



Monthly Progressive Test (Solution)



Class: X

Subject: PCMB

Test Booklet No.: MPT09

Test Date:

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Physics

1. ©

It is called pole.

2. ©

At focus as v is infinite.

3. Ⓐ

rear view mirror.

4. Ⓑ

$$2 = \frac{v}{u}$$

$$v = 2u = 2 \times 12 = 24 \text{ cm}$$

$$v - u = 12 \text{ cm.}$$

5. Ⓓ

virtual image, $m < 1$, erect image

6. ©

$$1. \sin 45^\circ = \mu \times \sin 30^\circ$$

$$\mu = \frac{2}{\sqrt{2}} = \sqrt{2} = 1.414$$

7. Ⓐ

$$\frac{3}{2} \sin i_c = \frac{4}{3} \sin 90^\circ$$

$$\sin i_c = \frac{8}{9}$$

8. ©

$$2f = 40 \text{ cm}$$

$$\therefore f = 20 \text{ cm}$$

$$P = \frac{100}{f} = \frac{100}{20} = +5D$$

9. Ⓐ

$$\frac{1}{v} - \frac{1}{-20} = -\frac{1}{20}$$

$$\frac{1}{v} + \frac{1}{20} = -\frac{1}{20}$$

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

$$v = -10 \text{ cm}$$

Separation is $u - v$
 $= 20 - 10 = 10 \text{ cm}$

10. B

$$P = \frac{100}{20} - \frac{100}{10}$$

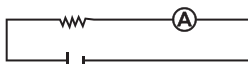
$$= 5 - 10 = -5 \text{ D}$$

11. B



Plug key ON

12. B



13. C

$v = iR$ if v is constant
 then $iR = \text{constant}$

$$\therefore i \propto \frac{1}{R}$$

14. A

resistivity increases with rise in temperature.

15. B

$$i = \frac{10}{10+20} \times 6 = 2 \text{ A}$$

16. C

$$\text{heater : } 1000 = \frac{v^2}{R}$$

$$\text{bulb : } 100 = \frac{v^2}{R'}$$

$$1000 R = 100 \times R'$$

$$\therefore R' = 10R$$

$$R' > R.$$

17. A

MRI is one diagnostic technique.

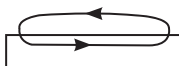
18. C

one face is North pole and another face is South Pole.

19. A

Where field lines are dense.

20. C



21. A

The needle of compass will get deflected.

22. Ⓑ

magnetic field lines are closed curve.

23. Ⓑ

Both assertion and reason are right but reason is not the correct explanation of assertion.

24. Ⓐ

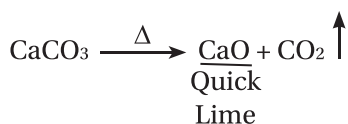
 $B_{\text{total}} = n \text{ (no. of coils)} \times B_{\text{single coil}}$.

25. Ⓒ

Strength of magnet field remains same but polarity will be opposite.

Chemistry

26. Ⓐ



27. Ⓐ



28. Ⓒ



This is a displacement reaction as well as redox reaction also.

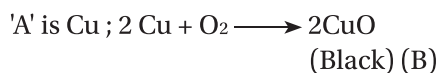
29. Ⓓ

Rancidity can be prevented by all of these : Adding antioxidants, storing food away from light keeping food in refrigerator.

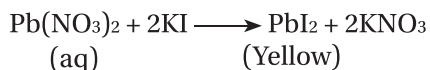
30. Ⓒ

(a) - (ii), (b) - (i), (c) - (iv), (d) - (v), (e) - (iii)

31. Ⓑ



32. Ⓒ



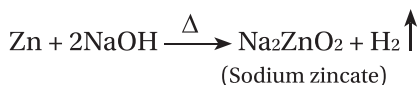
33. Ⓒ

 Na_2KPO_4 is mixed salt

34. Ⓒ

Solution with $\text{pH} = 2$, will have maximum concentration of H^+ ions.

