JEE Main 2025 Apr 3 Shift 1 Question Paper

Time Allowed :3 HourMaximum Marks :300Total Questions :75

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 75 questions. The maximum marks are 300.
- 3. There are three parts in the question paper consisting of Physics, Chemistry and Mathematics having 25 questions in each part of equal weightage.
- 4. Each part (subject) has two sections.

(i) Section-A: This section contains 20 multiple choice questions which have only one correct answer. Each question carries 4 marks for correct answer and -1 mark for wrong answer.

(ii) Section-B: This section contains 5 questions. The answer to each of the questions is a numerical value. Each question carries 4 marks for correct answer and -1 mark for wrong answer. For Section-B, the answer should be rounded off to the nearest integer.

1. The work function of a metal 3eV. The colour of the visible light that is required to cause emission of photo electrons is:

- (1) Yellow
- (2) Blue
- (3) Red
- (4) Green

2. A force of 49 N acts tangentially at the highest point of a sphere (solid of mass 20 kg) kept on a rough horizontal plane. If the sphere rolls without slipping, then the acceleration of the center of the sphere is:

(1) 0.25 m/s²
(2) 2.5 m/s²
(3) 3.5 m/s²
(4) 0.35 m/s²

3. A particle is released from height *s* above the surface of the earth. At a certain height its K.E is 3 times of P.E. The height from the surface of the earth and the speed of the particle at the instant are respectively:

(1) $\frac{s}{4}$, $\sqrt{\frac{3gs}{2}}$ (2) $\frac{s}{2}$, $\sqrt{\frac{3gs}{2}}$ (3) $\frac{s}{2}$, $\sqrt{\frac{3gs}{2}}$ (4) $\frac{s}{4}$, $\sqrt{\frac{3gs}{2}}$

4. The electrostatic potential on the surface of a uniformly charged spherical shell of radius R = 10 cm is 120 V. The potential at the centre of the shell, at a distance 5 cm from the centre, and at a distance 15 cm from the centre of the shell are:

- $(1)\,40\,V,40\,V,80\,V$
- (2) 120 V, 120 V, 80 V
- $(3)\ 0\ V, 120\ V, 40\ V$
- (4) 0 V, 0 V, 80 V

5. In YDSE, light of intensity 4*I* and 9*I* passes through two slits respectively. Difference of maximum and minimum intensity of interference pattern is:

- (1) I
- (2) 3*I*
- (3) 5I
- (4) 4I

^{6.} Power of point source is 450 watts. Radiation pressure on a perfectly reflecting

surface at a distance of 2 meters is:

(1) 1.5×10^{-8} (2) 3×10^{-8} (3) 0(4) 6×10^{-8}

7. Which of the following ions shows spin only magnetic moment of 4.9 B.M.?

- (1) Mn^{2+}
- (2) Cr^{2+}
- (3) Fe^{3+}
- (4) Co^{2+}

8. Which of the following has the highest atomic number?

- (1) Po
- (2) Pt
- (3) Pr
- (4) Pb

9. Order of limiting molar conductivities of these cations at 298 K is:

(1) H⁺, Ca²⁺, Na⁺, Li⁺, K⁺, Mg²⁺
 (2) H⁺, Na⁺, Ca²⁺, Li⁺, K⁺, Mg²⁺
 (3) H⁺, Li⁺, Na⁺, Ca²⁺, Mg²⁺, K⁺
 (4) H⁺, Li⁺, K⁺, Na⁺, Mg²⁺, Ca²⁺

10. An ideal gas with an adiabatic exponent 1.5, initially at 27°C is compressed adiabatically from 800 cc to 200 cc. The final temperature of the gas is:

- (1) 700 K
- (2) 500 K
- (3) 250 K
- (4) 600 K

11. 0.5 g of an organic compound gives 1.46 g CO_2 and 0.9 g H_2O . Find the percentage composition of carbon.

12. Match the following List-I with List-II and choose the correct option:

List-I (Compounds) — List-II (Shape and Hybridisation)

(A) PF_3 (I) Tetrahedral and sp^3

(B) SF_6 (II) Square planar and dsp^2

(C) Ni(CO)₄ (III) Octahedral and sp^3d^2

(D) $[PtCl_4]^{2-}$ (IV) Trigonal bipyramidal and sp³d

(1) A-IV, B-III, C-I, D-II

(2) A-II, B-III, C-I, D-IV

(3) A-III, B-IV, C-II, D-I

(4) A-IV, B-III, C-I, D-I

13. In YDSE, light of intensity 4I and 9I passes through two slits respectively. The difference of maximum and minimum intensity of the interference pattern is:

(1) 15I

(2) 20I

(3) 24I

(4) 21I

14. Let A be a 3×3 matrix such that det(A) = 5. If $det(3 adj(2A)) = 2^{\alpha} \cdot 3^{\beta} \cdot 5^{\gamma}$, then

 $(\alpha + \beta + \gamma)$ is equal to:

(1) 25

(2) 27

- (3) 26
- (4) 28

15. The sum of all rational numbers in $(2 + \sqrt{3})^8$ is:

- (1) 19117
- (2) 18817
- (3) 18280
- (4) 19000

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16. If the sum, \sum_{r=1}^{9} \frac{r+3}{2r} \cdot {9 \choose r} is equal to \alpha \cdot \left(\frac{3}{2}\right)^9 - \beta, then the value of (\alpha + \beta)^2 is equal to:
(1) 81
(2) 9
(3) 36
(4) 27
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