Monthly Progressive Test (Solution)

Class: X

Subject: PCMB

Academic Excellence Programme TECHNO ACE

Test Booklet No.: MPT08 **Test Date:** 2 0 1 2 2 0 2 4

Physics

1. Ⓐ

$1\,D = \dfrac{1}{f(m)} \Rightarrow f = 1\text{ m}$

2. Ⓑ

$p = \dfrac{1}{2} = 0.5\,D\,(-)$

3. Ⓓ

We cannot make lens by clay.

4. Ⓓ

Plane mirror : erect and same size

Convex mirror : erect but diminished

5. Ⓒ

We know, $f = \dfrac{R}{2} = \dfrac{32}{2} = 16\text{ cm}$

6. Ⓐ

$r \cdot i \text{ of glass} = \dfrac{3}{2} = \dfrac{3\times10^8\text{ m/s}}{x\times10^8\text{ m/s}},\ 2\times10^8\text{ m/s} = \text{Speed of light in glass}$

7. Ⓑ

Concave mirror when object is in between pole and focus.

8. Ⓒ

Light travels fastest in water as 1.33 < 1.44 < 1.47

9. Ⓓ

On retina of human eye

10. Ⓐ

$-5 = \dfrac{100}{f} \Rightarrow f = -20\text{ cm}$

11. Ⓑ

$1.5 = \dfrac{100}{f} \Rightarrow f = \dfrac{200}{3} = +66.7\text{ cm}$

12. Ⓒ

$P = (-)\frac{100}{100} = -1\ D$

13. Ⓓ

This is called accommodation.

14. Ⓐ

Standard is 25 cm

15. Ⓒ

$6 - 4 = 2 = \frac{100}{f} \Rightarrow f = 50$ cm

16. Ⓐ

$P = Vi = 220 \times 5 = 1100$ Watt.

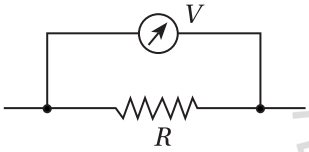
17. Ⓒ

$H = W = QV = 10 \times 50 = 500$ J (heat).

18. Ⓓ

Power = $i^2R = vi = v^2/R$

19. Ⓐ



20. Ⓓ

An ideal ammeter has zero resistance.

21. Ⓑ

Assertion and Reason are both true but reason is not correct explanation of assertion.

22. Ⓒ

As $F = Bil$ (for assertion part)

Direction can be determined by Fleming's left hand rule.

23. Ⓒ

If we cut a magnet, each piece behaves as magnet.

24. Ⓐ

$B \propto i$

25. Ⓐ

As soft iron is magnetic material.

Chemistry

26. Ⓓ

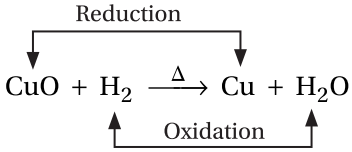
The incomplete breakdown of sugar into ethanol and carbondioxide with release of energy is called alcoholic fermentation. The final products of alcoholic fermentation are two molecules each of ethanol, carbondioxide and ATP respectively.

27. Ⓐ

Bleaching powder is used as an oxidising agent in many chemical industries because when reacts with acid or water releases chlorine gas which is a strong oxidising.

$$Ca(OCl)Cl + H_2O \longrightarrow Ca(OH)_2 + Cl_2 \uparrow$$

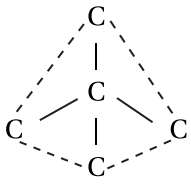
28. Ⓓ



CuO is getting reduced to metallic Cu by loosing its oxygen.

29. Ⓑ

The number of carbon atoms surrounding each carbon atom in diamond are 4.

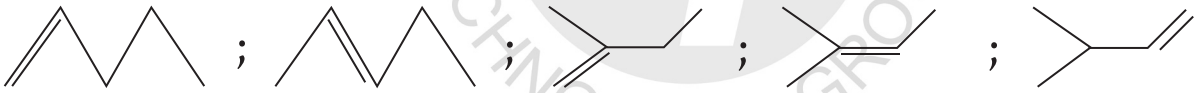


30. Ⓓ

The major constituent of the liquified petroleum gas is butane.