35. Ⓓ



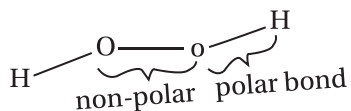
36. Ⓓ

Decreasing reactivity of metal with dilute mineral acid :

 $\text{Na} > \text{Mg} > \text{Zn} > \text{Fe} > \text{Cu}$

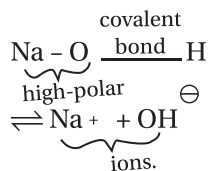
Decreasing reactivity

37. ©

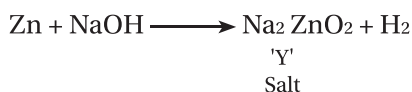
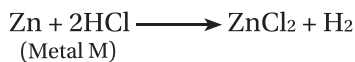
H₂O₂ contains both polar and non-polar bond

38. Ⓑ

NaOH contains both ionic and covalent bonds :



39. Ⓓ



40. ©

No change is observed in the solution (i), (iii), and (iv).

41. Ⓐ

Both assertion and reason are correct and reason is the correct explanation of Assertion.

42. Ⓐ

Both assertion and reason are correct and reason is the correct explanation of Assertion.

43. Ⓐ

Both assertion and reason are correct and reason is the correct explanation of Assertion.

44. Ⓐ

Both assertion and reason are correct and reason is the correct explanation of Assertion.

45. Ⓐ

Both assertion and reason are correct and reason is the correct explanation of Assertion.

46. Ⓑ

Steel contain non-metal carbon (C)

47. Ⓑ

Metal releases 2 electrons and non-metal accepts 2 electrons.

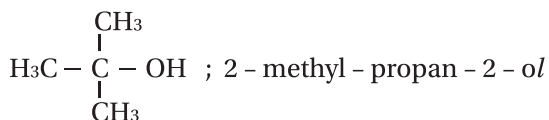
48. Ⓑ

$$X + Y = 8 + 6 = 14 ;$$

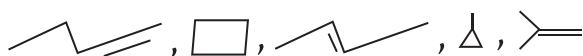
$$X = \text{total no. of electrons in the outermost shell of } \text{N}^{3-} = 5 + 3 = 8$$

$$Y = \text{Total valence electron of } \text{O}_2 = 6.$$

49. ©



50. Ⓓ

Total number of structural isomers of C₄H₈ is 5.

Mathematics

51. (A)

$$\frac{S_n}{S'_n} = \frac{\frac{n}{2}\{2a+(n-1)d\}}{\frac{n}{2}\{2a'+(n-1)d'\}} = \frac{a + \frac{(n-1)d}{2}}{a' + \frac{(n-1)d'}{2}} = \frac{7n+1}{4n+27}$$

$$\text{Put } \frac{n-1}{2} = 10 \Rightarrow n = 21$$

$$\frac{t_n}{t'_n} = \frac{7 \times 21 + 1}{4 \times 21 + 27} = \frac{148}{111} = \frac{4}{3}$$

52. (A)

A number multiple of 15 means it is always multiple of 3. Now multiple of 15 are 15, 30,, 120 \Rightarrow total 8 numbers

$$\therefore P = \frac{8}{120} = \frac{1}{15}$$

53. (D)

Let $A = (1, -2)$, $B = (3, 4)$, $C = (4, 7)$

$$AB = \sqrt{4+36} = \sqrt{40} = 2\sqrt{10}$$

$$BC = \sqrt{1+9} = \sqrt{10}$$

$$CA = \sqrt{9+81} = \sqrt{90} = 3\sqrt{10}$$

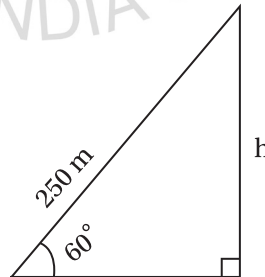
$AB + BC = AC \Rightarrow$ Collinear points \Rightarrow St. line.

(B) is also true. (C) $\sqrt{3^2+4^2} = \sqrt{5^2} = 5$ true.

