TS EAMCET 2025 April 30 Question Paper With Solution

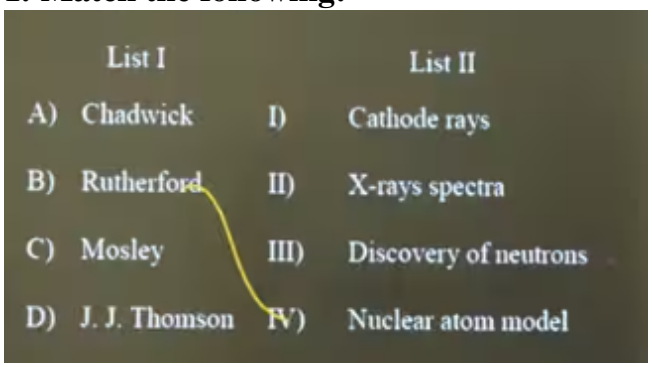
Time Allowed :3 Hours	**Maximum Marks : 160**	**Total Questions :**160

General Instructions

Read the following instructions very carefully and strictly follow them:

1. This question paper comprises 160 questions.
2. The Paper is divided into three parts- Biology, Physics and Chemistry.
3. There are 40 questions in Physics, 40 questions in Chemistry and 80 questions in Biology.
4. For each correct response, candidates are awarded 1 marks.

1. Match the following:



Solution: - Chadwick is known for the **Discovery of neutrons**, so A corresponds to III.

- Rutherford is associated with the **Nuclear atom model**, as he proposed the nuclear model of the atom based on his gold foil experiment, so B corresponds to IV.

- Mosley worked on **X-rays spectra**, where he studied X-ray spectra and established Moseley's law, so C corresponds to II.

- J. J. Thomson discovered **Cathode rays**, so D corresponds to I.

Thus, the correct matching is: A-III, B-IV, C-II, D-I

Quick Tip

Chadwick discovered neutrons, Rutherford proposed the nuclear atom model, Mosley studied X-rays spectra, and J.J. Thomson discovered cathode rays.

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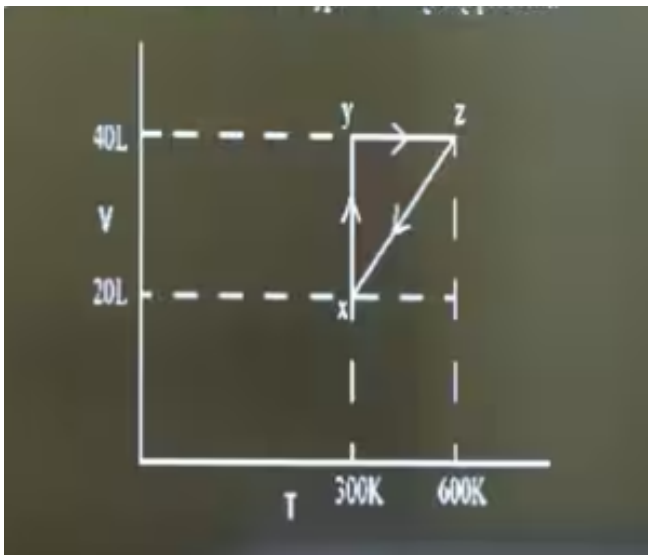
2. The following graph indicates the system containing 1 mole of gas involving various steps. When it moves from Z to X, the type of undergoing process is:



(1) Cyclic

(2) Isothermal

(3) Isobaric

Solution: :

The x-axis represents temperature (T), and the y-axis represents volume (V) of the gas.

The line from point Z to point X is a **horizontal line**, which indicates that the temperature remains constant during this process. In thermodynamics, when the temperature of a system remains constant, it is called an **isothermal process**.

In an **isothermal process**, the temperature does not change, and the system can either absorb or release heat to maintain that constant temperature. This is why the graph shows a horizontal line, meaning the temperature (T) remains constant (in this case, between 300K and 600K).

Thus, the correct answer is **Isothermal**.

Quick Tip

In an isothermal process, the temperature remains constant, which is represented by a horizontal line on a temperature vs. volume graph.

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3. Which of the following options represents the correct ionic radii in Å of N^{3-}, O^{2-}, and F^{-} respectively?

(1) 1.71, 1.36 and 1.40

(2) 1.71, 1.40 and 1.36

(3) 1.36, 1.40 and 1.71

(4) 1.40, 1.36 and 1.71

Correct Answer: (2) 1.71, 1.40 and 1.36

Solution: To understand the ionic radii of N^{3-}, O^{2-}, and F^{-}, let us consider the following points:

The ionic radius is the effective size of an ion in a crystal lattice.

The ionic radius depends on the charge of the ion: the more negative the charge, the larger the ionic radius, as additional electrons increase electron-electron repulsion.

For the same element in different ionic states, the more negatively charged ion will generally have a larger ionic radius because of the greater repulsion between the added electrons.

Now, let's examine each ion:

N^{3-} (Nitride ion) has the highest negative charge $(3-)$, which means it has gained three electrons. The added electrons cause the electron-electron repulsion to be high, which leads to an increase in size. This results in the largest ionic radius among the three ions. The ionic radius of N^{3-} is **1.71 Å**.

O^{2-} (Oxide ion) has a charge of $2-$, meaning it has gained two electrons. It has less repulsion compared to N^{3-} but still exhibits a larger size than F^{-}. The ionic radius of O^{2-} is **1.40 Å**.

F^{-} (Fluoride ion) has the smallest negative charge $(1-)$, which means it has only gained one electron. Since it has the least repulsion between electrons, it will have the smallest ionic radius among the three. The ionic radius of F^{-} is **1.36 Å**.

Thus, the correct order of ionic radii is:

$N^{3-} > O^{2-} > F^{-}$

So, the correct answer is option (2) **1.71, 1.40, and 1.36**.

Quick Tip

In anions, as the negative charge increases (more electrons added), the ionic radius increases due to greater electron-electron repulsion. Thus, N^{3-} has the largest ionic radius, followed by O^{2-}, and F^{-} has the smallest.
