

MHT CET 2023 Question Paper Shift 2

Question 1. What is the IUPAC name of propylene glycol?

Answer. The IUPAC name of propylene glycol is "1,2-propanediol."

Question 2. Find the number of electron bonds in H_2SO_4 .

Answer. 6

Solution. To determine the number of electron bonds in H_2SO_4 , we need to consider the Lewis structure of the molecule.

H_2SO_4 can be represented as:



In the Lewis structure of H_2SO_4 , there are two O-H bonds, one S=O double bond, and two S-O single bonds.

Each bond involves two electrons, one from each atom. Therefore, the total number of electron bonds in H_2SO_4 can be calculated as follows:

$$2 (\text{O-H bonds}) + 1 (\text{S=O double bond}) + 2 (\text{S-O single bonds}) = 6$$

Thus, H_2SO_4 contains a total of 6 electron bonds.

Question 3. What is the oxidation number of nitrogen?

Answer. -3 to +5

Solution. The oxidation number of nitrogen can vary depending on the compound or context in which it is found. Nitrogen typically exhibits oxidation numbers ranging from -3 to +5.

In most organic compounds, nitrogen has an oxidation number of -3, such as in ammonia (NH_3) or amines (R_3N), where the nitrogen atom has three bonds to other atoms and no formal charge.

In compounds like nitric acid (HNO_3) or nitrates (NO_3^-), nitrogen has an oxidation number of +5.

However, it's important to note that there are exceptions and other oxidation states for nitrogen are possible in certain compounds or coordination complexes.

Question 4. Find the approximate value of $(25.2)^{1/2}$.

Answer. 5.02

Solution. The approximate value of $(25.2)^{1/2}$ can be found by taking the square root of 25.2. Using a calculator or mathematical software, the square root of 25.2 is approximately 5.02.

Therefore, $(25.2)^{1/2} \approx 5.02$.

Question 5. Which of the following has the highest Boiling Point?

- (A) Chloromethane
- (B) Fluoromethane
- (C) Bromomethane
- (D) Iodomethane

Answer. D

Solution. The boiling point of a compound is influenced by various factors, including the strength and nature of intermolecular forces. In this case, we can compare the compounds based on the polarity and strength of the halogen bonding.

Among the given compounds, the polarity and intermolecular forces increase in the order: Fluoromethane (B) < Chloromethane (A) < Bromomethane (C) < Iodomethane (D)

As we move down the halogen group, the size and polarizability of the halogen atoms increase. Larger halogen atoms induce stronger van der Waals forces, resulting in higher boiling points.

Therefore, Iodomethane (D) is expected to have the highest boiling point among the given compounds.

Question 6. Which of the following is a trisaccharide?

- (A) Maltose
- (B) Lactose
- (C) Raffinose
- (D) Stachyose

Answer. C

Solution. Among the given options, the trisaccharide is (C) Raffinose.

Maltose (A) is a disaccharide composed of two glucose units linked together.

Lactose (B) is also a disaccharide, consisting of a glucose unit linked to a galactose unit.

Raffinose (C) is a trisaccharide made up of one glucose molecule, one fructose molecule, and one galactose molecule.

Stachyose (D) is a tetrasaccharide composed of two galactose units, one glucose unit, and one fructose unit.

Therefore, the trisaccharide among the given options is Raffinose (C).

Question 7. A man takes a step forward with probability 0.4 and backward with probability 0.6. The probability that at the end of eleven steps he is one step away from starting point is?

Question 8. If mutual inductance $M = 3H$, $L_1 = 4H$, $L_2 = 9H$, then the coefficient of coupling will be equal to?

Question 9. Diagonal relationship of Be is with which element?

Question 10. At the pure inductive stage, find e_{\max} .

Question 11. Find the Current unit conversion from SI to CGI.

Question 12. Find the ratio of the t_0 and t for a first-order reaction.

Question 13. If Bromopropane and Bromomethane were treated with sodium and ether, then what is the product?

Question 14. ΔH and ΔS were given, find ΔG (Gibbs energy)?

Question 15. Find $\int (\cos \sqrt{x}) dx = ?$

Question 16. Find the value of $\int \sin 2x \cos 2x dx = ?$

Question 17. Find the equivalent of $p \wedge (q \vee r) \vee \sim (r \wedge \sim (p \wedge q))$.

Question 18. Two lines $2x = 3y = -z$ and $6x = -y = -4z$ intersect at a point, then find the angle between them.

Question 19. Find $\tan^{-1}[(1 - \sin x + \cos x)/(1 + \sin x - \cos x)] = ?$