ⓓ

According to formula,

Density $(d) = \dfrac{\text{mass } (m)}{\text{volume } (V)}$

$\therefore$ Mass = (density) × (volume) = $(2 \times 76) = 152$ gm

31. Ⓑ

At this temperature, all the 50.0 gm of X will be dissolved

Solubility of X is 21 gm at 283 K and at 313 K, that is 62. So, on cooling from 313 K to 283 K, $(62 - 21) = 41$ gm crystallizes out which is more than 21 gm.

32. Ⓒ

When helium gas is released from a metal tank then its volume increases and pressure decreases. The average distance between the gas molecules increases as the gas molecules are moving far away from each other.

33. Ⓒ

When table salt is added to water then it mix with water properly and it is an example of homogeneous solution. In case of homogeneous solution all the components are in same physical state.

34. Ⓒ

When a mixture of sugar and benzoic acid is shaken in ether then sugar remains unchanged while benzoic acid dissolves in ether completely. Sugar is highly solubly in water.

35. Ⓓ

Tyndal effect is shown by colloidal solutions only and particles are very small in size.

36. Ⓑ

In case of chemical change or chemical reactions, chemical properties of the reactants change completely.

37. Ⓓ

Tyndal effect is shown by colloidal solutions only and these solutions are very stable and the colloidal particles do not settle down.

38. Ⓓ

The correct order of the particle size is : suspension > colloid > true solution.

39. Ⓐ

Filtration method is used to separate the particles of large size and the particles having size greater than 1000 A°, can not pass through the system that is used for filtration.

40. Ⓑ

On boiling, the liquid component vaporized but the solid component remains in the container with which the experiment is going on.

41. Ⓑ

Given formula is X_2O_5. So, the valency of the metal is 5 as valency of oxygen is 2. Now, valency of chlorine is 1. So, the formula of oxide is XCl_5.

42. Ⓒ

The chemical formula of potassium permanganate is $KMnO_4$.

43. Ⓑ

With the increase in surface area and temperature, rate of evaporation increases and with the increase in humidity, rate of evaporation decreases. But the material of the vessel is a factor on which rate of evaporation does not depend.

44. Ⓑ

The term sublimation is associated with the conversion of solid into vapours without touching the liquid state.

45. Ⓓ

When water is heated in a beaker then temperature increases regularly and after sometime temperature change becomes constant.

46. Ⓒ

Brownian movement is the impact of the interaction between the dispersed phase and dispersion medium

47. Ⓒ

5% water and 95% ethyl alcohol is a very stable mixture as their intermolecular force of attraction is high. Hence, they cannot be separated by fractional distillation.

48. Ⓑ

Fractional distillation is used to separate the components of two or more miscible fluids. The difference of boiling points of two fluids must be less than 25° C.

49. Ⓓ

Blood is a colloidal solution hence it shows scattering of light. Brine is the saturated solution of sodium chloride and it is true solution. When beam of light is passed through brine solution then scattering does not occur.

50. Ⓐ

Ink contains some components of very small amount and some components of very huge amount. So, chromatography is the best method to separate these components.

Mathematics

51. Ⓒ

$x = y$

$x - z = y - z$ ($\because$ Equal value can be subtracted from both sides of equals to remain the result same)

52. Ⓓ
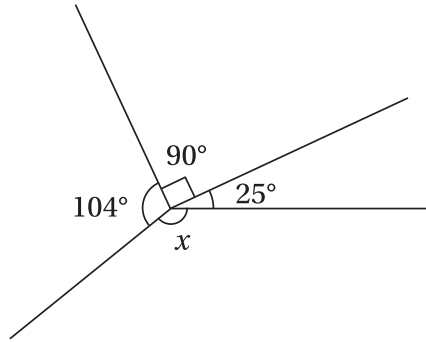
Let x be the angle its complement angle $= (90° - x)$

Its complement angle $= (90° - x)$

Its supplement angle $= (180° - x)$

ATQ, $(180° - x) = 3(90° - x)$ $\Rightarrow 180° - x = 270° - 3x$ $\Rightarrow -x + 3x = 270° - 180°$

