PREVIEW QUESTION BANK(Single)

Module Name : NCET Language: ENGLISH
Section Name : 319-Mathematics
Exam Date : 29-Apr-2025 Batch : 15:00-18:00

Sr. No.	Client Question ID	Question Body and Alternatives	Marks	Ne M
Section : 319-Mathematics				
Topic : Topic 102				
Q.Type : Objective Question				
1	6453	***This is mandatory question.** If C is a skew-symmetric matrix of order $n \times n$ and let B be a $n \times 1$ column matrix, then the matrix B^TCB is a : (1) Scalar matrix (2) Null matrix (3) Identity matrix (4) Diagonal matrix (A) 1 (B) 2 (C) 3 (D) 4	4.0	
Q.Type : Objective Question				
2	6454	***This is mandatory question.** If $a^2+b^2+c^2=-2$ and $f(x)=\begin{vmatrix} 1+a^2x & (1+b^2)x & (1+c^2)x \\ (1+a^2)x & 1+b^2x & (1+c^2)x \\ (1+a^2)x & (1+b^2)x & 1+c^2x \end{vmatrix}$, then $f(x)$ is a polynomial of degree : (1) 1 (2) 2 (3) 3 (4) 4 (A) 1 (B) 2 (C) 3 (D) 4	4.0	
Q.Type : Objective Question				
3	6455	***This is mandatory question.**	4.0	

If $e^y(x+1)=1$, where $x\neq -1$, then which of the following is true ?

(1) $\frac{d^2y}{dx^2} = -\frac{dy}{dx}$

(2) $\frac{d^2y}{dx^2} = \left(\frac{dy}{dx}\right)^2$

(3) $\frac{d^2y}{dx^2} = \frac{dy}{dx}$

(4) $\left(\frac{d^2y}{dx^2}\right)^2 = \left(\frac{dy}{dx}\right)^2$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

4 | 6456 | 4.0

*This is mandatory question.

If the function $f(x)=x^2-kx+5$ is increasing on [2, 4], then k lies in the interval :

(1) $(-\infty, 4)$
(2) $(4, \infty)$
(3) $(-\infty, 6)$
(4) $(2, \infty)$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

5 | 6457 | 4.0

*This is mandatory question.

$\int \frac{dx}{1+e^{-5x}}$ is equal to :

(1) $\frac{1}{5}\log_e|e^{-5x}| + C$

(2) $\frac{1}{5}\log_e|e^{5x}| + C$

(3) $\frac{1}{5}\log_e|1+e^{-5x}| + C$

(4) $\frac{1}{5}\log_e|1+e^{5x}| + C$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

6 | 6458 | 4.0

*This is mandatory question.

If [x] denotes the greatest integer function, then $\int_0^3 [x]\,dx$ is equal to :

(1) 0
(2) 1
(3) 2
(4) 3

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

7 | 6459 | 4.0

*This is mandatory question.

Match **List - I** with **List - II**.

List - I		**List - II**	
(A)	$\frac{d^3y}{dx^3}+\left(\frac{dy}{dx}\right)+y=0$	(I)	Order = 5, Degree = 1
(B)	$\frac{d^5y}{dx^5}+\left(\frac{d^3y}{dx^3}\right)^2+\left(\frac{dy}{dx}\right)^3+y=0$	(II)	Order = 3, Degree = 1
(C)	$\left(\frac{d^5y}{dx^5}\right)^2+\frac{d^3y}{dx^3}+y^3=0$	(III)	Order = 3, Degree = 2
(D)	$\frac{d^3y}{dx^3}-\left(\frac{dy}{dx}\right)^{1/2}=0$	(IV)	Order = 5, Degree = 2

Choose the **correct** answer from the options given below :

(1) (A)-(III), (B)-(I), (C)-(IV), (D)-(II)
(2) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)
(3) (A)-(III), (B)-(II), (C)-(IV), (D)-(I)
(4) (A)-(III), (B)-(IV), (C)-(I), (D)-(II)

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

8 | 6460 | 4.0

*This is mandatory question.