54. (A)

$$\frac{h}{250} = \sin 60^\circ = \frac{\sqrt{3}}{2}$$

$$\Rightarrow h = 125\sqrt{3} = 216.5$$



55. (B)

$$\text{Mid point of AC} = \left(\frac{-5+4}{2}, \frac{5-3}{2} \right) = \left(-\frac{1}{2}, 1 \right)$$

$$AB = \sqrt{(-5-1)^2 + (5+3)^2} = \sqrt{36+64} = 10$$

56. (D)

Put $k = \frac{9}{8}, -1, 2$ we will get discriminant is zero in each case but at $k = -3, D \neq 0$.

At $k = -3, -2x^2 + 4x + 1 = 0$

$$(4)^2 - 4 \cdot (-2) \cdot (1)$$

$$= 16 + 8 = 24 > 0.$$

57. A

Multiple of 15 are 15, 30, 120 \Rightarrow total 8 numbers.
 Multiple of 3 are 3, 6, 9, 12, 15, 18, , 120 = total 40.
 As all the multiple of 15 are present in all the multiple of 3.

$$P(3 \text{ or } 15) = \frac{40}{120} = \frac{1}{3}$$

58. C

$$\begin{aligned} h_1 &= 4.1 & r_1 &= 2.1 \\ h_2 &= 4.3 & r_2 &= 2.1 \\ \frac{1}{3}\pi r_1^2 h_1 + \frac{1}{3}\pi r_2^2 h_2 &= \frac{4}{3}\pi r^3 \\ \Rightarrow \frac{1}{3}\pi (r_1^2 h_1 + r_2^2 h_2) &= \frac{4}{3}\pi r^3 \\ \Rightarrow (2.1)^2 (4.1 + 4.3) &= 4r^3 \\ \Rightarrow (2.1)^2 \times 8.4 &= 4r^3 \\ \Rightarrow (2.1)^3 = r^3 &\Rightarrow r = 2.1 \Rightarrow d = 4.2 \end{aligned}$$

59. D

$$\begin{aligned} \sqrt{3}x + \sqrt{2}y &= 2\sqrt{3} \dots\dots\dots(1) \times \sqrt{2} \\ \sqrt{2}x - \sqrt{3}y &= 2\sqrt{2} \dots\dots\dots(2) \times \sqrt{3} \end{aligned}$$

$$\begin{array}{r} \sqrt{6}x + 2y = 2\sqrt{6} \\ \sqrt{6}x - 3y = 2\sqrt{6} \\ (-) + (-) \\ \hline 5y = 0 \\ y = 0 \end{array}$$

From (1): $\sqrt{3}x = 2\sqrt{3} \Rightarrow x = 2$

60. B

$$\begin{aligned} t_3 &= a_1 + 2d \\ a_1 + a_1 + d &= 9 \\ \Rightarrow 2a_1 + d &= 9 \dots\dots\dots (1) \end{aligned}$$

$$\begin{aligned} \frac{8^A}{2} \{2a_1 + 7d\} &= 108 \cdot 27 \\ \Rightarrow 2a_1 + 7d &= 27 \\ 2a_1 + d &= 9 \\ (-) (-) (-) \\ \hline 6d &= 18 \\ d &= 3 \end{aligned}$$

$$\begin{aligned} 2a_1 + 3 &= 9 \Rightarrow 2a_1 = 6 \Rightarrow a_1 = 3 \\ t_1 &= a_1 + 2d \\ &= 3 + 2 \times 3 \\ &= 9 \end{aligned}$$

61. Ⓓ

$$\angle BOD = 116, \text{ reflex } \angle BOD = 360^\circ - 116 = 244$$

$$x = \text{ref. } \frac{\angle BOD}{2} = \frac{244}{2} = 122^\circ$$

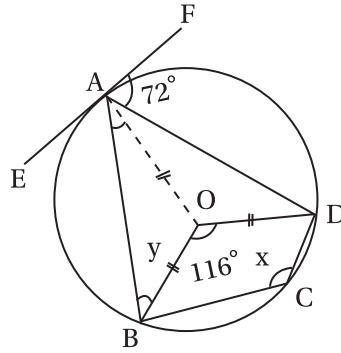
$$OA = OB = OD \Rightarrow \angle BAO = y$$

$$\angle OAF = 90^\circ \quad \therefore OA \perp EF$$

$$\angle OAD = 90^\circ - 72^\circ = 18^\circ = \angle ODA$$

$$\angle AOD = 180^\circ - (18^\circ + 18^\circ) = 144^\circ$$

$$\Rightarrow \angle BOA = 244^\circ - 144^\circ = 100^\circ \Rightarrow \angle OAB = \angle OBA = 40^\circ$$



