



Monthly Progressive Test

Class: X

Subject: PCMB

Academic
Excellence
Programme
TECHNO ACE

Test Booklet No.: MPT02

Test Date:

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Time: 180 mins

Full Marks: 200

Important Instructions :

1. The Test is of 180 mins duration and the Test Booklet contains 100 multiple choice questions of single correct option only. There are four sections with four subjects. You have to attempt all 100 questions (Candidates are advised to read all 100 questions). Questions 1 to 25 contain Physics, Questions 26 to 50 contain Chemistry, Questions 51 to 75 contain Mathematics, Questions 76 to 100 contain Biology.
2. Each question carries 2 marks. For each correct response, the candidate will get 2 marks. There is no negative mark for wrong response. The maximum mark is 200.
3. Use Blue / Black Ball point Pen only for writing particulars marking responses on Answer Sheet.
4. Rough work is to be done in the space provided for this purpose in the Test Booklet only.
5. On completion of the test, the candidate must handover the Answer Sheet to the invigilator before leaving the Room / Hall. The candidates are allowed to take away this Test Booklet with them.
6. The CODE for this Booklet is Off Line MPT0210052024.
7. The candidates should ensure that the Answer Sheet is not folded. Do not make any stray marks on the Answer Sheet. Do not write your UID No. anywhere else except in the specified space. Use of white fluid for correction is NOT permissible on the Answer Sheet. **Do not scibble or write on or beyond discrete bars of OMR sheet at both sides.**
8. Each candidate must show on-demand his/her Registration document to the Invigilator.
9. No candidate, without special permission of the Centre Superintendent or Invigilator, would leave his/her seat.
10. Use of Electronic Calculator/Cellphone is prohibited.
11. The candidates are governed by all Rules and Regulations of the examination with regard to their conduct in the Examination Hall. All cases of unfair means will be dealt with as per Rules and Regulations of this examination.
12. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.
13. There is no scope for altering response mark in Answer Sheet.

Space For Rough Works



Physics

1. A ray of light passes from glass into air. The angle of refraction will be
 - (A) equal to the angle of incidence
 - (B) greater than the angle of incidence
 - (C) smaller than the angle of incidence
 - (D) 45°

2. When a ray of light travelling in water enters into glass obliquely:
 - (A) is refracted towards the normal
 - (B) is refracted away from the normal
 - (C) does not get refracted
 - (D) is reflected along the same path

3. The refractive index of a medium depends on
 - (A) The nature of the material of the medium
 - (B) wavelength (or colour) of the light used
 - (C) both (A) and (B)
 - (D) none of the above is correct

4. If $n_{\text{kerosene}} = 1.44$; $n_{\text{glass}} = 1.5$, $n_{\text{water}} = 1.33$,
 In which of these materials does light travel fastest
 - (A) kerosene
 - (B) glass
 - (C) water
 - (D) we can't say

5. If ${}^{\text{air}}n_{\text{glass}} = 3/2$ and ${}^{\text{air}}n_{\text{water}} = 4/3$ then ${}^{\text{water}}n_{\text{glass}} =$
 - (A) 1.8
 - (B) 1.25
 - (C) $9/8$
 - (D) $8/9$

6. Select the correct option
 - (A) $\mu_{\text{violet}} > \mu_{\text{red}}$
 - (B) a glass slab appears to be only two-third of its real thickness when it is viewed vertically from above
 - (C) The depth of a water pond appears three-fourth of its real depth on seeing it from vertically above (it appears shallow)
 - (D) All the above are correct

7. As seen from the above the apparent depth of a liquid in a vessel is 15 cm, when its real depth is 20 cm. The refractive index of the liquid is
 - (A) $3/4$
 - (B) $3/2$
 - (C) $4/3$
 - (D) $9/8$

8. The letters appear to be raised when viewed through a glass slab placed over the document because of
 - (A) Reflection
 - (B) Dispersion
 - (C) Diffusion
 - (D) Refraction

