AP EAPCET 2025 May 22 Shift 2 Question Paper

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

General Instructions

Read the following instructions very carefully and strictly follow them:

1. Duration of Exam: 3 Hours
2. Total Number of Questions: 160 Questions
3. Section-wise Distribution of Questions:
    - Physics - 40 Questions
    - Chemistry - 40 Questions
    - Mathematics - 80 Questions
4. Type of Questions: Multiple Choice Questions (Objective)
5. Marking Scheme: One mark awarded for each correct response
6. Negative Marking: There is no provision for negative marking.

1.

Evaluate the integral:

$$\int_0^1 \frac{\ln(1+x)}{1+x^2}\,dx$$

(A) $\frac{\pi}{8}\ln 2$

(B) $\frac{\pi}{4}\ln 2$

(C) $\frac{\pi}{8}\ln(1+\sqrt{2})$

(D) $\frac{\pi}{4}\ln(1+\sqrt{2})$

2.

If a and b are the roots of the equation $4x^2 - 12x + 11 = 0$, find the value of $a^2 + b^2$.

(A) $\frac{7}{2}$

(B) $\frac{5}{2}$

(C) $\frac{3}{2}$

(D) $\frac{1}{2}$

3.

A body of mass 4 kg is moving with a velocity of 3 m/s. What is its kinetic energy?

(A) 18 J

(B) 36 J

(C) 9 J

(D) 12 J

4.

Find the distance between the points $(2, 3)$ and $(5, 7)$ in the Cartesian plane.

(A) 5

(B) 4

(C) 6

(D) 7

5.

Find the determinant of the matrix:

$$\begin{bmatrix} 3 & 2 \\ 1 & 5 \end{bmatrix}$$

(A) 13

(B) 11

(C) 15

(D) 17

6.

How many grams of calcium carbonate ($\mathrm{CaCO_3}$) are required to completely neutralize 200 mL of 0.5 M HCl? Given the reaction:

$$\mathrm{CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2}$$

(Molar mass of $\mathrm{CaCO_3} = 100$ g/mol)

(A) 5.0 g

(B) 10.0 g

(C) 2.5 g

(D) 7.5 g

7.

A point charge of $+2\,\mu$C is placed at the origin. What is the magnitude of the electric field at a point 3 m away along the x-axis? (Use $k = 9 \times 10^9$ N·m^2/C^2)

(A) 2×10^3 N/C

(B) 6×10^3 N/C

(C) 4×10^3 N/C

(D) 8×10^3 N/C

8.

If $\sin\theta = \frac{3}{5}$ and θ is in the first quadrant, find the value of $\tan\theta$.

(A) $\frac{3}{4}$

(B) $\frac{4}{3}$

(C) $\frac{3}{5}$

(D) $\frac{5}{4}$

9.

Calculate the enthalpy change (ΔH) for the combustion of 1 mole of methane ($\mathrm{CH_4}$) given the reaction:

$$\mathrm{CH_4}(g) + 2\mathrm{O_2}(g) \rightarrow \mathrm{CO_2}(g) + 2\mathrm{H_2O}(l)$$

Given bond energies: C–H = 413 kJ/mol, O=O = 498 kJ/mol, C=O = 803 kJ/mol, O–H = 467 kJ/mol.

(A) $-890\,\mathrm{kJ/mol}$

(B) $-802\,\mathrm{kJ/mol}$

(C) $-954\,\mathrm{kJ/mol}$

(D) $-726\,\mathrm{kJ/mol}$

10.

A car accelerates uniformly from rest to a speed of 20 m/s in 8 seconds. What is the distance covered by the car during this time?

(A) 80 m

(B) 160 m

(C) 100 m

(D) 120 m

11.

A bag contains 4 red and 5 blue balls. One ball is drawn at random. What is the probability that it is red?

(A) $\frac{4}{9}$

(B) $\frac{5}{9}$

(C) $\frac{2}{9}$

(D) $\frac{1}{3}$

12.

For a first-order reaction, the concentration of a reactant decreases from 0.8 M to 0.4 M in 20 minutes. What is the half-life of the reaction? (Use $\ln 2 = 0.693$)

(A) 20 min

(B) 10 min

(C) 40 min

(D) 15 min

13.

A force of 10 N acts on a 2 kg object initially at rest, moving it 8 m along a straight line. What is the work done by the force? Assume the force is parallel to the displacement.

(A) 80 J

(B) 40 J

(C) 120 J

(D) 20 J