62. Ⓓ

$$\frac{1}{2} \times (11 - 5) \times y_1 = 12 \Rightarrow y_1 = 4$$

$$\therefore y = y_1 + 7 = 4 + 7 = 11$$

63. Ⓑ

$$45^2 = 2025$$

$$\Rightarrow 45^2 - 1^2 = 2024$$

$$\Rightarrow (45 + 1)(45 - 1) = 2024$$

$$\Rightarrow \text{Sides} = 46, 44$$

$$\Rightarrow 46 \times 44 = 2024$$

$$\text{Perimeter} = 2(46 + 44) = 180.$$

64. Ⓐ

$$PM = \sqrt{(4x^2 + 1)^2 - (4x)^2} = \pm(4x^2 - 1)$$

$$\begin{aligned} \sec \theta + \tan \theta &= \frac{4x^2 + 1}{4x} + \frac{4x^2 - 1}{4x} \\ &= \frac{8x^2}{4x} = 2x \end{aligned}$$

$$\begin{aligned} \sec \theta - \tan \theta &= \frac{4x^2 + 1}{4x} - \frac{4x^2 - 1}{4x} \\ &= \frac{2}{4x} = \frac{1}{2x} \end{aligned}$$

$$\therefore \sec \theta + \tan \theta = 2x \text{ or } \frac{1}{2x}$$

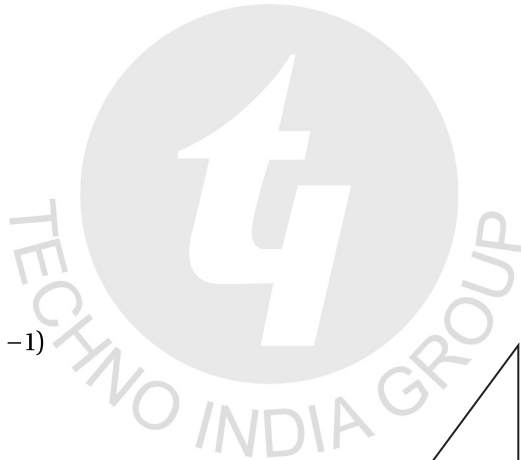
65. Ⓐ

$$\frac{\text{Smaller triangle}}{\text{Bigger triangle}} = \frac{9}{25}$$

$$\frac{\text{or } (\Delta PMS)}{\text{or (trape)}} = \frac{9}{25 - 9} = \frac{9}{16}$$

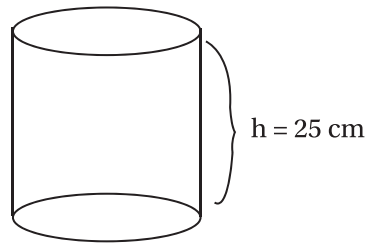
66. Ⓒ

$$\text{Mode} = 3 \text{ Median} - 2 \text{ Mean}$$



67. Ⓓ

$$\begin{aligned}
 \text{Volume} &= \pi r^2 h \\
 &= \frac{22}{7} \times 21 \times 21 \times 25 \text{ cm}^3 \\
 &= 34650 \text{ cm}^3 \\
 &= 34.650 \text{ l} .
 \end{aligned}$$



$$2 \pi r = 132$$

$$\Rightarrow r = 21$$

68. Ⓑ

$$\begin{aligned}
 &15 \times 20 \times 25 \times 30 \times 35 \\
 &= 3^2 \times 5 \times 2^2 \times 5 \times 5^2 \times 2 \times 3 \times 5 \times 5 \times 7 \\
 &= 2^3 \times 3^2 \times 5^6 \times 7
 \end{aligned}$$

We make 3 pairs of 2 & 5 which gives $2 \times 5 = 10$

\Rightarrow 3 zeroes at the end.

