MATHS

BOOKS - MCGROW HILL EDUCATION MATHS (HINGLISH)

JEE (Main) 2020 QUESTIONS WITH SOLUTION B.ARCH (6TH JAN-AFTERNOON

Multiple Choice Questions

1. The ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, (a > b)$ passes through $(2, 3)$ and have eccentricity equal to $\frac{1}{2}$.

Then find the equation of normal to the ellipse at $(2, 3)$.

A. 2y-x=4

B. 2x-y=1

C. 3x-2y=0

D. 3x-y=3

Answer: B

> ▶ **Watch Video Solution**

2.

$$\lim_{x \to 1} \left\{ \log_e \left(e^{x(x-1)} - e^{x(1-x)} \right) - \log_e (4x(x-1)) \right\}$$

is equal to :

A. $-2\log_e 2$

B. 1

C. $1 - \log_e 2$

D. $-\log_e 2$

Answer: D

▶ **Watch Video Solution**

3. The area (in sq. units) of the region $\{(x, y) : 3/2 \le y \le \sin x, 0 \le x \le \pi\}$ is :

A. $3 - 2\pi/3$

B. $\sqrt{3} - \pi/6$

C. $3 - \pi/3$

D. $\sqrt{3} - \pi/3$

Answer: D

4. A bag contains 6 red balls and 10 green balls. 3 balls are drawn from it one by one randomly without replacement. If the third ball drawn is red, then the probability that first two balls are green is:

A. $3/7$

B. $9/49$

C. $9/56$

D. $3/8$

Answer: A

▶ **Watch Video Solution**

---

5. Let the data, 4, 10, x, y, 27 be in the increasing order. If the median of the data is 18 and its mean deviation about mean is 7.6, then the mean of this data is:

A. 17

B. 16

C. 16.5

D. 15.5

Answer: C

▶ **Watch Video Solution**

6. If a variable plane in 3-dimensional space moves in such a way that the sum of the reciprocals of its intercepts on the x and y-axes exceeds the reciprocal

of its intercept on the z-axis by 2, then all such planes will pass through the point:

A. (1/2, 1/2, -1/2)

B. (1/2, 1/2, 1/2)

C. (1/2, -1/2, -1/2)

D. (1/2, -1/2, 1/2)

Answer: A

▶ Watch Video Solution

7. If m be the least value of $|z - 3 + 4i|^2 + |z - 5 - 2i|^2$, $z \in C$ attained at

$z = z_0$, then the ordered pair $(|z_0|, m)$ is equal to :

A. $\left(\sqrt{13}, 10\right)$

B. $\left(\sqrt{17}, 20\right)$

C. $\left(\sqrt{17}, 10\right)$

D. $\left(\sqrt{13}, 20\right)$

Answer: B

▶ **Watch Video Solution**

8. Let $A = \begin{bmatrix} x & 2y \\ -1 & y \end{bmatrix}$, $x, y \in R$

If AA'=$\begin{bmatrix} 1 & 0 \\ 0 & \alpha \end{bmatrix}$ $(\alpha \in R)$, then $\alpha + y^2$ is equal to :

A. $\sqrt{2} - 1$

B. 1

C. 2

D. $\sqrt{2}$

Answer: D

▶ Watch Video Solution

9. A ray of light is projected from the origin at angle of $60°$ with the positive direction of x-axis towards the line, y = 2, which gets reflected from the point (α

,2). Then the distance of the reflected ray of light from the point (2, 2) is:

A. $3 - \sqrt{3}$

B. $\sqrt{3} - 1$

C. $1 - 1/\sqrt{3}$

D. $2(1 - 1/\sqrt{3})$

Answer: D

▶ **Watch Video Solution**

10. If $\displaystyle\sum_{r=1}^{9} \left(\frac{r+3}{2^r} \right) (.^9 C_r) = \alpha \left(\frac{3}{2} \right)^9 + \beta,$ then $\alpha + \beta$ is equal to :

A. 9

B. 3

C. 6

D. 2

Answer: B

▶ **Watch Video Solution**

11. Let S_n denote the sum of the first n terms of an A.P. , a_1, a_2, a_3,...,a_n. If $a_5 + a_9 = 1$ and $S_9 = 6$, then which one of the following is not true ?

