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Holidays Homework

Class XII (Applied Mathematics)

Holiday's Home Work:

- *Prepare an project file containing atleast 10 activities, as discussed in the class.*
- *Complete the given assignment neatly in a separate register/file.*

HOLIDAYS HOMEWORK ASSIGNMENT(2026-27)

ASSIGNMENT ON NUMBER QUANTIFICATION

1. Pipes A and B can fill a tank in 5 hours and 6 hours respectively. Pipe C can empty it in 12 hours. If all the three pipes are opened together, then the time taken to fill the tank is

(a) 2 hours (b) $2\frac{3}{4}$ hours (c) 3 hours (d) $3\frac{9}{17}$ hours

2. Pipe A can fill a tank 6 times faster than a pipe B. If B can fill a tank in 21 minutes, then the time taken by both the pipes together to fill the tank is

(a) 3 minutes (b) $4\frac{1}{2}$ minutes (c) 7 minutes (d) 9 minutes

3. If a man rows 32 km downstream and 14 km upstream in 6 hours each, then the speed of the stream is

(a) 2 km/h (b) 1.5 km/h (c) 2.5 km/h (d) 2.25 km/h

4. In a 2 km race, P can give give Q, a start of 200 m and R, a start of 560 m, then in the same race Q can give R a start of

(a) 360 m (b) 380 m (c) 400 m (d) 430 m

5. What is the least value of 'x' that satisfies $x \equiv 27 \pmod 4$, when $27 < x \leq 36$?

(a) 27 (b) 30 (c) 31 (d) 35

6. In what ratio shall I add water to the liquid detergent costing ₹480 per litre to get resulting mixture worth ₹300 per litre?

(a) 5:3 (b) 3:8 (c) 3:5 (d) 5:8

7. The last digit of $(22)^{12}$ is

(a) 2 (b) 4 (c) 6 (d) 8

8. The least non negative remainder when 3^{50} is divided by 7 is

(a) 4 (b) 3 (c) 2 (d) 1

9. The number at unit place of number 17^{123} is

(a) 1 (b) 3 (c) 7 (d) 9

10. Two pipes A and B together can fill a tank in 40 minutes. Pipe A is twice as fast as Pipe B. A alone can fill the tank in

(a) 1 hour (b) 2 hours (c) 80 minutes (d) 20 minutes

11. In a 700 m race, Amit reaches the finish point in 20 seconds and Rahul reaches in 25 seconds . Amit beats Rahul by a distance of

(a) 120 m (b) 150 m (c) 140 m (d) 100 m

Answers:

1.D	2.A	3.B	4.C	5.C	6.C	7.C
8.C	9.B	10.A	11.C			

ASSIGNMENT ON NUMERICAL INEQUALITIES

1. If $|x - 2| \geq 7$, $x \in R$, then

(a) $x \in [-5, 9]$ (b) $x \in (-5, 9]$

(c) $x \in (-\infty, -5] \cup [9, \infty)$ (d) $x \in (-\infty, -5) \cup (9, \infty)$

2. Given that x , y and b are real numbers and $x < y$, $b < 0$, then

(a) $\frac{x}{a} < \frac{y}{b}$ (b) $\frac{x}{a} \leq \frac{y}{b}$ (c) $\frac{x}{a} > \frac{y}{b}$ (d) $\frac{x}{a} \geq \frac{y}{b}$

3. If $p > q$ and $r < 0$, then which of the following is true ?

(a) $pr < qr$ (b) $p - r < q - r$ (c) $p + r < q + r$ (d) none of these

4. If $\frac{x+1}{x+2} \geq 1$, then

(a) $x \in [-\infty, 2]$ (b) $x \in (-\infty, -2)$

(c) $x \in (-\infty, 2]$ (d) $x \in (-\infty, 2)$

5. Match the list I with list II

	List I		List II
A	The solution of the inequality $3x+7 > 12$, $x \in R$	I	$[-1, \infty)$
B	The solution of the inequality $\frac{3x+5}{2} \geq 1$, $x \in R$	II	$[\frac{17}{8}, \infty)$
C	The solution of the inequality $2x + 5 < 7x + 9$, $x \in R$	III	$[\frac{5}{3}, \infty)$
D	The solution of the inequality $6x - 5 \geq -2x + 12$, $x \in R$	IV	$[\frac{-4}{5}, \infty)$