31. Ⓒ

The number of non-cyclic structural isomers of C_5H_{10} is 5.



32. Ⓓ

The reagents used to distinguish between ethylene and acetylene are ammonical cuprous chloride and Tollen's reagent ($NH_4OH + AgNO_3$). Acetylene gives red ppt and white ppt respectively but ethylene does not give any colour.

33. Ⓒ

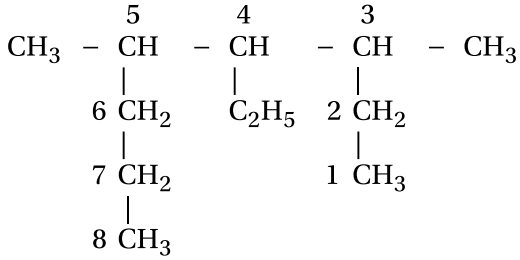
Buckmisterfullerene contain C_{60}.

34. Ⓒ

$$C_2H_2Br_4 \ ; \ CH \equiv CH + 2H_2 \longrightarrow \underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{|}} \ (\text{ethane})$$

$$CH \equiv CH + 2Br_2 \longrightarrow \begin{array}{l} H - \overset{\displaystyle Br}{\overset{|}{C}} - Br \\ H - \underset{\displaystyle Br}{\overset{|}{C}} - Br \end{array}$$

35. Ⓑ



(4–ethyl–3, 5–dimethyl–octane)

36. Ⓓ

C_4H_8, C_5H_{10}

Homologous series differ by $-CH_2$ group

37. Ⓒ

(5–methyl–3–heptyne)

38. Ⓑ

The hydrocarbon used for welding purpose is ethyne (C_2H_2).

39. Ⓒ

The source of fuel in thermal power plant is coal.

40. Ⓑ

Burning of fossil fuels causes global warming due to production of carbondioxide.

41. Ⓒ

Assertion is true but reason is false. Detergents are better cleansing agents than soaps as they can work both in hard and soft water and does not forms insoluble ppts with Ca and Mg.

42. Ⓐ

Both assertion and reason are correct and reason is the correct explanation of assertion. Homologous series differ by $-CH_2$ group.

43. Ⓐ

Both assertion and reason are correct and reason is the correct explanation of assertion. Copper does not react with is hot water but steel (which contain Fe) reacts with hot water (steam).

44. Ⓑ

K > Zn > Fe > Cu

Decreasing order of reactivity of metal

45. Ⓑ

On prolonged exposure to air silver metal reacts with H_2S gas and form silver sulphide (Ag_2S) due to which it turn black and gets furnished.

46. Ⓒ

The chemical formula of Plaster of Paris is $CaSO_4.\frac{1}{2}H_2O$

47. Ⓑ

Baking soda ($NaHCO_3$)

Blue vitriol = $CuSO_4.5H_2O$

Washing soda = $Na_2CO_3.10H_2O$

Gypsum = $CaSO_4.2H_2O$

48. Ⓐ

Na_2CO_3.

$$Na_2CO_3 + H_2O \longrightarrow \underbrace{\underbrace{NaOH}_{\text{(Strong alkali)}} + \underbrace{H_2CO_3}_{\text{(Weak acid)}}}_{\text{Resultant alkaline}}$$

49. Ⓑ

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

$\therefore$ $nA = 4NO_2$

50. Ⓐ

(i) and (iii)

Structure (i) is n-butane

Structure (iii) is isobutane

Since, molecular formula is same only structure are different. So, (i) and (iii) are isomers, while structure (ii) and (iv) have molecular formula C_4H_8.

Mathematics

51. Ⓑ

$2x^2 + (k - 1)x + 10 = 0$

For $x = 5$

$50 + 5K - 5 + 10 = 0$

$\Rightarrow 5K = -55$

$\Rightarrow K = -11$

52. Ⓒ

$m = p^5 q^2$ and $n = p^3 q^4$

LCM $(m, n) = p^5 q^4$

53. Ⓒ

$x = 3a$, $y = 2b$ represent straight lines which are intersecting at $(3a, 2b)$

54. Ⓐ

$K - 7$, $2K - 2$ and $2K + 6$ are three consecutive terms of an A. P.

