Monthly Progressive Test

Class: IX (G)

Subject: PCMB

Test Booklet No.: MPT07	Test Date: 22112024
Time: 120 mins	Full Marks: 200

Solutions

Physics

1. Ⓑ

We know, $F = \frac{GMm}{d^2}$

Therefore $F = \frac{Guv}{x^2}$

2. Ⓐ

$$F_{initial} = \frac{GMm}{d^2} \qquad F_{new} = G \cdot \frac{\left(\frac{M}{2}\right)\left(\frac{m}{2}\right)}{\frac{d^2}{4}} = \frac{GMm}{d^2} = F_{initial}$$

3. Ⓓ

As G is universal gravitational constant

4. Ⓓ

Mass and W = Mg (weight) remain constant.

5. Ⓑ

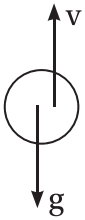
$W\,(moon) = \frac{Mg}{6} = 600 \times \frac{1}{6} = 100\,N.$

6. Ⓓ

$mgh = m\frac{g}{6} \times x$

$\therefore \quad x = 6h = 6m.$

7. Ⓑ

As 

8. Ⓒ

As $F \alpha m_1 \cdot m_2$

9. Ⓑ

Radius of Earth = 6400 km.

10. Ⓓ

11. Ⓑ

As $h = \frac{1}{2} gt^2$ is independent of mass.

12. Ⓑ

law of gravitation.

13. Ⓒ

$F \propto \frac{1}{d^2}$

14. Ⓒ

For point mass.

15. Ⓐ

Centripetal force is required of change the direction only.

16. Ⓒ

At highest point of motion, the particle as at instantaneous rest.

17. Ⓐ

Here slope represents the velocity which is constant in this case

18. Ⓐ

Acceleration is caused by the pull of earth on the object.

19. Ⓑ

$g = 9.8 \text{ m/s}^2$

[as acceleration acts towards the centre of earth]

20. ©

as $F = \frac{GMm}{d^2}$ which is independent of the medium.

21. Ⓐ

It will remain same

22. ©

F + 2F = 3F

23. Ⓓ

Circumcenter, in-center, centroid they coincide.

24. Ⓐ

25. Ⓑ

Sun-Earth System: Attraction of sun on Earth.

Earth-Moon System: Attraction of Earth on Moon.

Chemistry

26. Ⓑ

According to Bohr's model electron absorb energy when jump into higher energy level.

27. ©

$^{40}Ca_{20}$ and $^{40}Ar_{18}$ are isobars.

28. Ⓓ

Number of valence electron in F^- is 10.

Since, $^{19}F_9$ has Atomic number = 9 = Total e's & it has 1 –ve sign.

29. Ⓓ

Isotope of Iodine is used in the treatment of goitre.

30. ©

Atomic numbers is the number of protons present inside the nucleus of an atom.

31. Ⓓ

Isotopes are the atoms of same element (same atomic number) but different mass numbers. Thus, Ⓓ are correct.

32. Ⓐ

$^{40}Ca^{2+}_{20}$ proton (P) = 20 = Atomic number,

Neutron (N) = Mass number – proton = 40 – 20 = 20

33. Ⓒ

According to Bohr's theory the shape of orbit is circular.

34. Ⓑ

After releasing 3 electrons aluminium achieves the electronic configuration of Neon.

$Al_{13} - 3e^- \rightarrow Al_{13}^{3+}$ ($^{20}Ne_{10}$ gas configuration).

35. Ⓑ

Assertion : Atom is electrically neutral. This is correct.

Reason : Mass of electron is lower than the mass of proton. This is also correct.

But the reason is not the correct explanation of Assertion. Thus the answer is B.

36. Ⓐ

Assertion (A) : In case of gold foil experiment by Sir Rutherford, α-particle was selected. This is correct.

Reason (R) : Is also correct & it is the correct explanation of Assertion. Thus the answer is A.

37. Ⓐ

Assertion (A) : Valency of argon is zero. This is correct.

Reason (R) : The outer most shell of argon is fulfilled. This is also correct and the correct explanation of 'A'.

38. Ⓓ

Assertion : $^{39}K_{19}$ and $^{40}C_{20}$ are isobars. This is wrong.

Reason (R) : $^{19}K_{39}$ and $^{20}Ca_{40}$ have same number of neutrons. This is correct. Thus, the answer is Ⓓ.

39. Ⓑ

In case of gold foil experiment, the source of α-particle is a radioactive element.