Choose the correct answer from the options given below :

(a) A - III, B - IV, C-I , D-II (b) A - III, B - I, C-IV , D-II

(b) (c) A - I, B - III, C-IV , D-II (d) A - III, B - I, C-II , D-IV

6. Two water supplying trucks A and B supply water to remote areas. Truck A is carrying 100 litres of water to a village 1.5 km away and truck B is delivering 80 litres of water to another village, 1 km away. Due to bad road conditions, each truck loses 20 mL water

while travelling each metre distance. Which truck is able to deliver more water and by how much

(a) Truck A, 20 litres (b) Truck B, 20 litres

(c) Truck A, 10 litres (d) Truck B, 10 litres

1.C	2.C	3.A	4.B	5.B	6.C

ASSIGNMENT ON DERIVATIVES

1. If f(x) = $x^{x^{x^{\cdots\cdots\infty}}}$, then f'(x) =

(a) $\frac{(f(x))^2}{x(1-f(x)\log x)}$ (b) - $\frac{(f(x))^2}{x(1-f(x)\log x)}$ (c) $\frac{f(x)}{x(1-f(x)\log x)}$ (d) - $\frac{f(x)}{x(1-f(x)\log x)}$

2. If y = $log_e(\frac{x^3}{e^3})$, then $\frac{d^2y}{dx^2}$ is equal to

(a) $\frac{3}{x^2}$ (b) - $\frac{2}{x^2}$ (c) - $\frac{3}{x^2}$ (d) $-\frac{2}{x}$

3. Derivative of log x w.r.t. $\frac{1}{x}$ is

(a) $-\frac{1}{x^3}$ (b) $-\frac{1}{x}$ (c) -x (d) $\frac{1}{x}$

4. If y = e^{nx} , then nth derivative of y is

(a) e^{nx} (b) n^2e^{nx} (c) ny (d) n^ny

5. If y = e^{-2x} , then $\frac{d^3y}{dx^3}$ is equal to

(a) $2e^{-2x}$ (b) e^{-4x} (c) $4e^{-4x}$ (d) $-8e^{-2x}$

6. If x = log t and y = $\frac{1}{t^2}$, then $\frac{d^2y}{dx^2}$ is

(a) $\frac{2}{t^2}$ (b) $\frac{4}{t^2}$ (c) $-\frac{1}{t}$ (d) - $\frac{4}{t^2}$

7. If y = log $(\frac{1-x^2}{1+x^2})$, |x| < 1 , then $\frac{dy}{dx}$ =

(a) $\frac{-4x}{1-x^4}$ (b) $\frac{1}{4-x^4}$ (c) $\frac{4x^3}{1-x^4}$ (d) - $\frac{4x^3}{1-x^4}$

8. If $x^2 + xy + y^2 = 0$, then $\frac{dy}{dx}$ =

(a) $\frac{2x+y}{x+2y}$ (b) - $\frac{2x+y}{x+2y}$ (c) $\frac{x+2y}{2x+y}$ (d) - $\frac{x+2y}{2x+y}$

9. If y= Ae^{5x}+ Be^{-5x} , then $\frac{d^2y}{dx^2}$ is

(a) 25 y (b) 5y (c) - 25 y (d) 15 y

10. If $y = \frac{1}{x+1}$, then $\frac{d^2y}{dx^2}$ at x = 2 is

(a) $\frac{2}{9}$ (b) $\frac{3}{2}$ (c) $\frac{2}{27}$ (d) $\frac{3}{8}$

1. A	2.C	3. C	4.D	5.D
6.B	7.A	8.A	9.A	10.C

ASSIGNMENT ON APPLICATION OF DERIVATIVES

1. The sides of an equilateral triangle are increasing at the rate of 2 cm/sec. The rate at which its area increases, when side is 10 cm, is

(a) 10 cm^2 /sec (b) $10\sqrt{3}$ cm^2/sec (c) $\frac{10}{3}$ cm^2/sec (d) $\sqrt{3}$ cm^2/sec