$\therefore$ $(2K - 2) - (K - 7) = (2K + 6) - (2K - 2)$

$\Rightarrow K + 5 = 8$

$\Rightarrow K = 3$

55. (B)

$\angle APB = 60^\circ = \angle APO = 30^\circ$

$\therefore \frac{OA}{PA} = \tan 30^\circ$

$\Rightarrow \frac{5\,cm}{PA} = \frac{1}{\sqrt{3}}$

$\Rightarrow PA = 5\sqrt{3}$ cm

56. (A)

Number of remaining cards = 40

Number of king cards = 4

$\therefore$ Required probability = $\frac{4}{40} = \frac{1}{10}$

57. (D)

Let co-ordinattes of Q are (x, y).

Co-ordinates of P are (–4, 6)

$\therefore (2, -4) = \left(\frac{x-4}{2}, \frac{y+6}{2}\right)$

$\Rightarrow 2 = \frac{x-4}{2}, \quad -4 = \frac{y+6}{2}$

$\Rightarrow x - 4 = 4, \quad y + 6 = -8$

$\Rightarrow x = 8, \quad y = -14$ $\quad\quad$ $\therefore$ Co-ordinates of Q are (8, –14)

58. (B)

$$\frac{1-\cos A}{\sin A} = \frac{(1-\cos A)(1+\cos A)}{\sin A\,(1+\cos A)}$$

$$= \frac{1-\cos^2 A}{\sin A\,(1+\cos A)}$$

$$= \frac{\sin^2 A}{\sin A(1+\cos A)} = \frac{\sin A}{1+\cos A}$$

59. (B)

Let height of the cylindrical part be h_1 units and height of the conical part be h_2 units.

$\therefore$ Volume of cylindrical part = $\pi\, r^2 h_1$ cu. units.

Volume of conical part = $\frac{1}{3}\pi r^2 h_2$ cu. units

$\therefore \cancel{\pi}\, \cancel{r^2} h_1 = \frac{1}{3}\cancel{\pi}\, \cancel{r^2} h_2$

$\frac{h_1}{h_2} = \frac{1}{3}$

$\therefore h_1 : h_2 = 1 : 3$

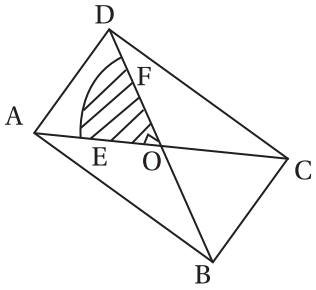
60. ©

8-th term from the end

$= 62 - 7(5)$

$= 62 - 35 = 27$

61. Ⓐ



Area of sector OEF

$= \frac{1}{4} \pi (6)^2 \text{ cm}^2$

$= 9 \pi \text{ cm}^2$

62. Ⓐ

$\Delta ABC \sim \Delta DEF$

$\therefore \quad \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$

$\Rightarrow \quad \frac{3}{4} = \frac{6 \text{ cm}}{EF}$

$\Rightarrow EF = \frac{^{2}\cancel{6} \times 4}{\cancel{3}} \text{ cm} = 8 \text{ cm}$

63. Ⓑ

$x^2 + 2x + 1 = 0$

$\Rightarrow (x + 1)^2 = 0$

$\Rightarrow x = -1, -1$

$\therefore$ The graph of $x^2 + 2x + 1$ will cut the x-axis at one point only.

64. Ⓓ

Modal class = 30 – 40

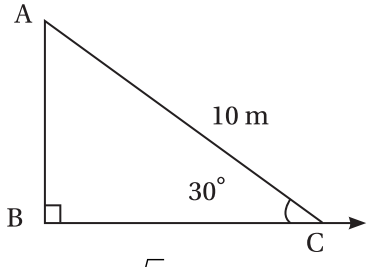
$\therefore$ lower limit = 30

Median class = 20 – 30

$\therefore$ lower limit = 20

$\therefore$ Sum of lower limits = 50.

65. Ⓓ



$\frac{BC}{AC} = \cos 30^\circ = \frac{\sqrt{3}}{2}$

TECHNO INDIA GROUP

$\Rightarrow$ BC = $\frac{\sqrt{3}}{2} \times 10$ m = $5\sqrt{3}$ m

66. ©

Let speed of boat in still water be x km/h and speed of current be y km/h.