9. A pencil partially immersed in water appears to be bent because of
 (A) Diffraction (B) Refraction (C) Dispersion (D) Interference
10. A lemon kept in water in a glass tumbler appears to be bigger than its actual size, when viewed from the sides, because of
 (A) Refraction (B) Reflection (C) Dispersion (D) Diffusion
11. Speed of light in glass is $y \times 10^8$ m/s, then $y =$
 (A) 3 (B) 2 (C) 1.5 (D) 1.25
12. When a light ray enters a glass slab, then the emergent ray is
 (A) Parallel to incident ray
 (B) Always at an angle of 30° to the incident ray
 (C) Always at an angle of 60° with the incident ray
 (D) None of the above is correct
13. In case of refraction through a rectangular glass slab in air medium, the outcome between incident angle i and emergent angle e
 (A) $i > e$ (B) $i < e$ (C) $i = e$ (D) Data insufficient
14. If speed of light in glass is 2×10^8 , then refractive index of glass is
 (A) $4/3$ (B) $9/8$ (C) $3/2$ (D) $\sqrt{2}$
15. Light enters from air to diamond ($n_i = 2.42$), then speed of light in diamond is
 (A) 10^8 m/s (B) 2.25×10^8 m/s (C) 2×10^8 m/s (D) 1.24×10^8 m/s
16. An object is at 20 cm in front of a plane mirror. The mirror is moved 10 cm away from the object. then the distance between the two positions of the image
 (A) 20 cm (B) 15 cm (C) 10 cm (D) 25 cm
17. The incident ray and the reflected ray from a mirror (plane) are mutually perpendicular to each other. The angle of incidence be x° ; then $x^\circ - 30^\circ =$
 (A) 20° (B) 15° (C) 35° (D) 25°
18. If R is the radius of curvature of a spherical mirror and f is its focal length, then:
 (A) $R = f$ (B) $R = \frac{f}{2}$ (C) $R = 3f$ (D) $R = 2f$
19. If the angle of incidence (for reflection) is 30° , then angle of deviation is
 (A) 90° (B) 110° (C) 100° (D) 120°
20. If the focal length of a concave mirror is 20 cm, then if the mirror is kept inside kerosene medium, its new focal length is
 (A) 10 cm (B) 15 cm (C) 20 cm (D) 25 cm

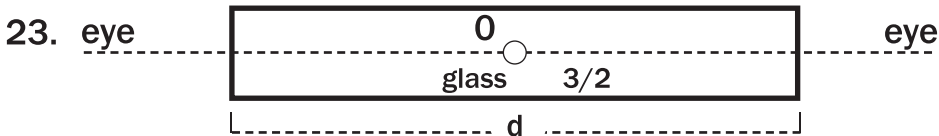
21. The value of the expression

$${}_a\mu_b \times {}_b\mu_c \times {}_c\mu_a =$$

- (A) >1 (B) <1 (C) $=1$ (D) Insufficient data

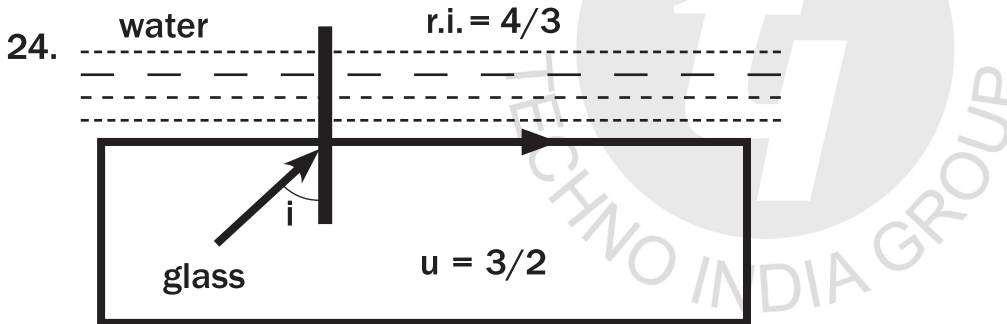
22. A glass paper weight in the form of glass slab is kept over a cross mark (X) on a white sheet. The thickness of glass slab is 3cm and refractive index is $3/2$. Then apparent shift of cross mark, when viewed almost vertically normal to the top surface from air, is