2. The radius of a cylinder is increasing at the rate of 3 cm/sec and its height is decreasing at the rate of 4 cm/sec. The rate of change of its volume when radius is 4 cm and height is 6 cm, is

(a) 64 cm^3 /sec (b) 144cm^3 /sec (c) 80cm^3 /sec (d) 80π cm^3/sec

3. The values of x for which the rate of increase of $x^3 - 5x^2 + 5x - 9$ is twice the rate of increase of x are

(a) - 3, $-\frac{1}{3}$ (b) - 3, $\frac{1}{3}$ (c) 3, $-\frac{1}{3}$ (d) 3, $\frac{1}{3}$

4. The interval on which the function f(x) = $2x^3 + 9x^2 + 12x - 1$ is decreasing is

(a) [-1 , ∞) (b) (- ∞ , - 2] (c)[-2 , -1] (d) [-1 , 1]

5. The function f(x) = $x^2 e^x$ strictly increases on

(a) [0 , 2] (b) [0 , ∞] (c) (- ∞,0] ∪[2 , ∞) (d) none of these

6. The function f(x) = $x(x-3)^2$ decreases for the values of x given by

(a) 1 ≤ x ≤3 (b) x ≤ 0 (c) x ≥ 0 (d) 0 ≤ x ≤ $\frac{3}{2}$

7. The fixed cost of a product is ₹1800 and the variable cost per unit is ₹55. If the demand function is p(x) = 400 - 15x then the breakeven values are at

(a) x = 10, 15 (b) x = 8, 15 (c) x = 8, 20 (d) x = 12, 15

8. The total revenue (in ₹) received by selling 'x' units of a certain product is given by

R(x) = $4x^2 + 10x + 3$. What is the marginal revenue on selling 20 such units?

(a) ₹130 (b) ₹170 (c) ₹173 (d) ₹360

9. Two positive numbers x and y whose sum is 25 and the product x^3y^2 is maximum are:

(a) x = 10, y = 15 (b) x = 15, y = 10 (c) x = 12, y = 13 (d) x = 16, y = 9

10. For the function $f(x) = 2x^3 - 9x^2 + 12x - 5$, $x \in [0,3]$

Match list I with list Ii:

	List I		List II
A	Absolute maximum value	I	3
B	Absolute minimum value	II	0
C	Point of maxima	III	-5
D	Point of minima	IV	4

Choose the correct answer from the options given below :

(a) A – IV, B – II, C-I , D-III (b) A – II, B – III, C-I , D-IV

(b) (c) A – IV, B – III, C-II , D-I (d) A – IV, B – III, C-I , D-II

1.B	2.D	3. D	4.C	5.A
6.A	7.B	8.B	9.B	10.D

ASSIGNMENT ON DETERMINANTS

1. If A and B are Square matrices of order 3×3 such that |A| = 5 and |B| = 3 , then | 3 AB| is

A) 135 B) 45 C) 405 D) None of these

2. If A is a square matrix of order 3 such that |A| = -7 , then |A adj A| is equal to

A) 49 B) 27 C) - 343 D) 343

3. If $A = \begin{bmatrix} a & 0 & 0 \\ 0 & a & 0 \\ 0 & 0 & a \end{bmatrix}$, $a \neq 0$, then the value of | adj A | is

A) a^2 B) a^3 C) a^6 D) a^9

4.If for a square matrix , A. (adj A) = $\begin{bmatrix} 2025 & 0 & 0 \\ 0 & 2025 & 0 \\ 0 & 0 & 2025 \end{bmatrix}$, then the value of |A| + | adj A| is equal to

A) 1 B) 2025+1 C) $(2025)^2$ +45 D) $(2025)^2$ +2025

5. If A and B are non- singular matrices of the same order with det.(A) = 5 , then det. $(B^{-1}AB)^2$ is equal to

A) 5 B) 5^2 C) 5^4 D) 5^5

6. If $A = \begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}$ and $B^{-1} = \begin{bmatrix} 4 & -5 \\ -3 & 4 \end{bmatrix}$, then $(AB)^{-1}$ is equal to

