MHT CET 2026 Mathematics Memory Based Question paper PDF

Mathematics

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) $\pm 1, 0, 0$

Physics

6. Calculate the de Broglie wavelength of an electron accelerated through a potential of 100V.

   (a) 1.227 Å
   (b) 0.612 Å
   (c) 2.45 Å
   (d) 3.12 Å

7. A Carnot engine works between 600K and 300K. 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) $4MR^2$

Chemistry

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) $ZnCl_2 + HCl$
    (b) $KMnO_4$
    (c) NaOH

(d) H_2SO_4

13. Calculate the osmotic pressure of a 0.1 M glucose at 27°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