The random variable X has a probability distribution P(X) of the following form; where α is some unknown constant.

$$P(X=x)=\begin{cases}\alpha, & \text{if } x=0\\ 3\alpha-1, & \text{if } x=1\\ 5\alpha, & \text{if } x=3\\ \alpha, & \text{if } x=5\\ 0, & \text{otherwise}\end{cases}$$

Then the value of α is :

(1) $\frac{1}{10}$

(2) $\frac{1}{5}$

(3) $-\frac{1}{5}$

(4) $-\frac{1}{10}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

9 | 6461 | ***This is mandatory question.** | 4.0

Let X denote the difference between the number of heads and number of tails obtained when six coins are tossed simultaneously. Then the probability P(X<3) is equal to :

(1) $\frac{5}{16}$

(2) $\frac{5}{32}$

(3) $\frac{25}{32}$

(4) $\frac{15}{32}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

10 | 6462 | ***This is mandatory question.** | 4.0

Consider the following statements :

(A) The solution set of the inequality $2x + y > 5$ is open half plane not containing the origin.

(B) If the constraints in LPP are changed then the optimal solution will remain unchanged.

(C) Feasible region in LPP consists of only boundary lines formed by the constraints.

(D) The common region determined by all the constraints of an LPP is called feasible region.

(E) A solution of an LPP is an infeasible solution if the system of constraints has infinitely many intersection points.

Choose the **correct** answer from the options given below :

(1) (A) and (E) only

(2) (A) and (D) only

(3) (B), (C) and (D) only

(4) (B), (C) and (E) only

(A) 1

(B) 2

(C) 3

(D) 4

Topic : Topic 103

Q.Type : Objective Question

11 | 6463 | 4.0

The value of 'a' for which the function $f : [0, \infty) \to [a, \infty)$, defined as $f(x) = 2x^2 + 3$, is a bijective function, is :

(1) $\frac{3}{2}$

(2) $\frac{1}{2}$

(3) 3

(4) 2

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

12 | 6464 | 4.0

For $x \in \mathbf{R} - \{0\}$, $\sin(\tan^{-1} x)$ is equal to :

(1) $\sqrt{1+x^2}$

(2) $\frac{1}{\sqrt{1+x^2}}$

(3) $\frac{x}{\sqrt{1+x^2}}$

(4) $\frac{\sqrt{1+x^2}}{x}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

13 | 6465 | 4.0

Let $A=\begin{bmatrix}-1 & 2\\ 3 & 1\end{bmatrix}$ and $I=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$. If $A^2=\lambda A-\mu I$, then

(1) $\lambda=0,\ \mu=-7$
(2) $\lambda=0,\ \mu=7$
(3) $\lambda=-7,\ \mu=0$
(4) $\lambda=7,\ \mu=0$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

14 | 6466 | 4.0

If $A=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$, then determinant of the adjoint of the matrix A is :

(1) 2
(2) -2
(3) 10
(4) -10

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

15 | 6467 | 4.0

The value of k for which the following homogenous system of equations has a non-trivial solution, is :

$x-y+2z=0$
$2x+y-3z=0$
$5x-3y+kz=0$

(1) -14
(2) $\frac{16}{3}$
(3) 14
(4) $-\frac{28}{3}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

16 | 6468 | 4.0

A balloon, which always remains spherical, has a variable diameter given by $\frac{5}{3}(3x+2)$. The rate of change of its surface area with respect to x, is :

(1) $\frac{100\pi}{3}(3x+2)$

(2) $\frac{100\pi}{3}(3x+2)^2$

(3) $\frac{50\pi}{3}(3x+2)^2$

(4) $\frac{50\pi}{3}(3x+2)$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

17 | 6469 | 4.0

If $f(x)=\begin{cases}2kx+5 & ; \ x \le 3 \\ 7x-6 & ; \ x>3\end{cases}$ is continuous, then

(A) $k=\frac{5}{3}$

(B) $k=\frac{3}{5}$

(C) f is differentiable at $x=3$.

(D) f is not differentiable at $x=3$.

(E) $k=-\frac{3}{5}$

Choose the **correct** answer from the options given below :

(1) (A) and (C) Only

(2) (B) and (C) Only

(3) (A) and (D) Only

(4) (C) and (E) Only

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

18 | 6470 | 4.0

$\int \frac{\cos(2x)}{(\sin(x)-\cos(x))^3} dx$ is equal to :

(1) $\log_e |\cos(x)-\sin(x)| + C$

(2) $\log_e |\cos(x)+\sin(x)| + C$

(3) $\frac{-1}{\cos(x)-\sin(x)} + C$

(4) $\frac{-1}{(\cos(x)-\sin(x))^2} + C$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

19 | 6471 | 4.0

The value of $\int_0^{\pi} \frac{1}{1+e^{\cos x}} dx$, is :