A) $\begin{bmatrix} 15 & -19 \\ -26 & 33 \end{bmatrix}$ B) $\begin{bmatrix} 11 & -14 \\ -29 & 37 \end{bmatrix}$ C) 5^4 D) 5^5

7. If $A = \begin{bmatrix} 2 & 5 \\ -11 & 7 \end{bmatrix}$, then (adj A)' is equal to

A) $\begin{bmatrix} -2 & 5 \\ 11 & -7 \end{bmatrix}$ B) $\begin{bmatrix} 7 & 5 \\ 11 & 2 \end{bmatrix}$ C) $\begin{bmatrix} 7 & 11 \\ -5 & 2 \end{bmatrix}$ D) $\begin{bmatrix} 7 & -5 \\ 11 & 2 \end{bmatrix}$

8. For non-singular square matrices A , B and C of the same order $(AB^{-1}C)^{-1}$ is equal to

A) $A^{-1}BC^{-1}$ B) $C^{-1}B^{-1}A^{-1}$ C) CBA^{-1} D) $C^{-1}BA^{-1}$

9. If $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ be such that $A^{-1} = k A$, then k is equal to

A) 19 B) $\frac{1}{19}$ C) $-\frac{1}{19}$ D) -19

10. If A(adj A) = $\begin{bmatrix} 3 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & 3 \end{bmatrix}$, then the value of |A| + | adj A| is equal to

A) 12 B) 9 C) 3 D) 27

Reason and Assertion based questions:(ONLY FOR CBSE)

Each of these questions contains two statements: Assertion (A) and Reason (R). Each of these questions also has four alternative choices, any one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

(A) A is true, R is true; R is a correct explanation for A.

(B) A is true, R is true; R is not a correct explanation for A.

(C) A is true; R is false.

(D) A is false; R is true

11. Assertion: For a square matrix A of order 3 , if |3A| = 135 , then $A^{-1} = \frac{1}{5}$ adj A .

Reason : For a non – singular square matrix A of order n , | adj A | = $|A|^{n-1}$

12. Assertion: : The system of equations - 2x + y + z = p , x - 2y + z = q and x + y - 2z = r is consistent if p + q + r = 0

Reason (R): The system AX = B of n simultaneous linear equations with n unknowns is consistent if |A| = 0 and (adj A)B ≠ 0.

(ONLY FOR CUET)

13. Based on the information match List I with List II

LIST I	LIST II
A. If A is a non-singular square matrix of order 3 x 3, then what is | adj A|.	I. $\|A\|^3$
B. If A is a n x n invertible matrix, then the value of |adj(adj A)|	II. A^3
C. If A is square matrix such that $A^4 = I$ then A^{-1}	III. $\|A\|^{(n-1)^2}$
D. If A is square matrix of order 3 then find the value of | A adj A|.	IV. $\|A\|^2$

Choose the correct answer from the options given below:

(A) A - IV, B - II, C - I, D - III

(B) A - IV, B - II, C - III, D - I

(C) A - IV, B - III, C - II, D - I

(D) A - IV, B -III, C - I, D - II

14. Based on the information match List I with List II

LIST I	LIST II
A. What is the value of $\|3I_3\|$, where I_3 is the identity matrix of order 3 ?	I. 90
B. A matrix of order 2×2 has determinant 10. What is the value of |3A| ?	II. 4
C. If A is a square matrix of order 3 and $\|2A\| = k\|A\|$, then write the value of k.	III. 8
D.A and B are square matrices of same order 3 such that AB =2I and |A| = 2 Write the value of |B|	IV. 27

Choose the correct answer from the options given below:

(A) A - IV, B - I, C - III, D - II

(B) A - IV, B - II, C - III, D - I

(C) A - IV, B - III, C - II, D - I

(D) A - IV, B -III, C - I, D - II

1. C	2.C	3. C	4. D	5.B	6.D	7. C
8. D	9.B	10.A	11. B	12.C	13. C	14.A

LINEAR PROGRAMMING PROBLEM

1. Corner points of the feasible region for an LPP are (0, 2), (3, 0), (6, 0), (6, 8) and (0, 5). Let F = 4x + 6y be the objective function. Maximum of F – Minimum of F
   (A) 60 (B)48 (C)42 (D)18

2. A linear programming problem is as follows.
   Minimize/ Maximize objective function: Z = 2x -y +5
   subject to the constraint $3x + 4y \leq 60$, x + 3y ≤ 30, x, y≥0,
   If the corner points A (0,10), B (12,6), C(20,0) and (0,0) which of the following is true?