- (A) 2cm (B) 1.5 cm (C) 1 cm (D) 0.5 cm



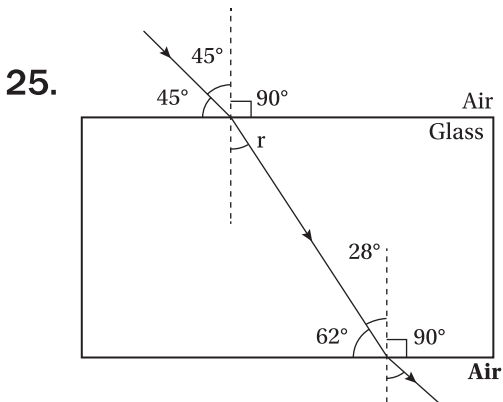
With reference to above figure, an air bubble is located at o, which is inside the glass slab of thickness d. The apparent position of air bubble from both sides when viewed normally from the horizontal direction is 2cm for each view. Then thickness of slab is (given ri of glass is $3/2$)

- (A) 6 cm (B) 2 cm (C) 3 cm (D) 4 cm



With reference to the diagram $\sin i =$

- (A) $1/9$ (B) $4/9$ (C) $2/9$ (D) $8/9$



With reference to the above diagram, the value of angle of refraction, when ray is transmitted from air to glass is

- (A) 20° (B) 30° (C) 28° (D) 60°

Chemistry

26. Which gas is evolved when metal carbonate and bicarbonate salts react with acids?
(A) O_2 (B) CO_2 (C) H_2 (D) N_2
27. What is the pH of an acidic solution?
(A) Greater than 7 (B) Equal to 7 (C) Less than 7 (D) Greater than 10
28. The acid produced in our stomach is
(A) Sulphuric acid (B) Hydrochloric acid (C) Acetic acid (D) Oxalic acid
29. The pH of a sample 'Y' at 298 K is found to be 10. Which of the following may be the sample 'Y'?
(A) NaOH (B) HCl (C) H_2O (D) CH_3COOH
30. When dilute HCl is added to granulated zinc placed in a test tube, the observation made is
(A) the surface of the metal turns shiny (B) the reaction mixture turns milky
(C) odour of chlorine is observed (D) a colourless and odourless gas evolved
31. What is the effect on HCl on litmus?
(A) red turns into blue
(B) blue turns into red
(C) no effect on both colours
(D) shows an effect on both blue and red litmus
32. pH values of 4 solutions A, B, C, D are 7, 8, 9, 10 respectively. Put them in a sequence according to their nature :
(A) acidic, acidic, neutral, basic (B) acidic, neutral, basic, basic
(C) acidic, acidic, acidic, neutral (D) neutral, basic, basic, basic
33. When NaOH reacts with zinc granules then the product formed along with hydrogen gas is
(A) Sodium oxide (B) Sodium peroxide (C) Sodium zincate (D) Sodium + O_2 gas
34. Which salt is formed by the reaction between strong acid and weak base?
(A) CH_3COONa (B) K_2SO_4 (C) $(NH_4)_2SO_4$ (D) CH_3COONH_4
35. General antacids contain
(A) KOH (B) $Ca(OH)_2$ (C) NaOH (D) $Mg(OH)_2$

36. Indicators differentiate acids and bases by changing
- (A) temperature (B) reaction time
(C) colour of the medium (D) boiling point
37. In alkaline medium, which colour is shown by phenolphthalein indicator?
- (A) Blue (B) Red (C) Pink (D) Colourless
38. Which is the correct product when metal oxide reacts with acids?
- (A) Salt + water (B) metal + O₂ gas + water
(C) salt + H₂ gas + H₂O (D) metal + O₂ gas + water
39. Curd is not placed inside copper containers because
- (A) Curd becomes solid (B) Water present in curd starts vapourizing
(C) Curd starts to react with oxygen (D) Curd starts to react with the metal
40. Which of the following cannot change the blue colour of litmus into red?
- (A) Tomato juice (B) NaHCO₃ solution
(C) Tamarind juice (D) Oxalic acid solution
41. Respiration is considered as an exothermic reaction because
- (A) Mass of product decreases (B) Mass of product increases
(C) Energy is absorbed (D) Energy is released
42. When quick lime reacts with water then calcium hydroxide is formed. It is an example of
- (A) Combination reaction (B) Displacement reaction
(C) Double displacement reaction (D) Decomposition reaction
43. Which type of decomposition causes the formation of CaO and CO₂ from CaCO₃?
- (A) Electrolytic decomposition (B) Thermal decomposition
(C) Photochemical decomposition (D) Aqueous decomposition
44. When barium chloride reacts with sodium sulphate then the colour of the precipitation is
- (A) Brown (B) yellow (C) green (D) White
45. Electrolytic decomposition of water in presence of dilute acid produces
- (A) H₂O₂ + O₂ (B) H₂O₂ + H₂ (C) H₂ + O₂ (D) H₂O₂ + H₂ + O₂
46. Rancidity can be prevented by adding
- (A) anti-oxidants to foods (B) acid to foods
(C) water to foods (D) oxygen gas to foods