(1) π

(2) $\frac{\pi}{2}$

(3) $\frac{\pi}{4}$

(4) $-\pi$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

20 | 6472 | 4.0

The area (in sq. units) of the region bounded by the curve $y^2=4y-x$ and the y-axis is :

(1) $\frac{8}{3}$

(2) $\frac{16}{3}$

(3) $\frac{32}{3}$

(4) $\frac{64}{3}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

21 | 6473 | 4.0

The general solution of the differential equation $\log_e\left(\frac{dy}{dx}\right) = ax + by + \log_e x$, $x>0$, is :

(1) $\frac{-1}{b}e^{-by} = \frac{e^{ax}}{a^2}(x-1) + C$

(2) $\frac{-1}{b}e^{-by} = \frac{e^{ax}}{a^2}(ax-1) + C$

(3) $\frac{-1}{b}e^{-by} = \frac{e^{ax}}{a}(x-1) + C$

(4) $\frac{-1}{b}e^{-by} = \frac{e^{ax}}{a}(ax-1) + C$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

22 | 6474 | 4.0

If the three vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$ having magnitudes 3, 5 and 6 respectively, satisfy the condition $\vec{a}+\vec{b}+\vec{c}=\vec{0}$, then $\mu = \vec{a}\cdot\vec{b} + \vec{b}\cdot\vec{c} + \vec{c}\cdot\vec{a}$ is equal to :

(1) $\frac{-21}{2}$

(2) -35

(3) $\frac{-70}{3}$

(4) $\frac{-11}{2}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

23 | 6475 | 4.0

A vector $\vec{a}$ has components 2p and 1 with respect to a rectangular coordinate system. This system is rotated through a certain angle about the origin in the counter clockwise direction. If with respect to the new coordinate system, $\vec{a}$ has components $p+1$ and 1, then :

(1) $p=0$ or $p=1$

(2) $p=1$ or $p=\frac{-1}{3}$

(3) $p=-1$ or $p=\frac{1}{3}$

(4) $p=1$ or $p=-1$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

24 | 6476 | 4.0

The minimum distance between the lines $\vec{r}=\hat{i}+2\hat{j}-4\hat{k}+\lambda\left(2\hat{i}+3\hat{j}+6\hat{k}\right)$ and $\vec{r}=3\hat{i}+3\hat{j}-5\hat{k}+\mu\left(2\hat{i}+3\hat{j}+6\hat{k}\right)$ is :

(1) $\frac{\sqrt{293}}{49}$

(2) $\frac{293}{7}$

(3) $\frac{\sqrt{293}}{7}$

(4) $\frac{293}{49}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

25 | 6477 | 4.0

The acute angle between pair of lines $\vec{r} = 3\hat{i} + 2\hat{j} - 4\hat{k} + \lambda\left(\hat{i} + 2\hat{j} + 2\hat{k}\right)$ and $\vec{r} = 5\hat{i} - 2\hat{j} + \mu\left(3\hat{i} + 2\hat{j} + 6\hat{k}\right)$, is :

(1) $\cos^{-1}\left(\frac{19}{21}\right)$

(2) $\cos^{-1}\left(\frac{17}{21}\right)$

(3) $\cos^{-1}\left(\frac{17}{19}\right)$

(4) $\cos^{-1}\left(\frac{15}{17}\right)$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

26 | 6478 | 4.0

The maximum value of $Z = 3x + 5y$ subjected to the constraints $3x + 2y \le 18$, $x \le 4$, $y \le 6$, $x \ge 0$, $y \ge 0$ is :

(1) 36
(2) 30
(3) 27
(4) 12

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

27 | 6479 | 4.0

If three numbers are selected at random from first fifteen natural numbers, then the probability that the numbers are in arithmetic progression, is :

(1) $\frac{3}{19}$

(2) $\frac{5}{46}$

(3) $\frac{7}{65}$

(4) $\frac{9}{77}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

28 | 6480 | 4.0

In a certain college, 4% of boys and 1% of girls are taller than 1.7 meters. Furthermore, 60% of the students are girls. If a student is selected at random and is taller than 1.7 meters , then the probability that the selected student is a girl, is :

(1) $\frac{5}{11}$

(2) $\frac{3}{11}$

(3) $\frac{7}{15}$

(4) $\frac{11}{15}$

(A) 1

(B) 2

(C) 3

(D) 4