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MHT CET 2025 April 16 Shift 2 Question Paper

Time Allowed :3 Hour	Maximum Marks :200	Total Questions :200

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.

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

(1) $1.0\,\text{s}$

(2) $2.0\,\text{s}$

(3) $3.0\,\text{s}$

(4) $4.0\,\text{s}$

2.

A wire of length 2 m and resistance 8 Ω is stretched to double its original length, keeping the volume constant. What is the new resistance of the wire?

(1) $16\,\Omega$

(2) $32\,\Omega$

(3) $8\,\Omega$

(4) $4\,\Omega$

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3. A ball is thrown vertically upwards with an initial velocity of 20 m/s. If the acceleration due to gravity is $10\,\text{m/s}^2$, what is the maximum height reached by the ball?

(1) $10\,\text{m}$

(2) $20\,\text{m}$

(3) $40\,\text{m}$

(4) $80\,\text{m}$

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4. Two point charges $+4\,\mu\text{C}$ and $-2\,\mu\text{C}$ are separated by a distance of 0.3 m in air. What is the magnitude of the electrostatic force between them? (Given: Coulomb's constant $k = 9 \times 10^9\,\text{N·m}^2/\text{C}^2$)

(1) $8\,\text{N}$

(2) $16\,\text{N}$

(3) $24\,\text{N}$

(4) $32\,\text{N}$

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5. A convex lens has a focal length of 20 cm. An object is placed 30 cm in front of the lens. What is the image distance from the lens?

(1) $12\,\text{cm}$

(2) $60\,\text{cm}$

(3) $15\,\text{cm}$

(4) $30\,\text{cm}$

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

(1) $100\,\text{J}$

(2) $173.2\,\text{J}$

(3) $200\,\text{J}$

(4) $346.4\,\text{J}$

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7. A copper block of mass 2 kg is heated from 20°C to 100°C. If the specific heat capacity of copper is $400\,\text{J/kg°C}$, how much heat energy is absorbed by the block? (Assume no phase change occurs.)

(1) $6400\,\text{J}$

(2) $16000\,\text{J}$

(3) $32000\,\text{J}$

(4) $64000\,\text{J}$

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

(1) $0.157\,\text{N·m}$

(2) $0.785\,\text{N·m}$

(3) $1.57\,\text{N·m}$

(4) $3.14\,\text{N·m}$

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9. What volume of oxygen gas at STP is required to completely burn 12 g of methane (CH_4)? (Molar mass of $CH_4 = 16\,\text{g/mol}$, 1 mole of gas at STP occupies $22.4\,\text{L}$).

(1) $11.2\,\text{L}$

(2) $22.4\,\text{L}$

(3) $33.6\,\text{L}$

(4) $44.8\,\text{L}$

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10. In an electrochemical cell, the standard electrode potential of Zn^{2+}/Zn is $-0.76\,\text{V}$ and that of Cu^{2+}/Cu is $+0.34\,\text{V}$. What is the standard EMF of the cell formed by these electrodes?

(1) $0.42\,\text{V}$

(2) $1.10\,\text{V}$

(3) $-1.10\,\text{V}$

(4) $-0.42\,\text{V}$

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11. Which of the following compounds will give a positive iodoform test?

(1) Methanol

(2) Ethanol

(3) Propan-1-ol

(4) Propan-2-ol

12.

The enthalpy change for the reaction $\mathbf{C_2H_4(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(l)}$ is -1410 kJ/mol. If the standard enthalpies of formation of $\mathbf{CO_2(g)}$ and $\mathbf{H_2O(l)}$ are -393.5 kJ/mol and -286 kJ/mol respectively, what is the standard enthalpy of formation of $\mathbf{C_2H_4(g)}$?

(1) $+52$ kJ/mol

(2) -52 kJ/mol

(3) $+104$ kJ/mol

(4) -104 kJ/mol

13.

What is the molarity of a solution prepared by dissolving 5.85 g of NaCl in water to make 250 mL of solution? (Molar mass of NaCl = 58.5 g/mol).

(1) 0.1 M

(2) 0.2 M

(3) 0.4 M

(4) 1.0 M

14.

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

15.

The energy of an electron in the second orbit of a hydrogen atom is -3.4 eV. What is the energy of the electron in the third orbit? (Given: Energy of an electron in the n-th orbit of hydrogen is $E_n = -\frac{13.6}{n^2}$ eV).

(1) $-1.51\,\text{eV}$

(2) $-2.27\,\text{eV}$

(3) $-3.4\,\text{eV}$

(4) $-6.04\,\text{eV}$

16.

For the reaction $\mathbf{N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)}$, the equilibrium constant K_c is 4.0×10^{-2} at a certain temperature. If the equilibrium concentrations are $[\mathbf{N_2}] = 0.5\,\mathbf{M}$ and $[\mathbf{H_2}] = 1.5\,\mathbf{M}$, what is the equilibrium concentration of $\mathbf{NH_3}$?

(1) $0.075\,\text{M}$

(2) $0.15\,\text{M}$

(3) $0.30\,\text{M}$

(4) $0.60\,\text{M}$

17.

Which of the following coordination compounds exhibits geometrical isomerism?

(1) $[Co(NH_3)_6]Cl_3$

(2) $[Co(NH_3)_4Cl_2]Cl$

(3) $[Co(NH_3)_5Cl]Cl_2$

(4) $[Co(Cl)_4]^{2-}$

18.

In plants, which of the following hormones is primarily responsible for promoting cell elongation in stems?

(1) Cytokinin

(2) Gibberellin

(3) Abscisic acid

(4) Ethylene

19.

Which part of the human nephron is primarily responsible for the reabsorption of

glucose and amino acids?

(1) Bowman's capsule

(2) Proximal convoluted tubule

(3) Loop of Henle

(4) Distal convoluted tubule

20.

In recombinant DNA technology, which enzyme is used to cut DNA at specific recognition sites to produce restriction fragments?

(1) DNA polymerase

(2) Restriction endonuclease

(3) Ligase

(4) Reverse transcriptase

21.

Which of the following is a pioneer species in the primary succession of a bare rock?

(1) Grasses

(2) Lichens

(3) Shrubs

(4) Trees

22.

In flowering plants, the process of double fertilization results in the formation of which two structures?

(1) Embryo and endosperm

(2) Embryo and seed coat

(3) Endosperm and pollen grain

(4) Seed coat and ovule

23.

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%

24.

Which of the following microorganisms is used in the production of curd from milk?

(1) Saccharomyces cerevisiae

(2) Lactobacillus acidophilus

(3) Aspergillus niger

(4) Penicillium notatum

25.

Which of the following 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

26.

In the human heart, which chamber receives oxygenated blood from the lungs?

(1) Right atrium

(2) Right ventricle

(3) Left atrium

(4) Left ventricle

27.

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

28.

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

29.

In flowering plants, which structure develops into the fruit after fertilization?

(1) Ovary

(2) Ovule

(3) Anther

(4) Stigma

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