A. Maximum value Z is 40.
B. Minimum value of Z is 5.
C. Difference of the maximum and minimum value of this is 35.
D. At 2 corner points value of Z are equal.

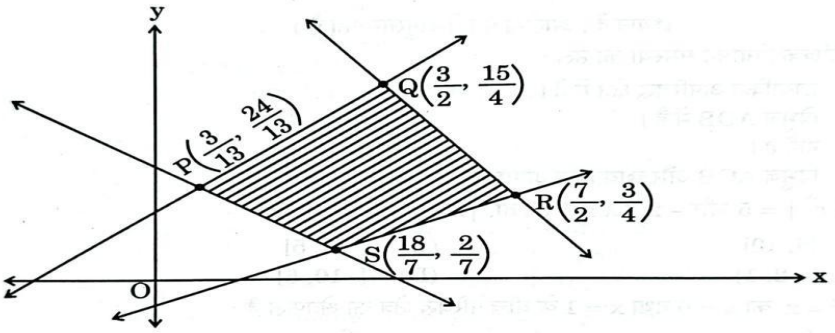
3. A linear programming problem is as follows
   Minimize: Z = 2x + y
   subject to the constraint $x \geq 3$, x ≤ 9, y≥0, x- y ≥ 0,x + y ≤ 14
   The feasible vision has
   (A) 5 corner point including (0,0) and (9,5) (B)5 corner point including (7,7) and (3,3)
   (C) 5 corner point including (14,0) and (9,0) (D)5 corner point including (3,6) and (9,5)

4. The corner points of the feasible region in graphical representation of a L.P.P are (2 ,72) ,(15,20) and (40 ,15) . If Z = 18 x + 9y be the objective function ,then

   (A) Z is maximum at (2 , 72) , minimum at (15 , 20)
   (B) Z is maximum at (15 , 20) , minimum at (40 ,15)
   (C) Z is maximum at (40, 15) , minimum at (15 ,20)
   (D) Z is maximum at (40, 15) , minimum at (2 ,72)

5. If the feasible region of a Linear programming problem with objective function Z = ax + by , is bounded , then which of the following is correct ?
   (A) It will only have a maximum value
   (B) It will only have a minimum value
   (C) It will only have both maximum and minimum value
   (D) It will only have neither maximum nor minimum value

6. For a linear Programming Problem (LPP), the given objective function is Z=x+2y. The Feasible region PQRS determined by the set of constraints is shown as a shaded region in the graph.



(Note : The figure is not to scale)

$$P \equiv \left(\frac{3}{13}, \frac{24}{13}\right), Q \equiv \left(\frac{3}{2}, \frac{15}{4}\right), R \equiv \left(\frac{7}{2}, \frac{3}{4}\right), S \equiv \left(\frac{18}{7}, \frac{2}{7}\right)$$

Which of the following statements is correct?

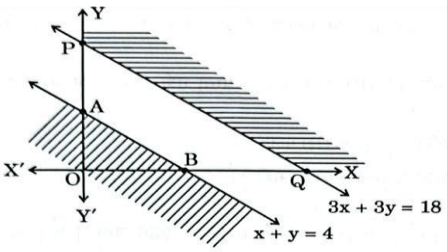
A. Z is minimum at $S(\frac{18}{7}, \frac{2}{7})$

B. Z is maximum at $R\ (\frac{7}{2}, \frac{3}{4})$

C. (Value of Z at P) > (Value of Z at Q)

D. (Value of Z at Q) < (Value of Z at R)

7. In a linear Programming Problem (LPP), the objective function Z = 2x + 5y is to be maximized under the following constraints: $x + y \leq 4, 3x + 3y \geq 18, x \geq 0, y \geq 0$ Study the graph and select the correct option.



