MHT CET 2025 Apr 12 Shift 1 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. What is the function of colipase in the human digestive system?

(A) Stimulates insulin secretion

(B) Activates pepsinogen

(C) Helps lipase to act on fat droplets

(D) Converts bile salts into bile pigments

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2. Earthworms contribute to decomposition by:

(A) Fixing atmospheric nitrogen

(B) Breaking down detritus and enhancing nutrient recycling

(C) Pollinating flowers

(D) Producing humic acid

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3. Match the following pairs:

a. Fructose — (i) Disaccharide

b. Lactose — (ii) Monosaccharide

Which is the correct match?

(A) a-(i), b-(ii)

(B) a-(ii), b-(i)

(C) a-(ii), b-(ii)

(D) a-(i), b-(i)

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4. Which of the following is NOT a part usually labeled in a liver diagram?

(A) Hepatic artery

(B) Hepatic vein

(C) Glomerulus

(D) Bile duct

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5. Which of the following tissues is primarily responsible for upward water transport in plants?

(A) Phloem

(B) Xylem

(C) Parenchyma

(D) Collenchyma

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6. What is the role of enterokinase in digestion?

(A) Converts pepsinogen to pepsin

(B) Emulsifies fats

(C) Activates trypsinogen to trypsin

(D) Breaks down carbohydrates

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7. Which of the following causes pneumonia in mice in Griffith's experiment?

(A) S-type (Smooth, Virulent)

(B) R-type (Rough, Non-virulent)

(C) Both A and B

(D) Heat-killed S-type only

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8. tRNA is referred to as an "adapter molecule" primarily because it:

(A) carries genetic information from the nucleus to the ribosome.

(B) catalyzes the formation of peptide bonds between amino acids.

(C) acts as a link between the mRNA codon and the corresponding amino acid.

(D) provides the structural framework for the ribosome.

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9. What is the main purpose of Polymerase Chain Reaction (PCR)?

(A) To sequence DNA

(B) To amplify specific DNA sequences

(C) To cut DNA into fragments

(D) To identify mutations in genes

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10. Which of the following statements about graphite is correct?

(A) Graphite is a good conductor of electricity due to its free electrons.

(B) Graphite is a poor conductor of electricity because it lacks free electrons.

(C) Graphite does not conduct electricity as it is an insulator.

(D) Graphite conducts electricity only when heated above 100°C.

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11. In an isothermal expansion of an ideal gas, the internal energy of the gas:

(A) Increases as the temperature increases.

(B) Decreases because the temperature decreases.

(C) Remains constant.

(D) Increases and then decreases during the expansion.

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12. What is the major organic product obtained when phenol undergoes the Reimer-Tiemann reaction?

(A) Benzaldehyde

(B) o-Hydroxybenzaldehyde (Salicylaldehyde)

(C) p-Hydroxybenzoic acid

(D) o-Nitrophenol

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13. What is the IUPAC name of phloroglucinol?

(A) 1,2,3-Trihydroxybenzene

(B) 1,3,5-Trihydroxybenzene

(C) 2,4,6-Trihydroxybenzene

(D) 1,2,4-Trihydroxybenzene

14. Which of the following elements is colourless?

(A) Ti^{4+}

(B) Fe^{2+}

(C) Fe^{3+}

(D) None of these

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15. Which of the following represents the correct structure of crotonyl alcohol?

(A) CH_2=CH-COOH

(B) CH_3-CH=CH-CHOH

(C) CH_3-CH=CH-COH

(D) CH_2=CH-CH_2-OH

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16. The Wolff-Löffler-Kishner reduction is used to convert which of the following compounds into the corresponding alkane?

(A) Aldehydes

(B) Alcohols

(C) Ketones

(D) Carboxylic acids

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17. Which of the following is a non-reducing sugar?

(A) Glucose

(B) Sucrose

(C) Fructose

(D) Maltose

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18. Which of the following correctly represents the bond angle and bond length in the crown-shaped S_8 molecule?

(A) Bond angle $\approx 120°$, Bond length $\approx 154\,\text{pm}$

(B) Bond angle $\approx 109.5°$, Bond length $\approx 140\,\text{pm}$

(C) Bond angle $\approx 108°$, Bond length $\approx 204\,\text{pm}$

(D) Bond angle $\approx 98^\circ$, Bond length $\approx 205\,\text{pm}$

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19. What is the major product formed when 2-methyl-3-chloropentane undergoes alcoholic KOH elimination (E2 reaction)?

(A) 2-methyl-1-pentene

(B) 2-methyl-2-pentene

(C) 3-methyl-1-pentene

(D) 3-methyl-2-pentene

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20. What is the major product when toluene reacts with concentrated sulfuric acid (H_2SO_4) under heating conditions?

(A) Benzene sulfonic acid

(B) p-Toluenesulfonic acid

(C) o-Toluenesulfonic acid

(D) A mixture of o- and p-toluenesulfonic acids

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21. Which of the following elements is classified as an alkali metal?

(A) Sodium (Na)

(B) Calcium (Ca)

(C) Magnesium (Mg)

(D) Aluminum (Al)

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22. Which of the following statements is true about a chiral carbon?

(A) A chiral carbon is attached to two identical groups.

(B) A chiral carbon must be attached to four different groups.

(C) A chiral carbon cannot exist in molecules with symmetry.

(D) A chiral carbon is always part of an alkene.

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23. A system absorbs 50 J of heat and does 10 J of work. What is the change in internal energy (ΔU) of the system?

(A) $\Delta U = 60\,\text{J}$

(B) $\Delta U = 40\,\text{J}$

(C) $\Delta U = 50\,\text{J}$

(D) $\Delta U = -10\,\text{J}$

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24. Which of the following compounds is a cyclic allyl?

(A) Cyclohexene

(B) Cyclopropene

(C) 1,3-Cyclohexadiene

(D) Cycloheptatriene

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25. What is the IUPAC name of the compound with the following structure: benzene attached to COOH, OH, and an ethyl group?

(A) 2-Ethylbenzoic acid

(B) 3-Ethylsalicylic acid

(C) 4-Ethylphenol

(D) 2-Ethyl-4-hydroxybenzoic acid

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26. What is the IUPAC name of phenylmethane?

(A) Benzyl alcohol

(B) Toluene

(C) Benzene methane

(D) Methylbenzene

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27. To double the pressure of an ideal gas, keeping volume and number of moles constant, the temperature should be:

(A) 2T

(B) 4T

(C) T/2

(D) T/4

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28. An AC circuit has a resistance of 150 Ω, inductive reactance of 250 Ω, and capacitive reactance of 100 Ω. What is the phase difference between current and voltage?

(A) $\tan^{-1}\left(\frac{250-100}{150}\right)$

(B) $\tan^{-1}\left(\frac{100-250}{150}\right)$

(C) $\tan^{-1}\left(\frac{150}{250-100}\right)$

(D) $\tan^{-1}\left(\frac{150}{250+100}\right)$

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29. What is the energy required to increase the radius of a soap bubble from R to $2R$ considering the surface tension T?

(A) $8\pi TR^2$

(B) $4\pi TR^2$

(C) $2\pi TR^2$

(D) $16\pi TR^2$

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30. Two coherent waves are represented by $y_1 = a_1 \cos\omega t$ and $y_2 = a_2 \sin\omega t$, and they are superimposed on each other. The resulting intensity is proportional to:

(A) $(a_1 + a_2)^2$

(B) $(a_1 - a_2)^2$

(C) $a_1^2 + a_2^2$

(D) $\sqrt{a_1^2 + a_2^2}$

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