

MHT CET 2025 April 16 Shift 2 Question Paper

Time Allowed :3 Hours	Maximum Marks :200	Total Questions :200
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 3 hours duration.
2. The question paper consists of 200 questions. The maximum marks are 200.
3. There are three parts in the question paper consisting of Physics, Chemistry and Biology (Botany and Zoology) having 50 questions in each part of equal weightage.

Q1. A simple pendulum of length 1 m is oscillating with a small amplitude. If the acceleration due to gravity is 9.8 m/s^2 , what is the time period of the pendulum?

- (1) 1.0 s
 - (2) 2.0 s
 - (3) 3.0 s
 - (4) 4.0 s
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Q2. A wire of length 2 m and resistance 8Ω is stretched to double its original length, keeping the volume constant. What is the new resistance of the wire?

- (1) 16Ω
 - (2) 32Ω
 - (3) 8Ω
 - (4) 4Ω
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Q3. A ball is thrown vertically upwards with an initial velocity of 20 m/s. If $g = 10 \text{ m/s}^2$, what is the maximum height reached by the ball?

- (1) 10 m
 - (2) 20 m
 - (3) 40 m
 - (4) 80 m
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Q4. Two point charges $+4\ \mu\text{C}$ and $-2\ \mu\text{C}$ are separated by $0.3\ \text{m}$ in air. What is the magnitude of the electrostatic force between them? (Coulomb's constant $k = 9 \times 10^9\ \text{N} \cdot \text{m}^2/\text{C}^2$).

- (1) 8 N
- (2) 16 N
- (3) 24 N
- (4) 32 N

Q5. A convex lens has focal length $20\ \text{cm}$. An object is placed $30\ \text{cm}$ in front of the lens. What is the image distance from the lens?

- (1) 12 cm
- (2) 60 cm
- (3) 15 cm
- (4) 30 cm

Q6. A block of mass $5\ \text{kg}$ is pulled along a horizontal surface by a force of $20\ \text{N}$ at an angle of 30° to the horizontal. If the coefficient of friction is 0.2 and $g = 10\ \text{m/s}^2$, what is the work done by the applied force in moving the block $10\ \text{m}$?

- (1) 100 J
- (2) 173.2 J
- (3) 200 J
- (4) 346.4 J

Q7. A copper block of mass $2\ \text{kg}$ is heated from 20°C to 100°C . If specific heat of copper is $400\ \text{J/kg}\cdot^\circ\text{C}$, how much heat energy is absorbed?

- (1) 6400 J
- (2) 16000 J
- (3) 32000 J
- (4) 64000 J

Q8. A circular coil of 50 turns, each radius $0.1\ \text{m}$, carries a current of $2\ \text{A}$. If placed in a uniform magnetic field of $0.5\ \text{T}$ perpendicular to its plane, what is the magnitude of the torque acting on the coil?

- (1) 0.157 N·m
 - (2) 0.785 N·m
 - (3) 1.57 N·m
 - (4) 3.14 N·m
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Q9. What volume of oxygen gas at STP is required to completely burn 12 g of methane (CH_4)? (Molar mass CH_4 =16 g/mol; 1 mol gas @ STP = 22.4 L)

- (1) 11.2 L
 - (2) 22.4 L
 - (3) 33.6 L
 - (4) 44.8 L
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Q10. In an electrochemical cell, $E^\circ(\text{Zn}^{2+}/\text{Zn}) = -0.76 \text{ V}$ and $E^\circ(\text{Cu}^{2+}/\text{Cu}) = +0.34 \text{ V}$. What is the standard EMF of the cell formed by these electrodes?

- (1) 0.42 V
 - (2) 1.10 V
 - (3) -1.10 V
 - (4) -0.42 V
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Q11. Which of the following compounds will give a positive iodoform test?

- (1) Methanol
 - (2) Ethanol
 - (3) Propan-1-ol
 - (4) Propan-2-ol
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Q12. The enthalpy change for $\text{C}_2\text{H}_4(\text{g}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{CO}_2(\text{g}) + 2\text{H}_2\text{O}(\text{l})$ is -1410 kJ . If $\Delta H_f^\circ(\text{CO}_2) = -393.5 \text{ kJ/mol}$ and $\Delta H_f^\circ(\text{H}_2\text{O}(\text{l})) = -286 \text{ kJ/mol}$, what is $\Delta H_f^\circ(\text{C}_2\text{H}_4(\text{g}))$?