(Note : The figure is not to scale)

The solution of the given LPP:

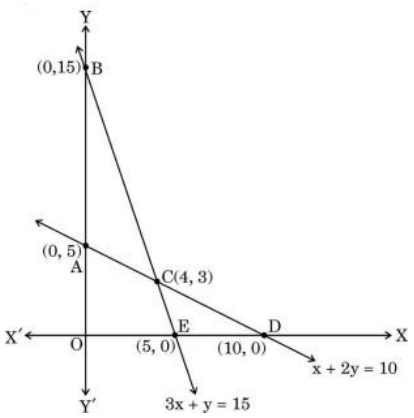
A. Lies in the shaded unbounded region.

B. Lies in △AOB

C. Does not exist

D. Lies in the combined region of △AOB and unbounded shaded region.

8. For a linear Programming Problem, the given objective function Z = 3x +2y is subject to constraints:
$x + 2y \leq 10, 3x + y \leq 15, x \geq 0, y \geq 0$



The correct feasible region is:

(A) ABC (B)AOEC (C) CED (D) Open unbounded region BCD

9. A common region of the inequality $x + y \leq 1, x \geq 0, y \geq 0$ lies in
   (A) IV Quadrant (B) II Quadrant (C) III Quadrant (D) I Quadrant

10. A factory produces two products X & Y. The profit earned by selling X & Y is represented by objective function Z = 5x +7y, where x & y are the number of units of X & Y respectively sold. Which of the following statement is correct?
    (A) The objective function. Maximise the difference of the profit earned from product. X&Y.
    (B) The objective function measured the total production of product X&Y.
    (C) The objective function maximise the combined profit earned from selling X&Y.
    (D) The objective function ensures the company produces more of the product X than the product Y.

    Reason and Assertion based questions:

    Each of these questions contains two statements: Assertion (A) and Reason (R). Each of these questions also has four alternative choices, any one of which is the correct answer. You have to select one of the codes (A), (B), (C) and (D) given below.

    A. A is true, R is true; R is a correct explanation for A.
    B. A is true, R is true; R is not a correct explanation for A.
    C. A is true; R is false.
    D. A is false; R is true.

11. **Assertion(A):** Every point of the feasible region of a linear programming problem is an optimal solution.
    Reason (R): The optimal solution of a linear programming problem exists only at one or more corner point(s) of feasible region.

12. **Assertion (A):** In an L.P.P. if an objective function Z = ax + by has the same minimum value on the two-corner points P and Q of the feasible region, then the number of points at which Z_{min} occurs is infinite.

Reason (R): If the objective function z has the same minimum value on 2 corner points of the feasible region, then the objective function Z has the same minimum value at every point of line segment joining the two corner points.

(ONLY FOR CUET)

13. Based on the information match List I with List II

LIST I	LIST II
A. $2x + y > 5$ is	**I.** Open half plane containing the origin
B. $3x - 4y < 2$ is	**II.** Closed half plane containing the origin
C. $7x + 2y \geq 1$ is	**III.** closed half plane not containing the origin
D. $5x + 3y \leq 4$ is	**IV.** Open half plane Not containing the origin

Choose the correct answer from the options given below:

(A) A - IV, B - II, C - I, D - III (B) A - IV, B - II, C - III, D - I

(C) A - IV, B - I, C - III, D - II (D) A - IV, B -III, C - I, D - II

ANSWER

1. A	2.B	3.B	4.C	5.C	6.A	7.C
8.B	9.D	10.C	11.D	12.A	13.C	

MATRICES

1.If $A = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$ & $(3I + 4A)(3I - 4A) = x^2 I$ then value of x is/ are

(a)$\pm\sqrt{7}$ (b)0 (c)± 5 (d)25

2.If $A = \begin{bmatrix} 1 & -1 & 1 \\ 1 & -1 & 1 \\ 1 & -1 & 1 \end{bmatrix}$, then $A^5 - A^4 - A^3 + A^2$ is equal to

