TS PGECET 2025 Question Paper With Solutions

Time Allowed :2 Hours	**Maximum Marks :**120	**Total questions :**120

General Instructions

Read the following instructions very carefully and strictly follow them:

1. **Mode of Examination:** Online (Computer-based examination)
2. **Medium of Exam:** English
3. **Duration of Exam:** 2 hours
4. **Type of Questions:** Multiple-choice questions
5. **Number of Questions:** 120 Questions
6. **Total Marks:** 120 Marks
7. **Marking Scheme:**
   - 1 mark for each correct answer.
   - No negative markings for incorrect answers.

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1. What is the principle of the operation of a hydraulic press?

(A) Pascal's Law

(B) Archimedes' Principle

(C) Bernoulli's Theorem

(D) Hooke's Law

Correct Answer: (A) Pascal's Law

Solution:

The principle of operation of a hydraulic press is based on Pascal's Law, which states that the pressure exerted on a confined fluid is transmitted undiminished in all directions. In a hydraulic press, a small force applied to a small-area piston results in a large force on a large-area piston, due to the equal transmission of pressure. Therefore, the correct answer is:

$$\boxed{(A)\text{ Pascal's Law}}$$

Quick Tip

Pascal's Law is used in all hydraulic machines, such as hydraulic presses, jacks, and lifts.

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2. Which of the following elements has the highest atomic number?

(A) Uranium

(B) Neptunium

(C) Plutonium

(D) Rutherfordium

Correct Answer: (D) Rutherfordium

Solution:

The atomic numbers of the elements are:

- Uranium (U) has an atomic number of 92.

- Neptunium (Np) has an atomic number of 93.

- Plutonium (Pu) has an atomic number of 94.

- Rutherfordium (Rf) has an atomic number of 104.

Thus, Rutherfordium has the highest atomic number among the options. Therefore, the correct answer is:

$$\boxed{(D)\,\text{Rutherfordium}}$$

Quick Tip

The atomic number of an element increases with the addition of protons to its nucleus, so check periodic tables for the latest elements.

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3. Which of the following is a valid method for solving a system of linear equations?

(A) Gaussian Elimination

(B) Cramer's Rule

(C) Matrix Inversion Method

(D) All of the above

Correct Answer: (D) All of the above

Solution:

All the listed methods are valid for solving a system of linear equations:

1. Gaussian Elimination: A systematic method to reduce the system to row echelon form.

2. Cramer's Rule: A method using determinants to solve linear equations.

3. Matrix Inversion Method: Involves finding the inverse of the coefficient matrix to solve the system.

Thus, the correct answer is:

$$\boxed{(D)\,\text{All of the above}}$$

Quick Tip

Use Gaussian elimination for large systems and Cramer's rule for smaller systems with a unique solution.

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4. Which of the following is the unit of electric charge?

(A) Volt

(B) Ampere

(C) Coulomb

(D) Ohm

Correct Answer: (C) Coulomb

Solution:

The unit of electric charge is the Coulomb (C). It is defined as the amount of charge transported by a current of one ampere in one second. Therefore, the correct answer is:

$$\boxed{(C)\,\text{Coulomb}}$$

Quick Tip

To remember the unit of charge, recall that it is defined through the relationship between current (in amperes) and time (in seconds).

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5. Which of the following represents the correct relationship between the speed of light c, frequency ν, and wavelength λ?

(A) $c = \nu\lambda$

(B) $c = \lambda\nu^2$

(C) $c = \frac{\nu}{\lambda}$

(D) $c = \lambda^2\nu$

Correct Answer: (A) $c = \nu\lambda$

Solution:

The speed of light c is related to frequency ν and wavelength λ by the equation:

$$c = \nu\lambda$$

where:

- c is the speed of light (approximately 3×10^8 m/s),

- ν is the frequency of the light wave,

- λ is the wavelength.

Thus, the correct answer is:

$$\boxed{(A)\, c = \nu\lambda}$$

Quick Tip

Remember that the speed of light is the product of frequency and wavelength for electromagnetic waves.

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6. Which of the following is a type of nuclear decay that involves the emission of an alpha particle?

(A) Alpha decay

(B) Beta decay

(C) Gamma decay

(D) Neutron emission

Correct Answer: (A) Alpha decay

Solution:

Alpha decay is a type of nuclear decay in which an unstable nucleus emits an alpha particle (consisting of two protons and two neutrons). This results in the formation of a new element. Beta decay involves the emission of electrons or positrons, and gamma decay involves the emission of gamma rays. Neutron emission is a separate type of decay. Therefore, the correct answer is:

$$\boxed{(A)\ \text{Alpha decay}}$$

Quick Tip

In alpha decay, the atom loses two protons and two neutrons, reducing its atomic number by 2.

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7. The process of removing an electron from an atom is called:

(A) Ionization

(B) Dissociation

(C) Deionization

(D) Oxidation

Correct Answer: (A) Ionization

Solution:

Ionization refers to the process of removing one or more electrons from an atom or molecule, creating an ion. This can be achieved by adding energy to the atom. The other options refer to different chemical processes:

- Dissociation involves the breaking of a compound into its components.
- Deionization is the process of removing ions.
- Oxidation refers to the loss of electrons in a chemical reaction.

Thus, the correct answer is:

$$\boxed{(A)\ \text{Ionization}}$$

Quick Tip

Ionization always involves energy input to overcome the attraction between the electron and the nucleus.

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8. What is the unit of electrical resistance?

(A) Ampere

(B) Volt

(C) Ohm

(D) Watt

Correct Answer: (C) Ohm

Solution:

The unit of electrical resistance is the Ohm (), named after the German physicist Georg Simon Ohm. The resistance of a conductor is defined as the ratio of the voltage applied to the current that flows through it:

$$R = \frac{V}{I}$$

where R is the resistance, V is the voltage, and I is the current. Therefore, the correct answer is:

$$\boxed{(C)\,\text{Ohm}}$$

Quick Tip

Remember that the unit of resistance is Ohm, which is defined as one volt per ampere.

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9. Which of the following is the correct relationship for Ohm's Law?

(A) $V = I \times R$

(B) $V = R \div I$

(C) $I = V \div R$

(D) $R = V \div I$

Correct Answer: (A) $V = I \times R$

Solution:

Ohm's Law states that the voltage across a conductor is directly proportional to the current flowing through it, and the constant of proportionality is the resistance.

The equation is:

$$V = I \times R$$

where:

- V is the voltage,
- I is the current,
- R is the resistance.

Thus, the correct answer is:

$$\boxed{(A)\,V = I \times R}$$

Quick Tip

Ohm's law is fundamental in understanding circuits: Voltage is the product of current and resistance.

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10. Which of the following is an example of an exothermic reaction?

(A) Photosynthesis

(B) Combustion of methane

(C) Melting of ice

(D) Evaporation of water

Correct Answer: (B) Combustion of methane

Solution:

An exothermic reaction is one that releases energy in the form of heat. The combustion of methane is a classic example of an exothermic reaction, where methane reacts with oxygen to produce carbon dioxide and water, releasing energy:

$$\mathrm{CH_4} + 2\mathrm{O_2} \rightarrow \mathrm{CO_2} + 2\mathrm{H_2O} + \text{Energy}$$

Therefore, the correct answer is:

$$\boxed{(B)\,\text{Combustion of methane}}$$

Quick Tip

Exothermic reactions release heat, so look for reactions where energy is a product.