69. Ⓓ

$$4 \text{ seconds} \rightarrow 1.2 \times 4 \text{ m} = 4.8 \text{ m}$$

$$90 \text{ cm} = \frac{90}{100} = .9 \text{ m}$$

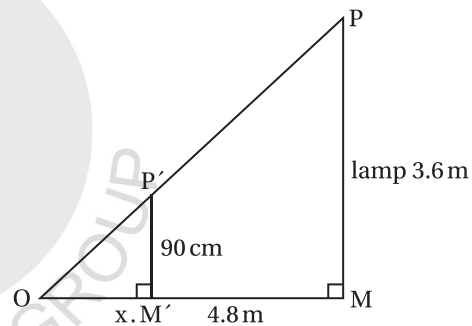
$\Delta POM \sim \Delta P'OM'$ (by AA)

$$\frac{PM}{P'M'} = \frac{OM}{OM'}$$

$$\Rightarrow \frac{3.6}{.9} = \frac{4.8 + x}{x}$$

$$4x = 4.8 + x$$

$$\Rightarrow 3x = 4.8 \Rightarrow x = 1.6 \text{ m}$$



70. Ⓐ

Median = 28.5

Median class = 20 - 30 \rightarrow 20

Class	f	cf
0 - 10	5	5
10 - 20	x	5 + x
20 - 30	20	25 + x
30 - 40	15	40 + x
40 - 50	y	40 + x + y
50 - 60	5	45 + x + y
	<u>60</u>	

$$5 + x + 20 + 15 + y + 5 = 45 + x + y = 60 \Rightarrow \boxed{x + y = 15}$$

$$\text{Median} = l + \frac{\frac{n}{2} - cf}{f} \times h$$

$$28.5 = 20 + \frac{30 - (5 + x)}{2} \times 10$$

$$\Rightarrow 8.5 = \frac{25 - x}{2}$$

$$\Rightarrow 17.0 = 25 - x$$

$$\Rightarrow x = 25 - 17 = 8 \Rightarrow y = 7.$$

71. ©

A true }
R false } \Rightarrow (c)

72. Ⓐ

A true }
R true and correct explanation } (A)

73. Ⓑ

$$RS = \sqrt{(6-0)^2 + (-2-2)^2} = \sqrt{36+6} = \sqrt{52} = 2\sqrt{13} = 7.21$$

74. Ⓓ

(1, 0), (-1, 0), (0, 0) lies on the right bisector of the line segment joining the points (0, 2) and (0, -2).

75. Ⓐ

$$\text{Area} = \frac{1}{2} \times 6 \times 4^2 = 12$$

Biology

76. Ⓓ

(iv) Vena cava - takes blood from body parts to right auricle

77. Ⓑ

2 and 3.
Mesophyll tissue

78. Ⓓ

The process of digestion completes in the small intestine.

79. Ⓐ

It requires energy.
Active transport.

80. Ⓑ

2.

81. ©

Alveoli are the sites of formation of oxyhaemoglobin.
Oxyhaemoglobin formation occurs in the blood capillaries surrounding the alveolus.

82. Ⓐ

They selectively filter toxic substances through their leaves.

83. Ⓐ
Filtration under high pressure.
84. Ⓓ
All of them.
85. Ⓓ
It has three floral whorls.
86. Ⓓ
Total number of chromosomes in any cell of a female, except the female gamete.
87. Ⓓ
3 tall : 1 dwarf.
88. Ⓒ
Pancreas.
Pancreas is mixed gland while others are endocrine glands.
89. Ⓑ
Grass, goat, human.
90. Ⓐ
Producers.
By the process of photosynthesis.
91. Ⓑ
Both A and R are true but R is not the correct explanation of A.
92. Ⓓ
A is false but R is true.
93. Ⓒ
A is true but R is false.
94. Ⓑ
Both A and R are true and R is the correct explanation of A.
95. Ⓓ
All of the above
96. Ⓒ
A is true but R is false.
Movement of pollen tube is chemotropism and movement of Part Y is phototropism
97. Ⓐ
Unequal distribution of auxin in the illuminated and shady parts of the stem.
98. Ⓓ
None of these combinations will be produced in the gametes
99. Ⓐ
900.
As per 9:3:3:1 ratio
100. Ⓑ
Round and yellow seeds.
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