$\Rightarrow 2x = 90°$ $\Rightarrow x = 45°$

53. Ⓐ

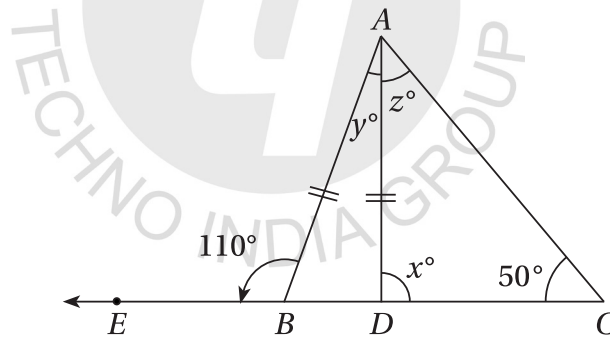ATQ, $104° + 90° + 25° + x = 360°$ $\Rightarrow 219° + x = 360°$ $\Rightarrow x = 141°$

54. Ⓑ

Let $\angle A + \angle B = 116°$ and $\angle A - \angle B = 24°$

$\therefore \angle A = \dfrac{116° + 24°}{2} = 70°$ $\quad \angle B = \dfrac{116° - 24°}{2} = 46°$ $\quad \therefore \angle C = 180° - (70° + 46°) = 180° - 116° = 64°$

55. Ⓓ

$\triangle ABD \cong \triangle ACD$ (S-S-S) $\quad \therefore \angle ACD = 35°$ $\quad \therefore \angle A = 110°$ $\quad \therefore \angle BAD = 55°$
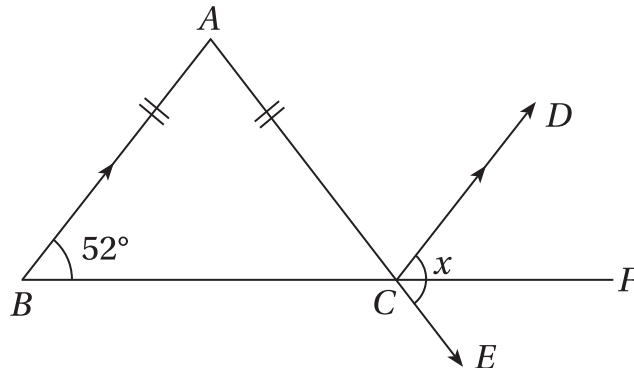
56. Ⓐ

$\because AB = AD$

$\angle ABD = \angle ADB \quad \Rightarrow 70 = 180 - x \quad \Rightarrow x = 180 - 70 = 110$

In $\triangle ADC$, $z + x + 50 = 180 \quad \Rightarrow z + 110 + 50 = 180 \quad \Rightarrow z + 160 = 180 \quad \boxed{z = 20}$

57. Ⓓ

$\angle DCF = \angle ABC = 52°$

$\angle ACB = \angle ABC = 52°$

$\therefore \angle ECF = 52°$ $\qquad \therefore x = 52° + 52° = 104°$

58. Ⓐ

$\angle ABC = \angle BCD = 66°$

$\Rightarrow AB \parallel CD$ ($\because$ Alternate angles) $\qquad$ … (1)

Again, $\quad \angle FEC + \angle ECD = 150° + 30° = 180°$
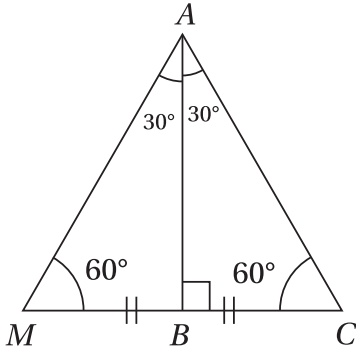
$\Rightarrow EF \parallel CD \qquad$ … (2)

($\because$ sum of co-interior angles in the same side of transversal is 180°)

From (1) and (2) : $AB \parallel EF$

59. Ⓑ
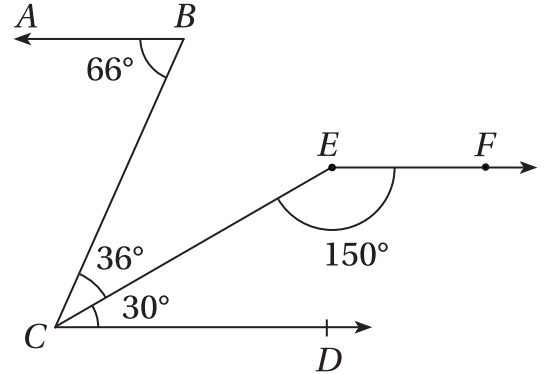
$\therefore \triangle ABC \cong \triangle ABM$ (S–A–S)

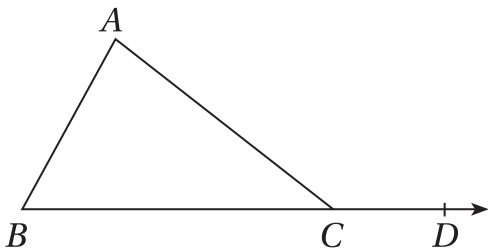$\therefore \triangle AMC$ is equilateral triangle.