47. When foods having oil and fat are kept inside refrigerators then
- (A) rancidity increases (B) rancidity decreases
 (C) rancidity remains same (D) nothing can be predicted about rancidity
48. CH_3COOH is a
- (A) Monobasic acid (B) Dibasic acid
 (C) Tribasic acid (D) Cannot be predicted about its basicity
49. Maximum how many KOH molecules can react with dilute H_2SO_4 ?
- (A) 1 (B) 2 (C) 3 (D) 4
50. Formic acid is present in the insect body. The molecular formula of this acid is
- (A) HCOOH (B) CH_3COOH (C) $\text{H}_2\text{C}_2\text{O}_4$ (D) $\text{H}_6\text{C}_4\text{O}_4$

Mathematics

51. For what value of k , do the equations $3x - y + 8 = 0$ and $6x - ky + 16 = 0$ represent coincident lines?
- (A) $\frac{1}{2}$ (B) $-\frac{1}{2}$ (C) 2 (D) -2
52. If $x = a$, $y = b$ is the solution of the system of equations $x - y = 2$ and $x + y = 4$, then the values of a and b are respectively
- (A) 3 and 1 (B) 3 and 5 (C) 5 and 3 (D) -1 and -3
53. The sum of the digits of a two digit number is 9. If 27 is added to it, the digits of the number get reversed. The number is
- (A) 25 (B) 72 (C) 63 (D) 36
54. The value of k for which the system of equations $x + 2y = 5$, $3x + ky + 15 = 0$ has no solution is
- (A) 6 (B) -6 (C) $\frac{3}{2}$ (D) None of these
55. If a pair of linear equations in two variables is consistent, then the lines represented by two equations are
- (A) intersecting (B) parallel
 (C) always coincident (D) intersecting or coincident
56. The area of the triangle formed by the lines $y = x$, $x = 6$ and $y = 0$ is
- (A) 36 sq. units (B) 18 sq. units (C) 9 sq. units (D) 72 sq. units

67. The number $\sqrt{14+6\sqrt{5}} + \sqrt{14-6\sqrt{5}}$ is
 (A) is a rational number (B) is not a rational number
 (C) simplifies to 5 (D) simplifies to 7
68. The least perfect square number which is divisible by 8, 15, 20, 22 is
 (A) 435600 (B) 43560 (C) 39600 (D) 465660
69. If $-\frac{1}{3}$ is the zeros of the cubic polynomial $f(x) = 3x^3 - 5x^2 - 11x - 3$ the other zeros are
 (A) -3, -1 (B) 1, 3 (C) 3, -1 (D) -3, 1
70. If α, β are zeros of $ax^2 + bx + c$ then zeros of $a^3x^2 + abcx + c^3$ are
 (A) $\alpha\beta, \alpha + \beta$ (B) $\alpha^2\beta, \alpha\beta^2$ (C) $\alpha\beta, \alpha^2\beta^2$ (D) α^3, β^3
71. The value of k for which the system of equations $3x + 5y = 0$ and $kx + 10y = 0$ has a non-zero solution is
 (A) 0 (B) 2 (C) 6 (D) 8
72. If the system of equations $2x + 3y = 7$ and $(a + b)x + (2a - b)y = 21$ has infinitely many solutions, then
 (A) $a = 1, b = 5$ (B) $a = 5, b = 1$ (C) $a = -1, b = 5$ (D) $a = 5, b = -1$
73. In the equations $3x + 2y = 13xy$ and $4x - 5y = 2xy$, the values of x and y that satisfy the equations are
 (A) (2, 3) (B) (3, 2) (C) $\left(\frac{1}{2}, \frac{1}{3}\right)$ (D) $\left(\frac{1}{3}, \frac{1}{2}\right)$
74. Which of the following system of equations has no solution?
 (A) $3x - y = 2, 9x - 3y = 6$ (B) $4x - 7y + 28 = 0, 5y - 7x + 9 = 0$
 (C) $3x - 5y - 11 = 0, 6x - 10y - 7 = 0$ (D) None of these
75. The value of $x + y$ in the solution of equations $\frac{x}{4} + \frac{y}{3} = \frac{5}{12}$ and $\frac{x}{2} + y = 1$ is
 (A) $\frac{1}{2}$ (B) $\frac{3}{2}$ (C) 2 (D) $\frac{5}{2}$

