MHT CET 2026 April 20 Shift 1

Question Paper (Memory Based)

Conducted by CET Cell, Maharashtra

General Instructions

(i) **Duration:** The total duration of the examination is 3 hours (180 minutes).

(ii) **Total Marks:** The complete paper carries a maximum of 200 marks.

(iii) **Structure:** The paper has 3 Sections:

- **Section A:** 50 Multiple Choice Questions (Physics)
- **Section B:** 50 Multiple Choice Questions (Chemistry)
- **Section C:** 50 Multiple Choice Questions (Mathematics)

(iv) **Compulsory Questions:** All 150 questions are compulsory.

(v) Each question has four options. Only **one** option is correct.

(vi) **Right Answer:** Physics (+1 marks), Chemistry (+1 marks) and Mathematics (+2 marks).

(vii) **Incorrect Answer:** (No Negative marking).

(viii) **Unanswered/Marked for Review:** 0 marks.

1. If the vectors $2\hat{i}-\hat{j}+\hat{k}$, $\hat{i}+2\hat{j}-3\hat{k}$ and $3\hat{i}+a\hat{j}+5\hat{k}$ are coplanar, find the value of a.

(A) 4

(B) -4

(C) 2

(D) -2

---

2. Find the area of the region bounded by the curve $y^2=8x$ and the line $x=2$.

(A) $\frac{28}{3}$ sq. units

(B) $\frac{32}{3}$ sq. units

(C) $\frac{16}{3}$ sq. units

(D) $\frac{20}{3}$ sq. units

---

3. Solve the differential equation $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$ given $y(0) = 1$.

(A) $\tan^{-1} y = \tan^{-1} x + \frac{\pi}{6}$

(B) $\tan^{-1} y = \tan^{-1} x + \frac{\pi}{4}$

(C) $\tan^{-1} y = \tan^{-1} x + \frac{\pi}{3}$

(D) $\tan^{-1} y = \tan^{-1} x + \frac{\pi}{2}$

---

4. In a Binomial distribution with $n = 10$ and $p = 0.4$, find the variance.

(A) 2.0

(B) 2.4

(C) 4.0

(D) 3.2

---

5. Find the direction cosines of a line that makes equal angles with the coordinate axes.

(A) $\pm\frac{1}{\sqrt{2}}, \pm\frac{1}{\sqrt{2}}, 0$

(B) $\pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}, \pm\frac{1}{\sqrt{3}}$

(C) $\pm\frac{1}{2}, \pm\frac{1}{2}, \pm\frac{1}{2}$

(D) $\pm 1, 0, 0$

---

6. Calculate the de Broglie wavelength of an electron accelerated through a potential of $100\,\text{V}$.

(A) $1.227\,\text{Å}$

(B) $0.612\,\text{Å}$

(C) $2.45\,\text{Å}$

(D) $3.12\,\text{Å}$

---

7. A Carnot engine works between $600\,\text{K}$ and $300\,\text{K}$. Find its efficiency.

(A) 25%

(B) 40%

(C) 50%

(D) 60%

---

8. Calculate the energy stored in a $10\,\mu F$ capacitor charged to $50\,V$.

(A) $0.025\,J$

(B) $0.0125\,J$

(C) $0.05\,J$

(D) $0.1\,J$

---

9. Find the moment of inertia of a uniform ring of mass M and radius R about a tangent perpendicular to its plane.

(A) MR^2

(B) $2MR^2$

(C) $3MR^2$

(D) $4MR^2$

---

10. What is the major product when 2-bromopentane reacts with alcoholic KOH?

(A) Pent-1-ene

(B) Pent-2-ene

(C) Pentanol

(D) Pentanal

---

11. How many atoms are present in a unit cell of a body-centered cubic (BCC) lattice?

(A) 1

(B) 2

(C) 3

(D) 4

---

12. Which reagent is used in the Lucas test to distinguish alcohols?

(A) $\mathrm{ZnCl_2} + HCl$

(B) $KMnO_4$

(C) $NaOH$

(D) H_2SO_4

---

13. Calculate the osmotic pressure of $0.1\,M$ glucose at $27^\circ C$.

(A) 1.23 atm

(B) 2.46 atm

(C) 4.92 atm

(D) 0.82 atm

---

14. What is the hybridization of the central sulfur atom in SF_6?

(A) sp^3

(B) sp^3d

(C) sp^3d^2

(D) sp^2