$\therefore AC = MC = 2BC$

60. Ⓐ

$\angle DAP = 30° \qquad DA = AP \qquad \Rightarrow \angle ADP = \angle APD = 75°$

$\therefore \angle CDP = 15°, \qquad \angle PCD = 15°, \qquad \angle DPC = 150°$

61. Ⓑ

A : $\qquad\qquad\qquad\qquad\qquad\qquad \angle ACD = \angle A + \angle B \qquad$ True

R : The sum of angles of a triangle is 180°. True

$\qquad$ Here, (R) is not the correct explanation of (A).

62. Ⓐ

(A): $AB = AC$ (given)

$\Rightarrow \angle ABC = \angle ACB$ ... (1)

Again, $BD = CD$ (given)
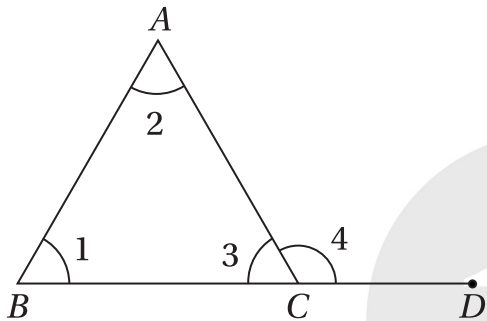
$\Rightarrow \angle DBC = \angle DCB$ ... (2)

$(1) - (2) : \angle ABC - \angle DBC = \angle ACB - \angle DCB$

$\Rightarrow \angle ABD = \angle ACD.$ True

(R) is the correct explanation of (A).

63. Ⓐ

$\angle 1 + \angle 2 + \angle 3 = 180° \qquad \Rightarrow \angle 1 + 3\angle 1 + 2\angle 1 = 180° \qquad \Rightarrow 6\angle 1 = 180°$

$\Rightarrow \angle 1 = \dfrac{180°}{6} = 30°$

64. Ⓒ

$\angle 3 = 2\angle 1 = 2 \times 30° = 60°$

65. Ⓓ

$\angle 2 = 3 \times 30° = 90°$

66. Ⓑ

$2^{2008} - 2^{2007} - 2^{2006} + 2^{2005} = k \times 2^{2005}$

Dividing both sides 2^{2005}

$\Rightarrow 2^3 - 2^2 - 2^1 + 2^0 = k \qquad \Rightarrow 8 - 4 - 2 + 1 = k \qquad \Rightarrow 3 = k$

67. Ⓐ

$\sqrt{x} + \dfrac{1}{\sqrt{x}} = 2 \quad \Rightarrow \left(\sqrt{x}\right)^2 + 1 = 2\sqrt{x} \quad \Rightarrow \left(\sqrt{x}\right)^2 - 2\sqrt{x} + 1^2 = 0 \quad \Rightarrow \left(\sqrt{x} - 1\right)^2 = 0 \quad \Rightarrow \boxed{x = 1}$

$x^8 + \dfrac{1}{x^8} = (1)^8 + \dfrac{1}{(1)^8} = 1 + 1 = 2$

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68. Ⓓ

$a + b + c = 0 \quad \Rightarrow a^3 + b^3 + c^3 = 3abc$

$\dfrac{a^2}{bc} + \dfrac{b^2}{ac} + \dfrac{c^2}{ab} = \dfrac{a^3 + b^3 + c^3}{abc} = \dfrac{3abc}{abc} = 3$

69. Ⓒ

$a = 2^{\frac{1}{3}} - 2^{-\frac{1}{3}}$

Cubing both sides,

$a^3 = \left(2^{\frac{1}{3}} - 2^{-\frac{1}{3}}\right)^3 = 2^1 - 2^{-1} - 3 \cdot 2^{\frac{1}{3}} \cdot 2^{-\frac{1}{3}}\left(2^{\frac{1}{3}} - 2^{\frac{1}{3}}\right) = 2 - \dfrac{1}{2} - 3 \cdot 2^{\circ}(a)$

