

MHT CET 2021 Mathematics Memory Based Question Paper PDF

1. Which of the following is a soft metal?
 - (a) Sodium (Na)
 - (b) Iron (Fe)
 - (c) Copper (Cu)
 - (d) Aluminum (Al)
2. Find the area under the curve $x = y$ bounded by the lines $x = -1$ and $x = 2$ and the x-axis.
 - (a) 1.5 sq. units
 - (b) 2.0 sq. units
 - (c) 2.5 sq. units
 - (d) 3.0 sq. units
3. Which of the following is an α -amino acid?
 - (a) Glycine
 - (b) Benzoic acid
 - (c) Acetic acid
 - (d) Aniline
4. If $A \cdot \text{adj}(A) = \begin{bmatrix} -10 & 0 & 0 \\ 0 & -10 & 0 \\ 0 & 0 & -10 \end{bmatrix}$, then the value of $|A|$ is:
 - (a) 10
 - (b) -10
 - (c) 100
 - (d) -1000
5. Which of the following is the least acidic?
 - (a) HF
 - (b) HCl
 - (c) HBr
 - (d) HI

6. Which polymer is commonly used for making shopping bags?
- (a) LDP (Low-Density Polyethylene)
 - (b) PVC
 - (c) Nylon-6,6
 - (d) Terylene
7. Which of the following polymers is used in the manufacturing of tyres?
- (a) Neoprene
 - (b) SBR (Styrene-Butadiene Rubber)
 - (c) PHBV
 - (d) PAN
8. The maximum area of a rectangle that can be inscribed in a circle of radius r is:
- (a) r^2
 - (b) $\sqrt{2}r^2$
 - (c) $2r^2$
 - (d) $4r^2$
9. If $a \sin \theta = b \cos \theta$, then the value of $a \cos 2\theta + b \sin 2\theta$ is:
- (a) a
 - (b) b
 - (c) a/b
 - (d) b/a
10. The volume of a unit cell in a BCC (Body-Centered Cubic) lattice in terms of atomic radius r is:
- (a) $\frac{64r^3}{3\sqrt{3}}$
 - (b) $8r^3$
 - (c) $\frac{16\sqrt{2}r^3}{3}$
 - (d) $\frac{12.4r^3}{\sqrt{2}}$
11. What product is formed when vapors of phenol and hydrogen are passed over a nickel catalyst?
- (a) Benzene
 - (b) Cyclohexane
 - (c) Cyclohexanol
 - (d) Cyclohexanone
12. A stone is projected in two ways: (1) Vertically upwards with velocity V , and (2) With velocity V at an angle of 60° with the vertical. What is the ratio of their Potential Energies at the highest point?

- (a) 4 : 1
(b) 1 : 4
(c) 2 : 1
(d) 1 : 2
13. Evaluate the integration $\int_0^4 x \cdot [x] dx$, where $[x]$ is the greatest integer function.
- (a) 15
(b) 17
(c) 18.5
(d) 21
14. If the velocity of a particle is given by $v = 6t - \frac{t^2}{2}$ and the distance at $t = 0$ is 0, what is the distance covered at $t = 3$ seconds?
- (a) 18.5 m
(b) 22.5 m
(c) 27 m
(d) 31.5 m
15. If $|\vec{a}| = 5$, $|\vec{b}| = 4$, and the vectors $(\vec{a} + k\vec{b})$ and $(\vec{a} - k\vec{b})$ are perpendicular to each other, the value of k is:
- (a) $\frac{3}{4}$
(b) $\frac{4}{5}$
(c) $\frac{5}{4}$
(d) 1
16. For the equation of a pair of straight lines $ax^2 + bxy - y^2 = 0$, the tangent of the angle θ between the two lines is:
- (a) $\frac{b}{1+a}$
(b) $\frac{\sqrt{b^2+4a}}{a-1}$
(c) $\frac{2\sqrt{b^2/4+a}}{a-1}$
(d) $\frac{b}{a-1}$
17. Two particles of mass m are attached to the ends of a massless rod of length l . The radius of gyration for an axis through the midpoint of the rod is k and the angular momentum is L . The angular frequency ω is:
- (a) $\frac{L}{2mk^2}$
(b) $\frac{L}{mk^2}$
(c) $\frac{2L}{mk^2}$
(d) $\frac{L}{m^2k}$
18. In a triangle with usual notations, if a^2, b^2, c^2 are in A.P., then the value of $\frac{\sin 3B}{\sin B}$ is:

- (a) $\frac{a^2-c^2}{ac}$
(b) $1 - \frac{a^2+c^2}{b^2}$
(c) $\frac{4b^2-(a^2+c^2)}{2ac}$
(d) Value depends on constants
19. A circle with centre $(2, 5)$ has a chord whose midpoint is $(1, 2)$. What is the equation of the chord?
- (a) $x + 3y - 7 = 0$
(b) $x - 3y + 5 = 0$
(c) $3x + y - 5 = 0$
(d) $x + 2y - 5 = 0$