(a)2 A (b)3A (c) 4A (d)0

3. If for square matrix A, $A^2 - A + I = 0$ then A^{-1} equals

(a) A (b) A+I (c) I-A (d) A-I

4. If $A = \begin{bmatrix} 0 & 1 \\ 0 & 0 \end{bmatrix}$ then A^{2023} is equal to

(a) $\begin{bmatrix} 0 & 1 \\ 0 & 2 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & 2023 \\ 0 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (d)$\begin{bmatrix} 2023 & 0 \\ 0 & 2023 \end{bmatrix}$

5.If $A = \begin{bmatrix} 0 & 1 & c \\ -1 & a & -b \\ 2 & 3 & 0 \end{bmatrix}$ is skew symmetric matrix then a+b+c=

(a) 1 (b)2 (c) 3 (d)4

6. If order of matrix A is 2× 3, of matrix B is 3× 2 & of matrix C is 3× 3 then which of the following is not defined

(a) C(A+B') (b) C(A+B')' (c) BAC (d) CB+A'

7. For any 2 matrices A &B we have

(a) AB=BA (b)AB≠ BA (c) AB=0 (d) None

8. A matrix which is both symmetric and skew symmetric , then A is necessarily

(a)diagonal matrix (b) zero matrix (c) square matrix (d)Identity matrix

9. If matrix $A = [1\ 2\ 3\ ]$ then matrix AA' is

(a) 14 (b)$\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 1 \\ 3 & 1 & 2 \end{bmatrix}$ (d) [14]

10.If A = $\begin{bmatrix} 1 & 0 \\ 2 & 1 \end{bmatrix}$ B = $\begin{bmatrix} x & 0 \\ 1 & 1 \end{bmatrix}$ and A = B^2, then x =

a) ± 1 b) -1 c) 1 d) 2

11. If $A = \begin{bmatrix} 3 & 2 & x \\ 1 & x & 1 \end{bmatrix} \begin{bmatrix} 14 \\ 1 \\ 8 \end{bmatrix}$ then x is

a) $\frac{16}{3}$ b) -3 c) -4 d) 4

12. The number of possible matrices of order 2×3 with each entry 1 or 2 is

a) 16 b) 6 c) 64 d) 24

13. Find the matrix A^2 , where A=[a_{ij}] is a 2x2 matrix whose elements are given by a_{ij}=maximum (i,j) – minimum (i,j) :

(A) $\begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$ (B) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ (C) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (D) $\begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$

Reason and Assertion based questions:

Each of these questions contains two statements: Assertion (A) and Reason (R). Each of these questions also has four alternative choices, any one of which is the correct answer. You have to select one of the codes (a), (b), (c) and (d) given below.

(a) A is true, R is true; R is a correct explanation for A.

(b) A is true, R is true; R is not a correct explanation for A.

(c) A is true; R is false.
(d) A is false; R is true.
14. Assertion: If A is any square matrix, then $(A^n)' = (A')^n$ for all positive integers n.
Reason: $(AB)' = B'A'$
15. Assertion: Every square matrix can be uniquely written as the sum of a symmetric and a skew-symmetric matrix.
Reason: If A is a square matrix, then A + A' is a symmetric matrix and A – A' is a skew-symmetric matrix.

16. Match the column

Column -1		Column 2	
A.	If A = $[a_{ij}]_{2\times2}$ is a matrix where $a_{ij} = \frac{(i+j)^2}{2}$ Then a_{21} is	(1)	$\frac{49}{2}$
B.	If B = $[b_{ij}]_{2\times3}$ is a matrix where $b_{ij} = \frac{(i+2j)^2}{2}$ Then b_{13} is	(2)	1
C.	If C = $[c_{ij}]_{3\times4}$ is a matrix where $c_{ij} = \frac{\lvert-3i+j\rvert}{2}$ Then c_{11} is	(3)	2
D.	If D = $[d_{ij}]_{3\times4}$ is a matrix where $d_{ij} = 2i - j$ Then d_{34} is	(4)	$\frac{9}{2}$

Codes

a) 1,4,2,3
b) 2,4,3,1
c) 4,2,1,3
d) 4 ,1,2,3

Answers

1. C	2. D	3. C	4. C	5. A	6. A	7. D	8. B	9. D	10. C	11. D	12. C	13. C.	14 A.	15 B.	16 D.