$= 2 - \dfrac{1}{2} - 3a = \dfrac{4 - 1 - 6a}{2}$

$a^3 = \dfrac{3 - 6a}{2} \quad \Rightarrow 2a^3 = 3 - 6a \quad \Rightarrow 2a^3 + 6a - 3 = 0$

70. Ⓐ

$\dfrac{4}{x} + 5y = 7 \qquad\qquad \text{(i)} \times 3$

$\dfrac{3}{x} + 4y = 5 \qquad\qquad \text{(ii)} \times 4$

$\dfrac{12}{x} + 15y = 21$

$\dfrac{12}{x} + 16y = 20$

$\underline{(-) \quad (-) \quad\; (-)}$

Sub, $-y = +1$

$\boxed{y = -1}$

From (i); $\dfrac{4}{x} + 5(-1) = 7 \qquad \Rightarrow \dfrac{4}{x} = 12 \qquad \Rightarrow 3x = 1 \qquad \boxed{\therefore x = \dfrac{1}{3}}$
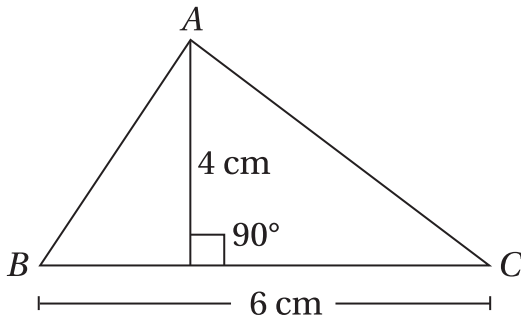
71. Ⓐ

Triangle $ABC \cong$ Triangle PQR (by SSS)
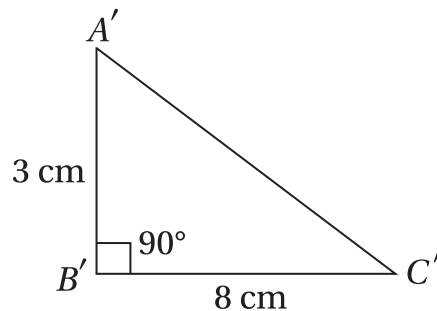
72. Ⓑ

60° by CPCT.

73. Ⓒ

$6^2 + 8^2 = 10^2$ (Pythagorean triplet)

74. Ⓓ

(A) : not true

$$\text{ar}\,(ABC) = \frac{1}{2} \times 6 \times 4 \text{ cm}^2 = 12 \text{ cm}^2$$

$$\text{ar}\,(A'B'C') = \frac{1}{2} \times 8 \times 3 \text{ cm}^2 = 12 \text{ cm}^2$$

(R) : Reason is true

75. Ⓑ

(A) : True by CPCT

(R) : True

(R) is not the correct explanation of (A).

Biology

76. Ⓑ

Collenchyma

77. Ⓐ

Presence of chloroplasts

78. Ⓓ

Growth of plants

Meristematic tissue consists of cells which are in a constant state of division.

79. Ⓐ

Parenchyma

80. Ⓑ

Differentiation

81. Ⓒ

Dead permanent simple tissue

82. Ⓑ

Phellogen

83. Ⓓ

In a constant state of division

84. Ⓓ

Vascular bundles

85. Ⓓ

No meristematic tissue occur at the internodes

86. Ⓐ

Cellulose

87. Ⓓ

Increasing the girth of stem

88. Ⓒ

A is true but R is false

89. Ⓑ

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

90. Ⓐ

Both A and R are true and R is the correct explanation of A
Pectin provides flexibility

91. Ⓐ

Nuclear membrane
The chromatin lies naked in the cytoplasm

92. Ⓐ

Nucleus

93. Ⓒ

Ribosome

94. Ⓐ

Endoplasmic reticulum
ER provides a system of transport channels in the cell

95. Ⓐ

One

96. Ⓓ

A is false, R is true

Lateral meristem appears on the sides of the stem

97. Ⓐ

Both A and R are true and R is the correct explanation of A

Tracheids, vessels and fibres are dead. Only parenchyma is the living component.

98. Ⓒ

A is true, R is false

99. Ⓐ

Parenchyma

100. Ⓑ

Collenchyma