40. Ⓐ

Maximum valency of sodium is 1.

41. Ⓐ

The molecular formula of oxygen molecule is O_2. Hence the molecular mass = (16×2) = 32 amu.

42. Ⓓ

Chalk powder is insoluble in water and hence it settles down as it is heavier component in the system.

43. Ⓐ

Assertion : Atomic mass of Mg is 24 — Correct.

Reason : An atom of magnesium is 24 times heavier than of the man of carbon atom (C–12)—Correct. Reason is the correct explanation of Assertion. Thus, the option 'A' is correct.

44. Ⓑ

Chemical properties of Nitrogen and Oxygen are different. This is true. Both Nitrogen and Oxygen are gases. This is also true. But, Nitrogen and Oxygen are different elements. So, Assertion and Reason both are correct but Reason is not the correct explanation of Assertion.

45. Ⓓ

Atomicity of sulphuric acid (H_2SO_4) is 9. This is wrong. Actual atomicity 7. Atomicity is defined as the total number of atoms present in the molecule. This is correct. So, assertion is wrong reason is correct.

46. Ⓐ

Since, electronic configuration of trinegative ion is 2,8,8; the electronic configuration of the neutral atom is 2,8,5 and its atomic number is 15.

47. Ⓐ

$^{35}Cl_{17}$ and $^{37}Cl_{17}$ are isotopes to each other.

48. Ⓐ

All the isotopes of an element have identical chemical properties.

49. Ⓐ

Here both assertion (A) and reason (R) are correct and Reason is the correct explanation of Assertion. Than the answer is A.

50. Ⓑ

Isoelectronic means same no. of electron. $^{20}Ne_{10}$ has no. of electrons 10 as the atomic no. = no. of proton = no. of electron = 10

O^{2-} has 10e's as, atomic no. of 'O' = 8 and it has 2e's extra.

F^+ has 8 electrons as at no. of F is 9 & 1 +ve

Mg has total 12 electron(s)

Na has total 11 electron

Mathematics

51. Ⓑ

$$S = \frac{13+14+15}{2}\,\text{m} = \frac{42}{2}\,\text{m} = 21\,\text{m}$$

$\therefore$ Area of one side of the board

$= \sqrt{21(21-13)(21-14)(21-15)}\ \text{m}^2 = \sqrt{21\times 8\times 7\times 6}\ \text{m}^2$

$= \sqrt{7\times 3\times 4\times 2\times 7\times 3\times 2}\ \text{m}^2 = 7\times 3\times 2\times 2\ \text{m}^2 = 84\ \text{m}^2$

Cost of painting $= ₹\ 8\frac{3}{4}\times 84 = ₹\ \frac{35}{4}\times 84 = ₹\ 735$

52. Ⓐ

Area of an equilateral triangle $= \frac{\sqrt{3}}{4}a^2$

$\therefore \frac{\sqrt{3}}{4}a^2 = 4\sqrt{3} \quad \Rightarrow a^2 = 16 \quad \Rightarrow a = 4$

$\therefore$ length of each side = 4 cm

53. Ⓓ

Volume of cone $= \frac{1}{3}\pi r^2 h = \frac{\pi}{3}(6)^2\times 12\ \text{cm}^3 = \frac{\pi}{3}\times 36\times 12\ \text{cm}^3 = 144\pi\ \text{cm}^3$

54. Ⓐ

Volume of sphere = 38808 cm^3

$\therefore \frac{4}{3}\pi r^3 = 38808 \quad \Rightarrow r^3 = \frac{38808\times 3\times 7}{4\times 22} \quad \Rightarrow r^3 = (21)^3 \quad \Rightarrow r = 21$

$\therefore$ Surface area of sphere $= 4\pi r^2 = 4\times\frac{22}{7}\times 21\times 21\ \text{cm}^2 = 5544\ \text{cm}^2$

55. Ⓑ

$\frac{4}{3}\pi r_1^3 : \frac{4}{3}\pi r_2^3 = 1:8 \quad \Rightarrow \frac{r_1}{r_2} = \frac{1}{2}$

$\therefore$ Ratio of their surface areas $= 4\pi r_1^2 : 4\pi r_2^2 = \left(\frac{r_1}{r_2}\right)^2 = \frac{1}{4} = 1:4$

56. Ⓒ

Frequency polygon is more preferable to identity patterns, trends and central tendencies in the data set.