Biology

76. Respiratory structures in the insects are—
 (A) Gills (B) Skin (C) Lungs (D) Trachea

77. In the experiment demonstrating respiration in germinating seeds, KOH is used to :
- (A) Absorb carbon dioxide present in the flask
 (B) Absorb oxygen present in the flask
 (C) Absorb water vapour released by the seeds
 (D) Liberate oxygen to be used by the seeds
78. Epiglottis guards the opening of—
- (A) Oesophagus (B) Eustachian tubes (C) Larynx (D) Internal nares
79. Vocal cords occur in
- (A) Pharynx (B) Larynx (C) Glottis (D) Bronchial tube
80. Which one of the following is connected with transport of water in plants?
- (A) Phloem (B) Xylem (C) Epidermis (D) Cambium
81. Transpiration in plants takes place through :
- (A) Stomata (B) Cuticle (C) Lenticels (D) All of these
82. The factors which affect the rate of transpiration is—
- (A) Speed of wind (B) Temperature
 (C) Surface area of leaf (D) All of the above
83. Which of the following is the respiratory substrate—
- (A) Stored food (B) Fats (C) Glucose (D) Proteins
84. Respiration by lungs is called—
- (A) Pulmonary respiration (B) Cuticular respiration
 (C) Branchial respiration (D) Cutaneous respiration
85. The exchange of gases between the external air and the blood occurs in the—
- (A) Bronchus (B) Bronchiole (C) Trachea (D) Alveoli
86. Trachea branches into two
- (A) Alveoli (B) Bronchioles (C) Bronchi (D) Oesophagus
87. Life span of human RBC is about
- (A) 45 days (B) 80 days (C) 120 days (D) 150 days
88. Alveoli are surrounded by
- (A) Arteries (B) Veins (C) Capillaries (D) None

89. Eosinophil, basophil and neutrophil are types of
Ⓐ RBCs Ⓑ Proteins Ⓒ Platelets Ⓓ WBCs
90. Fluid part of blood, after removal of coagulated corpuscles is
Ⓐ Plasma Ⓑ Lymph Ⓒ Serum Ⓓ Vaccine
91. Which of the following has no digestive enzyme?
Ⓐ Saliva Ⓑ Bile Ⓒ Gastric juice Ⓓ Intestinal juice
92. Organisms feeding on dead and decaying matter are called—
Ⓐ Parasites Ⓑ Herbivores Ⓒ Saprotrophs Ⓓ Insectivores
93. Name the organ that stores bile
Ⓐ Liver Ⓑ Gall bladder Ⓒ Stomach Ⓓ Large intestine
94. Amoeba shows _____ nutrition.
Ⓐ Saprotrophic Ⓑ Parasitic Ⓒ Autotrophic Ⓓ Holozoic
95. How many molecules of carbon dioxide are utilised to produce one molecule of glucose, during photosynthesis?
Ⓐ 6 Ⓑ 5 Ⓒ 4 Ⓓ 3
96. Which of the following is not a part of the human respiratory system?
Ⓐ Nose Ⓑ Oesophagus Ⓒ Trachea Ⓓ Lungs
97. Muscle cramps, during a strenuous activity, is caused due to the accumulation of
Ⓐ Ethyl alcohol Ⓑ Pyruvic acid Ⓒ Water Ⓓ Lactic acid
98. Sphygmomanometer measures
Ⓐ Blood volume Ⓑ Heart beat Ⓒ Blood pressure Ⓓ Cardiac output
99. The number of chamber(s) in a fish's heart is/are—
Ⓐ 1 Ⓑ 2 Ⓒ 3 Ⓓ 4
100. Which among the following has the thickest wall?
Ⓐ Right atrium Ⓑ Left atrium Ⓒ Right ventricle Ⓓ Left ventricle

Space For Rough Works



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