

# MHT CET 2024 May 16 Shift 1 & 2

## Question Paper

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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  $60^\circ$

B  $180^\circ$

C  $90^\circ$

D  $30^\circ$

Ans. B

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

$P(X = x) = \frac{5}{16}, x = 0, 1 = \frac{kx}{48}, x = 2, = \frac{1}{4}, x = 3$  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.  $1/2, 1/2$
- B. -1, 1
- C. 2,  $-1/2$
- 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