57. Ⓓ

Here $f_0 = 0$ and $f_{n+1} = 0$

$\therefore f_0 + f_{n+1} = 0$

$f_0 - f_{n+1} = 0$

$f_0 \times f_{n+1} = 0$

58. ©

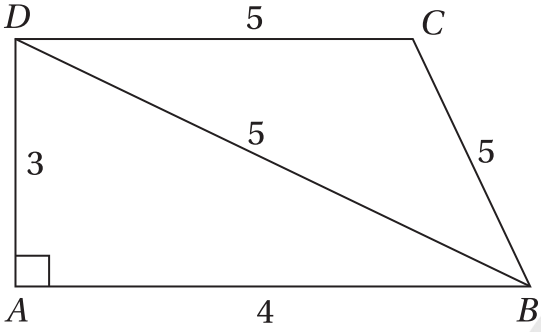
$S = \frac{13+14+15}{2}\text{ cm} = 21\text{ cm}$

$\therefore$ Area $= \sqrt{21\times8\times7\times6}\text{ cm}^2 = 84\text{ cm}^2$

$\therefore$ Assertion is true.

Reason is false

59. Ⓓ



Area of $\Delta ABD = \frac{1}{2}\times4\times3\text{ unit}^2 = 6\text{ unit}^2$

Area of $\Delta BCD = \frac{\sqrt{3}}{4}\times(5)^2\text{ unit}^2 = \frac{25\sqrt{3}}{4}\text{ unit}^2$

$\therefore$ Area of $\square ABCD = \left(6+\frac{25\sqrt{3}}{4}\right)\text{unit}^2 = \frac{1}{4}\left(24+25\sqrt{3}\right)\text{unit}^2$

$\therefore$ Assertion is false.

But reason is true

60. Ⓑ

Volume of sphere $= \frac{4}{3}\pi r^3$ cu.units

Volume of hemisphere $= \frac{2}{3}\pi r^3$ cu.units

$\therefore$ Ratio = 2 : 1

61. Ⓑ

Surface area of sphere = $4\pi r^2$ sq.units.

Curved surface area of sphere = $2\pi r^2$ sq.units.

$\therefore$ Ratio = 2 : 1

62. Ⓓ

Ratio of surface area of sphere to total surface area of hemisphere $= 4\pi r^2 : 3\pi r^2 = 4:3$

63. Ⓓ

Area of the triangle $= \sqrt{16\times6\times6\times4}\ \text{m}^2 = 48\ \text{m}^2$

$\therefore$ Area of rectangle = 48 m^2

$\therefore$ Length of rectangle $= \frac{48}{4}\ \text{m} = 12\ \text{m}$

$\therefore$ Perimeter of rectangle = 2(12 + 4) m = 32 m

64. Ⓓ

$$\text{Volume} = \frac{4}{3}\pi\times8r^3\ \text{cu.units} = \frac{32\pi r^3}{3}\ \text{cu.units}$$

65. Ⓓ

$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h\ \text{cu.units}$$

When radius and height are doubled, then

$$\text{Volume} = \frac{1}{3}\pi(2r)^2\times2h\ \text{cu.units} = \frac{\pi}{3}8r^2h\ \text{cu.units} = 8\left(\frac{\pi}{3}r^2h\right)\text{cu.units}$$

$= 8$ times of original volume

66. Ⓒ

$AB = CD$

$\Rightarrow \angle AOB = \angle COD = 70°$

$OD = OC$

$\Rightarrow \angle ODC = \angle OCD = x$

$\therefore\ x + x + 70° = 180° \quad \Rightarrow\ 2x = 110° \quad \Rightarrow\ x = 55°$

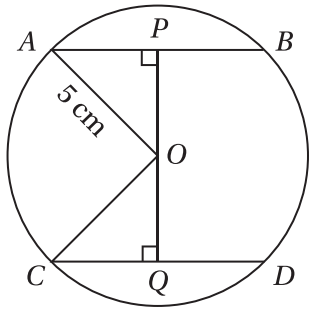
67. Ⓒ

$AP = 3$ cm $\quad AO = 5$ cm

$\therefore\ OP = 4$ cm

$CQ = 4$ cm $\quad CO = 5$ cm

$\therefore\ OQ = 3$ cm $\quad \therefore\ PQ = 7$ cm



68. Ⓐ

If all the altitudes from vertices to the opposite sides of a triangle are equal, then the triangle is equilateral.

69. Ⓓ

$2x + 3y = 6$

For $x = 0$, $y = 2$

For $y = 0$, $x = 3$

$\therefore$ The line IV is the graph of the given equation.