A. $a_6 + a_8 = 1$

B. $S_6 = 19/2$

C. $S_{13} = 13/2$

D. $a_{13} = 0$

Answer: B

12. The function $f(x) = e^{x+1}(4x^2 - 16x + 11)$ is :

    A. decreasing in $(-\infty, -5/2) \cup (1/2, \infty)$

    B. decreasing in $(-\infty, 1/2) \cup (5/2, \infty)$

    C. increasing in $(-\infty, -2) \cup (2, \infty)$

    D. increasing in $(-\infty, -1/2) \cup (5/2, \infty)$

Answer: D

> ▶ **Watch Video Solution**

13. If $10 \sin^4 \alpha + 15 \cos^4 \alpha = 6,$ then find the value of $27 \cos ec^6 \alpha + 8 \sec^6 \alpha.$

A. 250

B. 280

C. 270

D. 240

Answer: A

▶ **Watch Video Solution**

14. Let a function , $f:(-1,3) \to R$ be defined as

f(x) =min {x[x], |x[x]-2|+2} , where [x] denotes the

greatest integer $\le x$. Then f is :

A. neither continuous nor differentiable at exactly 3 points.

B. not continuous at only one point and not differentiable at three points.

C. neither continuous nor differentiable at exactly two points.

D. not continuous at two points and not differentiable at three points.

Answer: D

▶ **View Text Solution**

15. If A = (1, 2, 3, 4), then the number of functions on the set A, which are not one-one, is:

    A. 240

    B. 248

    C. 232

    D. 256

Answer: C

▶ View Text Solution

16. If x=x(y) is the solution of the differential equation, $ydx - (x + 2y^2)dy = 0,$ with $x(-\pi) = \pi^2$, then x is equal to :

A. $-2y^2 + 3\pi y$

B. $2y^2 + \pi y$

C. $2y^2 - \pi^2$

D. $-y^2 - 2\pi y$

Answer: B

▶ **Watch Video Solution**

17. Which of the following is NOT equivalent to $\sim p \wedge q$?

    A. $\sim(q \rightarrow p)$

    B. $\sim p \wedge (\sim p \rightarrow q)$

    C. $\sim(p \vee \sim q)$

    D. $\sim p \rightarrow \sim q$

Answer: D

▶ **View Text Solution**

18. The sum of the values of x satisfying the equation,

$$\sqrt{x}\left(\sqrt{x} - 4\right) - 3\left|\sqrt{x} - 2\right| + 6 = 0 (x \geq 0), \text{ is :}$$

A. 26

B. 10

C. 25

D. 8

Answer: A

19. If the volume of a parallelopiped whose coterminus edges are a=i+j+2k, b=2i+λj+k and c=2i+2j+λk is 35 m^3, then a value of a.b + b.c - c.a is :

A. -10

B. 2

C. 22

D. -14

Answer: C

20. If for some $c < 0$, the quadratic equation, $2cx^2 - 2(2x - 1)x + 3c^2 = 0$ has two distinct real roots , 1/a and 1/b , and $\Delta = \begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix}$. Then Δ is equal to :

A. $4/3$

B. 0

C. 1

D. 2

Answer: D

▶ View Text Solution

21. v22

22. If the line joining the points A(-1,2,5) and B(3,4,-10) intersects the xy-plane at the point (x,y,z), then y/x is equal to _____

23.   Let

$$f(x) = \begin{cases} |x-3| & \text{,if } x < -1 \\ 3x + 4 & \text{,if } x \geq -1 \end{cases}, g(x) = x^2 - bx - 2$$

, $(x \in R)$ and b is a real constant. If gof is

continuous at x=-1, then b is equal to _____

24. If the total number of ways in which 8-digit

numbers can be formed by using all the digits 0, 1, 2,

3, 4, 5, 7, 9 such that no two even digits appear

together is (5!)k, then k is equal to _____

25. Let a, b $\in$ R and a $>$ 0. If the tangent at the point (2, 2) to the circle $x^2 + y^2 = 8$ touches the parabola y^2 = 4a(x- b), then b-a is equal to _____