$\therefore$ $x + y = 16$

$x - y = 8$

$2x = 24$

$x = 12$

$\therefore$ $y = 16 - 12 = 4$

$\therefore$ Speed of boat in still water = 12 km / h.

67. Ⓑ

The speed of stream is 4 km / hr.

68. Ⓑ

The average speed of steam and boat in still water = $\left(\frac{12+4}{2}\right)$ km /h = 8 km / h.

69. Ⓓ

L. C. M. = $\frac{3072}{16}$ = 192

But given L.C.M. = 162

$\therefore$ Assertion is wrong. But reason is true.

70. ©

$\sin\theta = \frac{1}{2} \Rightarrow \theta = 30^\circ$

$3\cos\theta - 4\cos^3\theta$

$3\cos 30^\circ - 4(\cos 30^\circ)^3$

$= 3 \times \frac{\sqrt{3}}{2} - 4x\left(\frac{\sqrt{3}}{2}\right)^3 = \frac{3\sqrt{3}}{2} - \frac{3\sqrt{3}}{2} = 0$

$\therefore$ Assertion is true

$\sin\theta = \frac{1}{2} = \theta = 30^\circ$ ($\therefore$ θ is acute) $\therefore$ Reason is flase.

71. ©

$3x - 5y = 7$

$-6x + 10y = 7$

$\therefore$ $\frac{3}{-6} = \frac{-5}{10} \neq \frac{7}{7}$

$\therefore$ The pair of equations have no solution.

72. Ⓓ

$2x^2 + kx + 3 = 0$

For, equal roots $k^2 - 4 \times 2 \times 3 = 0$

$\Rightarrow k^2 = 24$

$\Rightarrow k = \pm\sqrt{24}$

$= \pm 2\sqrt{6}$

73. Ⓓ

$\frac{AB}{DF} = \frac{BC}{FE} = \frac{CA}{ED}$

$\Rightarrow \Delta ABC \sim \Delta DFE$

74. ©

$\sin\theta + \sin^2\theta = 1$

$\Rightarrow \sin\theta = 1 - \sin^2\theta = \cos^2\theta$

$\Rightarrow \sin^2\theta = \cos^4\theta$

$\Rightarrow 1 - \cos^2\theta = \cos^4\theta$

$\Rightarrow \cos^2\theta + \cos^4\theta = 1$

75. Ⓓ

(–5, 1), (1, p) and (4, –2) are collinear if

$-5(p+2) + 1(-2-1) + 4(1-p) = 0$

$\Rightarrow -5p - 10 - 2 - 1 + 4 - 4p = 0$

$\Rightarrow -9p - 9 = 0$

$\Rightarrow 9p = -9$

$\Rightarrow p = -1$

Biology

76. Ⓐ

Divides into two equal daughter cells

77. Ⓐ

Vasectomy
Surgical method of contraception in males

78. ©

Purple

79. Ⓓ

Both A and B

80. ©

Smell

81. Ⓐ

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

82. Ⓐ

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

83. ©

A is true but R is false
Hypothalamus is a part of forebrain

84. ©

A is true but R is false
Triple fusion results in the formation of endosperm

85. Ⓑ

30 J

TECHNO INDIA GROUP

86. Ⓐ
10%

87. Ⓑ
10%

88. Ⓓ
None

89. Ⓓ
All

90. Ⓓ
All

These are all methods of contraception

91. Ⓑ
Q – brown. R - brown

The part Q does not receive sunlight and the part R does not get CO_2 which is absorbed by the KOH in the flask

92. Ⓒ

H_2O

93. Ⓐ
Pulmonary veins carry deoxygenated blood

94. Ⓒ
No urea

95. Ⓐ
Pancreas

96. Ⓒ
Positively geotropic and positively hydrotropic

97. Ⓓ
HIV
HIV is a virus, others are diseases

98. Ⓒ

TtPp
Hybrids showing dominant traits

99. Ⓑ

Omnivores – moulds and mushrooms
These are saprophytes

100. Ⓓ
Ⓑ and Ⓓ

TECHNO INDIA GROUP