70. Ⓐ

Side of the square = 5 units.

Co-ordinates of S are (–3, 3)

71. Ⓐ

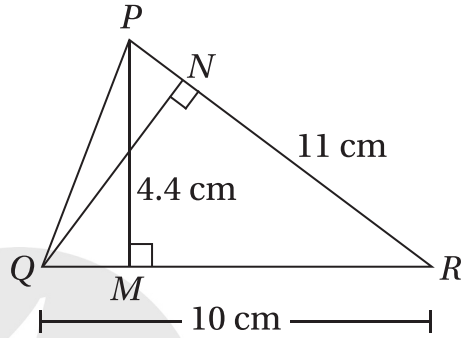
Let $QN = x$ cm

$\text{ar}\,(\Delta PQR) = \frac{1}{2} \times 10 \times 4.4 \text{ cm}^2$

$\text{ar}\,(\Delta PQR) = \frac{1}{2} \times 11 \times x \text{ cm}^2$

$\therefore\ 11x = 44 \qquad x = 4$

$\therefore\ QN = 4$ cm



72. Ⓓ

area of square = a^2 sq.units

area of equilateral triangle $= \frac{\sqrt{3}}{4}a^2$ sq.units

$\therefore$ Ratio $= a^2 : \frac{\sqrt{3}}{4}a^2 = 4 : \sqrt{3}$

73. Ⓐ

Lateral surface area of cone

$= \pi rl \quad \left[l = \sqrt{4^2 + 3^2} \text{ cm} = 5 \text{ cm} \right]$

$= \frac{22}{7} \times 4 \times 5 \text{ cm}^2 = \frac{440}{7} \text{ cm}^2 = 62\frac{6}{7} \text{ cm}^2$

74. Ⓐ

Volume of three solids $= \frac{4}{3}\pi\left(3^3 + 4^3 + 5^3\right) \text{ cm}^3$

$= \frac{4}{3}\pi(27 + 64 + 125) \text{ cm}^3 = \frac{4}{3}\pi \times 216 \text{ cm}^3$

$\therefore \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \times 216 \qquad \Rightarrow r^3 = 216 \quad \Rightarrow r = 6$

$\therefore$ radius = 6 cm

75. Ⓑ

A frequency polygon can be drawn with the help of a histogram.

Biology

76. Ⓐ

All

All are non living factors affecting crop production.

77. Ⓐ

Soil

13 out of 16 nutrients come from soil.

78. Ⓓ

Both Ⓑ & Ⓒ

B is cow and C is buffalo. Females of both animals are used for milk production.

79. Ⓐ

Honey

Bee keeping is done mainly for the commercial production of honey.

80. Ⓒ

Soyabean

81. Ⓒ

Layers

82. Ⓑ

Non competing

There should not be any competition for food among the fishes, so that food available at all levels of the pond is utilised.

83. Ⓑ

Chemical fertilisers

These are not naturally made or organic in nature

84. Ⓒ

Intercropping

85. Ⓑ

Both A and R are true but R is not the correct explanation of A.
Both are harmful effects of weeds. Hence R does not explain A.

86. Ⓐ

Both A and R are true and R is the correct explanation of A.
Its a part of cattle management in farms, for getting maximum benefit.

87. Ⓐ

Broilers

88. Ⓒ

White Leghorn
Breed of Italy

89. Ⓑ

Foreign breed successfully acclimatized in India.
Brought either for cross breeding with the native varieties or for higher yield of a product.

90. Ⓓ

All

91. Ⓐ

Ribosome
The ribosomes studded on the surface gives the ER a rough look.

92. Ⓑ

Centrosome
Helps in formation of spindle fibres.

93. Ⓐ

One

94. Ⓑ

Purkinje

95. Ⓓ

Companion cells
Its a component of phloem

96. Ⓓ

A is false but R is true

Apiculture is the process of rearing honey bees for honey production.

97. ©

A is true but R is false

Different types of fishes are used which feed from various levels of the pond, ensuring optimum utilisation of food and avoiding competition between them.

98. Ⓑ

On the same field in a pre planned succession

The crops chosen have different water and nutritional requirements, allowing the soil nutrients to replenish themselves by natural processes.

99. ©

Legumes increase the nitrogen content of soil

Legumes have nitrogen fixing bacteria in their root nodules, which increase the nitrogen content of soil.

100. Ⓐ

All of these