



General Instructions

- (i) **Duration:** The total duration of the examination is 3 hours (180 minutes).
- (ii) **Total Marks:** The complete paper carries a maximum of 200 marks.
- (iii) **Structure:** The paper has 3 Sections:
 - **Section A:** 50 Multiple Choice Questions (Physics).
 - **Section B:** 50 Multiple Choice Questions (Chemistry).
 - **Section B:** 100 Multiple Choice Questions (Biology).
- (iv) **Compulsory Questions:** All 200 questions are compulsory.
- (v) Each question has four options. Only **one** option is correct.
- (vi) **Correct Answer:** +1 marks.
- (vii) **Incorrect Answer:** (No Negative marking).
- (viii) **Unanswered/Marked for Review:** 0 marks.

1. Filarial disease (filariasis) is transmitted by which of the following mosquitoes?

- (A) Anopheles
- (B) Aedes
- (C) Culex
- (D) Mansonia

2. Match the following diseases with their causative agents:

Column A (Disease)	Column B (Causative agent)
1. Common cold	A. Bacteria
2. Typhoid	B. Virus
3. Malaria	C. Protozoa

- (A) 1 – B, 2 – A, 3 – C
 (B) 1 – A, 2 – B, 3 – C
 (C) 1 – C, 2 – A, 3 – B
 (D) 1 – B, 2 – C, 3 – A
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3. The normal value of Tidal Volume (TV) in a healthy adult is approximately:

- (A) 500 mL
 (B) 2500 – 3000 mL
 (C) 1100 – 1200 mL
 (D) 4500 – 5000 mL
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4. Which of the following respiratory volumes represents the air remaining in the lungs after forced expiration?

- (A) Tidal Volume (TV)
 (B) Inspiratory Reserve Volume (IRV)
 (C) Residual Volume (RV)
 (D) Vital Capacity (VC)
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5. Where is sperm produced?

- (A) Vas deferens
 (B) Epididymis
 (C) Seminiferous tubules
 (D) Prostate gland
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6. If the stroke volume of the heart is 70 mL/beat and the cardiac output is 5250 mL/min, what is the heart rate?

- (A) 60 beats/min
 - (B) 70 beats/min
 - (C) 75 beats/min
 - (D) 80 beats/min
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7. Extrusion of the second polar body from the egg nucleus occurs:

- (A) After entry of sperm but before fertilization
 - (B) After completion of fertilization
 - (C) Before entry of sperm into the ovum
 - (D) Simultaneously with first cleavage
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8. Which of the following population interactions is widely used in medical science for the production of antibiotics?

- (A) Commensalism
 - (B) Mutualism
 - (C) Parasitism
 - (D) Amensalism
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9. *Wuchereria bancrofti* is transmitted to the human body by:

- (A) Housefly
 - (B) Anopheles
 - (C) Culex
 - (D) Aedes
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10. What is the phenotypic ratio of a dihybrid cross in the F_2 generation?

- (A) 3 : 1
 - (B) 1 : 2 : 1
 - (C) 9 : 3 : 3 : 1
 - (D) 1 : 1 : 1 : 1
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11. Identify the "molecular scissors" used to cut DNA at specific sequences.

- (A) DNA Ligase
 - (B) DNA Polymerase
 - (C) Restriction Enzymes
 - (D) RNA Polymerase
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12. Which hormone is responsible for apical dominance in plants?

- (A) Gibberellin
 - (B) Cytokinin
 - (C) Auxin
 - (D) Ethylene
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13. Which antibody is most abundant in human colostrum (initial breast milk)?

- (A) IgG
 - (B) IgM
 - (C) IgA
 - (D) IgE
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14. In an ecosystem, which ecological pyramid is always upright and never inverted?

- (A) Pyramid of Biomass
 - (B) Pyramid of Numbers
 - (C) Pyramid of Energy
 - (D) Pyramid of Producers
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15. What is the ratio of escape velocity to orbital velocity?

- (A) 1 : 1
 - (B) 2 : 1
 - (C) $\sqrt{2} : 1$
 - (D) $1 : \sqrt{2}$
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16. Find the moment of inertia of a solid sphere about its diameter.

- (A) $\frac{2}{3}MR^2$
- (B) $\frac{2}{5}MR^2$

(C) $\frac{1}{2}MR^2$

(D) $\frac{3}{5}MR^2$

17. If the distance between two charges is doubled, the Coulomb force becomes:

(A) Twice

(B) Half

(C) One-fourth

(D) Four times

18. What is the de Broglie wavelength of a particle at rest?

(A) Zero

(B) Infinite

(C) One

(D) Undefined

19. The working of an optical fiber is based on which phenomenon?

(A) Refraction

(B) Diffraction

(C) Total Internal Reflection

(D) Interference

20. What is the hybridization of carbon in an Ethyne (C_2H_2) molecule?

(A) sp^3

(B) sp^2

(C) sp

(D) sp^3d

21. Name the linkage that holds amino acids together in a protein.

(A) Glycosidic bond

(B) Ester bond

(C) Peptide bond

(D) Hydrogen bond

22. Which element has the highest electronegativity in the periodic table?

- (A) Oxygen
- (B) Chlorine
- (C) Fluorine
- (D) Nitrogen

23. What is the product when Phenol reacts with neutral Ferric Chloride?

- (A) Green precipitate
- (B) Blue complex
- (C) Violet colored complex
- (D) Colorless solution

24. In a BCC (Body-Centered Cubic) unit cell, what is the coordination number?

- (A) 4
- (B) 6
- (C) 8
- = (D) 12