- (1) +52 kJ/mol
 - (2) -52 kJ/mol
 - (3) +104 kJ/mol
 - (4) -104 kJ/mol
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Q13. What is the molarity of a solution prepared by dissolving 5.85 g NaCl in water to make 250 mL? (Molar mass NaCl = 58.5 g/mol).

- (1) 0.1 M
 - (2) 0.2 M
 - (3) 0.4 M
 - (4) 1.0 M
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Q14. The rate constant for a first-order reaction is 0.0693 min^{-1} . What is the half-life of the reaction?

- (1) 5 min
 - (2) 10 min
 - (3) 15 min
 - (4) 20 min
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Q15. The energy of an electron in the second orbit of hydrogen is -3.4 eV . What is the energy of the electron in the third orbit? ($E_n = -\frac{13.6}{n^2} \text{ eV}$)

- (1) -1.51 eV
 - (2) -2.27 eV
 - (3) -3.4 eV
 - (4) -6.04 eV
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Q16. For the reaction $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$, the equilibrium constant $K_c = 4.0 \times 10^{-2}$. If $[\text{N}_2] = 0.5 \text{ M}$ and $[\text{H}_2] = 1.5 \text{ M}$ at equilibrium, what is $[\text{NH}_3]$?

- (1) 0.075 M
 - (2) 0.15 M
 - (3) 0.30 M
 - (4) 0.60 M
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Q17. Which of the following coordination compounds exhibits geometrical isomerism?

- (1) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$
- (2) $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]\text{Cl}$

- (3) $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$
 - (4) $[\text{Co}(\text{Cl})_4]^{2-}$
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Q18. In plants, which hormone primarily promotes cell elongation in stems?

- (1) Cytokinin
 - (2) Gibberellin
 - (3) Abscissic acid
 - (4) Ethylene
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Q19. Which part of the human nephron is primarily responsible for reabsorption of glucose and amino acids?

- (1) Bowman's capsule
 - (2) Proximal convoluted tubule
 - (3) Loop of Henle
 - (4) Distal convoluted tubule
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Q20. In recombinant DNA technology, which enzyme cuts DNA at specific recognition sites to produce restriction fragments?

- (1) DNA polymerase
 - (2) Restriction endonuclease
 - (3) Ligase
 - (4) Reverse transcriptase
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Q21. Which of the following is a pioneer species in the primary succession of a bare rock?

- (1) Grasses
 - (2) Lichens
 - (3) Shrubs
 - (4) Trees
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Q22. In flowering plants, double fertilization results in formation of which two structures?

- (1) Embryo and endosperm
 - (2) Embryo and seed coat
 - (3) Endosperm and pollen grain
 - (4) Seed coat and ovule
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Q23. In a DNA molecule, if the percentage of adenine (A) is 30%, what is the percentage of cytosine (C)?

- (1) 20%
 - (2) 30%
 - (3) 40%
 - (4) 50%
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Q24. Which microorganism is used in production of curd from milk?

- (1) *Saccharomyces cerevisiae*
 - (2) *Lactobacillus acidophilus*
 - (3) *Aspergillus niger*
 - (4) *Penicillium notatum*
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Q25. Which is an example of homologous structures that provide evidence for evolution?

- (1) Wings of a bird and wings of an insect
 - (2) Forelimbs of a human and wings of a bat
 - (3) Fins of a fish and flippers of a whale
 - (4) Stingers of a bee and spines of a porcupine
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Q26. In the human heart, which chamber receives oxygenated blood from the lungs?

- (1) Right atrium
 - (2) Right ventricle
 - (3) Left atrium
 - (4) Left ventricle
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Q27. Which organelle in a eukaryotic cell is primarily responsible for synthesizing proteins destined for secretion?

- (1) Mitochondrion
 - (2) Rough endoplasmic reticulum
 - (3) Golgi apparatus
 - (4) Lysosome
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Q28. In a cross between a pea plant heterozygous for round seeds (Rr) and a plant with wrinkled seeds (rr), what is the expected phenotypic ratio of the offspring?

- (1) 1 Round : 1 Wrinkled
 - (2) 3 Round : 1 Wrinkled
 - (3) All Round
 - (4) All Wrinkled
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Q29. In flowering plants, which structure develops into the fruit after fertilization?

- (1) Ovary
 - (2) Ovule
 - (3) Anther
 - (4) Stigma
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