PREVIEW QUESTION BANK(Single)

Module Name : NCET Language: ENGLISH
Section Name : 1319-Applied Mathematics
Exam Date : 29-Apr-2025 Batch : 15:00-18:00

Sr. No.	Client Question ID	Question Body and Alternatives	Marks	Ne M
Section : 1319-Applied Mathematics				
Topic : Topic 104				
Q.Type : Objective Question				
1	6481	***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	6482	***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	6483	***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 | 6484 | 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 | 6485 | 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 | 6486 | *This is mandatory question. | 4.0

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 | 6487 | *This is mandatory question. | 4.0

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 | 6488 | *This is mandatory question. | 4.0

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 | 6489 | ***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 | 6490 | ***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 105

Q.Type : Objective Question

11 | 6491 | 4.0

A tank can be filled in 5 hours by three pipes A, B, and C. The pipe C is twice as fast as pipe B and pipe B is twice as fast as pipe A. The time taken by pipe A alone to fill the tank, is :

(1) 32 hours

(2) 35 hours

(3) $17\frac{1}{2}$ hours

(4) $8\frac{3}{4}$ hours

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

12 | 6492 | 4.0

The remainder when 3^{267} is divided by 23, is :

(1) 2

(2) 3

(3) 4

(4) 7

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

13 | 6493 | 4.0

If in a kilometer race, A beats B by 80 meter or by 8 seconds, then the time taken by A to complete the race, is :

(1) 60 seconds
(2) 112 seconds
(3) 46 seconds
(4) 92 seconds

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

14 | 6494 | 4.0

Let A and B be symmetric matrices of the same order, then :

(A) $A+B$ is a symmetric matrix.
(B) $A-B$ is a symmetric matrix.
(C) $AB-BA$ is a symmetric matrix.
(D) $AB+BA$ is a symmetric matrix.

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

(1) (B), (C) and (D) only
(2) (A) and (D) only
(3) (A), (B) and (D) only
(4) (A), (B) and (C) only

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

15 | 6495 | 4.0

If the following system of equations

$3x-y+2z=1$;
$2x+y+3z=-1$;
$x-3y+\lambda z=0$

has a unique solution, then

(1) $\lambda=-2$
(2) $\lambda\neq-2$
(3) $\lambda=3$
(4) $\lambda\neq-3$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

16 | 6496 | 4.0

If the largest open interval, in which the function defined by $f(x)=x^6-\frac{x^5}{5}$ decreases, is (a, b), then the value of $5a+12b$ is :

(1) 12
(2) 5
(3) 7
(4) 2

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

17 | 6497 | 4.0

The demand function for a certain product is represented by the equation $p=15+7x-2x^2$ where x is the number of units demanded and p is the price per unit. The marginal revenue when 3 units are sold, is :

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

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

18 | 6498 | 4.0

The area (in sq. units) of the region bounded by $y=|x-1|$, $x=0$, $x=2$ and the x-axis is :

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

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

19 | 6499 | 4.0

The particular solution of the differential equation $ydx-(3x+4y^4)dy=0$, $y(1)=1$, is :

(1) $x-y^3+4y^4=0$

(2) $x+y^3-4y^4=0$

(3) $x+3y^3-4y^4=0$

(4) $x-3y^3+4y^4=0$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

20 | 6500 | 4.0

Which of the following is **not** true for normal probability distribution ?

(1) The normal probability curve is a bell-shaped curve.

(2) The normal probability curve is asymmetrical about the line $x=$ Mean

(3) For normal probability distribution, Mean = Mode = Median

(4) The maximum probability occurs at the point $x=$ Mean

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

21 | 6501 | 4.0

If the sum of the mean and the variance in a binomial distribution of 5 trials is 4.8, then the distribution is given by :

(1) $^5C_{r-1}\left(\frac{4}{5}\right)^r\left(\frac{1}{5}\right)^{5-r}$

(2) $^5C_r\left(\frac{4}{5}\right)^r\left(\frac{1}{5}\right)^{5-r}$

(3) $^5C_r\left(\frac{3}{5}\right)^r\left(\frac{2}{5}\right)^{5-r}$

(4) $^5C_{r-1}\left(\frac{3}{5}\right)^r\left(\frac{2}{5}\right)^{5-r}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

22 | 6502 | 4.0

Let a random variable X take the values 0, 1, 2, 3, ..., with probability density $P(X = x) = \frac{k}{7^x}$, where k is a constant. Then P(X = 0) is :

(1) $\frac{6}{7}$

(2) $\frac{36}{7}$

(3) $\frac{36}{49}$

(4) $\frac{6}{49}$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

23 | 6503 | 4.0

If for the following data :

Year	2004	2005	2006	2007	2008	2009	2010
Profit (in ₹ crores)	114	130	126	144	138	156	164

a straight line trend by the method of least square is $y_t = 138.86 + 7.64x$, then the trend value for the year 2004, is :

(1) 115.94
(2) 225.94
(3) 105.94
(4) 155.94

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

24 | 6504 | 4.0

Which of the following statement is **false** ?

(1) Null hypothesis asserts that there is no significant difference between two sample statistics.
(2) Alternative hypothesis asserts the existence of a significant difference between two sample statistics.
(3) The number of independent pieces of information on which an approximation is based, is known as degree of freedom
(4) Central limit theorem implies that the distribution of a sample leads to become a binomial distribution as the sample size become larger, considering that all the sizes of samples are identical

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

25 | 6505 | 4.0

A random sample of size 20 from a normal population has mean 42 and standard deviation 5. The hypothesis is that the population mean at 5% level of significance is 45. Then, (use $t_{19}(0.05) = 2.09$)

(1) Hypothesis accepted as $|t| < t_{19}(0.05)$
(2) Hypothesis rejected as $|t| = t_{19}(0.05)$
(3) Hypothesis accepted as $|t| > t_{19}(0.05)$
(4) Hypothesis rejected as $|t| > t_{19}(0.05)$

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

26 | 6506 | 4.0

At what rate per annum compounded semi-annually will the present value of a perpetuity of ₹ 1000 payable at the end of each six months be ₹ 50,000 ?

(1) 4%
(2) 8%
(3) 3%
(4) 6%

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

27 | 6507 | 4.0

Ram wishes to purchase a car for ₹ 8,00,000 for which he paid a down payment of ₹ 3,00,000. If he takes a car loan on the remaining amount at a flat rate of 12% per annum for 3 years, then his EMI is equal to :

(1) ₹ 18,888.89
(2) ₹ 27,222.22
(3) ₹ 18,222.22
(4) ₹ 27,888.89

(A) 1

(B) 2

(C) 3

(D) 4

Q.Type : Objective Question

28	6508	The optimal solution of the L.P.P. maximum $z = 5x + 3y$ subject to the constraints $3x + 5y \leq 15$, $5x + 2y \leq 10$, $x \geq 0$, $y \geq 0$, is : (1) (2, 0) (2) $\left(\frac{20}{19}, \frac{45}{19}\right)$ (3) (0, 3) (4) (5, 0) (A) 1 (B) 2 (C) 3 (D) 4	4.0