

MHT CET 2021 Mathematics Memory Based Question Paper PDF

1. Find the area of the region bounded by the parabola $y^2 = 4ax$ and the line $x = a$.
 - (1) $\frac{4}{3}a^2$
 - (2) $\frac{8}{3}a^2$
 - (3) $\frac{16}{3}a^2$
 - (4) $\frac{2}{3}a^2$
2. If $3 \sin 2x = 2 \sin 3x$, then what is the value of $\sin x$?
 - (1) 0
 - (2) $\pm\sqrt{\frac{1}{2}}$
 - (3) $\pm\sqrt{\frac{1}{4}}$
 - (4) $\pm\sqrt{\frac{1}{3}}$
3. Which of the following represents the vector equation for the foot of the normal drawn from a point to a line?
 - (1) $\vec{a} + \left(\frac{(\vec{p}-\vec{a}) \cdot \vec{b}}{|\vec{b}|^2} \right) \vec{b}$
 - (2) $\vec{a} - \left(\frac{(\vec{p}-\vec{a}) \cdot \vec{b}}{|\vec{b}|^2} \right) \vec{b}$
 - (3) $\vec{b} + \left(\frac{(\vec{p}-\vec{b}) \cdot \vec{a}}{|\vec{a}|^2} \right) \vec{a}$
 - (4) $\frac{\vec{a} \cdot \vec{b}}{|\vec{b}|}$
4. The area enclosed between the parabolas $y^2 = 8x$ and $x^2 = 8y$ is:
 - (1) $64/3$
 - (2) $16/3$
 - (3) $32/3$
 - (4) $8/3$
5. Which protein is primarily found in human nails and hair?

- (1) Myosin
 - (2) Keratin
 - (3) Albumin
 - (4) Hemoglobin
6. Evaluate the integral: $\int_0^1 |5x - 3| dx$
- (1) 13/10
 - (2) 17/10
 - (3) 9/10
 - (4) 11/10
7. The equation of the plane passing through the midpoint of segment AB and perpendicular to AB , where A and B are given points, is known as:
- (1) Normal form
 - (2) Perpendicular bisector plane
 - (3) Intercept form
 - (4) Two-point form
8. Find the projection of vector $\vec{a}$ on vector $\vec{b}$ if $\vec{a} = 2\hat{i} + 3\hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + 2\hat{j} + 2\hat{k}$.
- (1) 10/3
 - (2) 8/3
 - (3) 11/3
 - (4) 7/3
9. In a simple cubic structure, the relation between edge length a and radius of atom r is:
- (1) $a = 2r$
 - (2) $a = 4r/\sqrt{3}$
 - (3) $a = 2\sqrt{2}r$
 - (4) $a = r/2$
10. Evaluate the integral: $\int e^{(e^x+x)} dx$
- (1) $e^{e^x} + C$
 - (2) $e^x + C$

(3) $e^{(e^x+x)} + C$

(4) $xe^x + C$

11. Find the order and degree of the differential equation: $\left(\frac{d^2y}{dx^2}\right)^{1/3} = \left(\frac{dy}{dx}\right)^{1/2}$

(1) 2, 3

(2) 2, 2

(3) 1, 3

(4) 2, 1

12. If the differential equation is given as $3\sqrt{y''} = \sqrt{y'}$, then its order and degree are respectively:

(1) 2, 2

(2) 2, 1

(3) 2, 3

(4) 1, 3

13. In a bipolar junction transistor, the relationship between emitter current (I_e), base current (I_b), and collector current (I_c) is:

(1) $I_b = I_e + I_c$

(2) $I_e = I_b + I_c$

(3) $I_c = I_e + I_b$

(4) $I_e = I_c - I_b$

14. The area formed by the intersection of $y^2 = 8x$ and $x^2 = 8y$ is:

(1) $32/3$

(2) $16/3$

(3) $64/3$

(4) $8/3$

15. Evaluate: $\int_0^\pi \frac{1}{4+3\cos x} dx$

(1) Zero

(2) $\sqrt{7}/2$

(3) $\pi/\sqrt{7}$

(4) $2/\sqrt{7}$

16. Which of the following pairs are the monomers of Terylene (Dacron)?
- (1) Ethylene glycol and Phthalic acid
 - (2) Ethylene glycol and Terephthalic acid
 - (3) Adipic acid and Hexamethylene diamine
 - (4) Phenol and Formaldehyde
17. Which of the following represents the correct formula for the rate constant (k) of a zero-order reaction?
- (1) $k = \frac{[A]_0 - [A]_t}{t}$
 - (2) $k = \frac{2.303}{t} \log \frac{[A]_0}{[A]_t}$
 - (3) $k = \frac{1}{t} \left(\frac{1}{[A]_t} - \frac{1}{[A]_0} \right)$
 - (4) $k = \frac{0.693}{t}$
18. A fair coin is tossed 100 times. What is the probability that the head comes an even number of times?
- (1) 1/8
 - (2) 3/8
 - (3) 1/2
 - (4) 3/4
19. Which of the following is an example of an extensive property?
- (1) Temperature
 - (2) Viscosity
 - (3) Surface Tension
 - (4) Heat capacity
20. Teflon (Polytetrafluoroethylene) is prepared by the polymerization of which monomer?
- (1) Vinyl chloride
 - (2) Tetrafluoroethene
 - (3) Styrene
 - (4) Isoprene
21. In a Galvanic cell consisting of Nickel and Copper electrodes, which electrode acts as the oxidizing agent (undergoes reduction) in the standard state?

- (1) Ni^{2+}
- (2) Cu^{2+}
- (3) Ni
- (4) Cu

