

MHT CET 2024 May 16 Shift 1 & 2

Question Paper

Ques 1. A vector parallel to the line of intersection of the planes $\vec{r} \cdot (3\hat{i} - \hat{j} + \hat{k}) = 1$ and $\vec{r} \cdot (\hat{i} + 4\hat{j} - 2\hat{k}) = 2$ is

A $-2\hat{i} + 7\hat{j} + 13\hat{k}$

B $2\hat{i} - 7\hat{j} + 13\hat{k}$

C $-\hat{i} + 4\hat{j} + 7\hat{k}$

D $\hat{i} - 4\hat{j} + 7\hat{k}$

Ans. A

Ques 2. The angle between the lines, whose direction cosines l, m, n satisfy the equations $l + m + n = 0$ and $2l^2 + 2m^2 - n^2 = 0$, is

A 60°

B 180°

C 90°

D 30°

Ans. B

Ques 3. If X is a random variable with p.m.f. as follows.

$P(X = x) = \frac{5}{16}, x = 0, \frac{x}{48}, x = 1, \frac{1}{4}, x = 2, \frac{1}{4}, x = 3$ then $E(x)$

A 1.1875

B 1.3125

C 1.5625

D 0.5625

Ans. B

Ques 4. The surface area of a spherical balloon is increasing at the rate $2 \text{ cm}^2 / \text{sec}$. Then rate of increase in the volume of the balloon is, when the radius of the balloon is 6 cm.

- A** $4 \text{ cm}^3 / \text{sec}$
- B** $16 \text{ cm}^3 / \text{sec}$
- C** $36 \text{ cm}^3 / \text{sec}$
- D** $6 \text{ cm}^3 / \text{sec}$

Ans. D

Ques 5. If $f(x) = 2x^3 - 15x^2 - 144x - 7$, then $f(x)$ is strictly decreasing in

- A** $(-8, 3)$
- B** $(-3, 8)$
- C** $(3, 8)$
- D** $(-8, -3)$

Ans. B

Ques 6. If $y = (\sin x)^y$. then dy/dx is

- A.** $(y^2 \cot x) / (1 - y \log(\sin x))$
- B.** $(y^2 \cot x) / (1 - y \log(x))$
- C.** $(y^2 \cot x) / (1 + y \log(\sin x))$
- D.** $(y^2 \cot x) / (1 + y \log(x))$

Ans. A

Ques 7. If, $\sin^{-1} x + \cos^{-1} y = 3\pi/10$ then the value of $\cos^{-1} x + \sin^{-1} y$ is

- A** $\pi/10$
- B** $7\pi/10$
- C** $9\pi/10$
- D** $3\pi/10$

Ans. B

Ques 8. $\sin^{-1}[\sin(-600^\circ)] + \cot^{-1}(-\sqrt{3}) =$

- A $\pi/6$
- B $\pi/4$
- C $\pi/3$
- D $7\pi/6$

Ans. A

Ques 9. If $A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & a & 1 \end{bmatrix}$ and $A^{-1} = \frac{1}{2} \begin{bmatrix} 1 & -1 & 1 \\ -8 & 6 & 2c \\ 5 & -3 & 1 \end{bmatrix}$, then values of a and c are respectively

- A. $\frac{1}{2}, \frac{1}{2}$
- B. -1, 1
- C. 2, $-\frac{1}{2}$
- D. 1, -1

Ans. D

Ques 10. The p.m.f of random variate X is $P(X) = \begin{cases} \frac{2x}{n(n+1)}, & x = 1, 2, 3, \dots, n \\ 0, & \text{otherwise} \end{cases}$,
Then $E(X) =$

- A. $(n + 1)/3$
- B. $(2n + 1)/3$
- C. $(n + 2)/3$
- D. $(2n - 1)/2$

Ans. B