

FIRST QUARTERLY TEST AUGUST 2024

CLASS : II PUC

SUBJECT : BASIC MATHEMATICS (75)

Max. Marks : 40

TIME : 1 Hr. 30 Mins.

PART-A

I Answer ALL the questions :

5x1=5

1) If $A = \begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix}$ then $5A' =$

a) $\begin{bmatrix} 5 & 15 \\ -10 & 20 \end{bmatrix}$

b) $\begin{bmatrix} 5 & -10 \\ 15 & 20 \end{bmatrix}$

c) $\begin{bmatrix} 1 & -2 \\ 3 & 4 \end{bmatrix}$

d) $\begin{bmatrix} 3 & 3 \\ -2 & 4 \end{bmatrix}$

2) The adjoint of the matrix $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is

a) $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$

b) $\begin{bmatrix} a & -b \\ c & d \end{bmatrix}$

c) $\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$

d) $\begin{bmatrix} d & b \\ -c & a \end{bmatrix}$

3) The duplicate ratio of 5 : 4 is

a) 5:4

b) 16:25

c) 125:64

d) 25:16

4) The mean proportional of 2 and 8 is

a) 32

b) 4

c) 8

d) 2

5) $\lim_{x \rightarrow 0} \left(\frac{e^{3x} - 1}{x} \right) =$

a) 3

b) e^3

c) -3

d) e^{-3}

II For question number 6 to 10 choose appropriate answers from the given answers below:

5x1=5

$\left[1, \frac{2}{3}, 12, \frac{1}{3}, 5, 13 \right]$

6) If $A = \begin{bmatrix} 3 & 1 & 4 \\ 5 & 6 & 3x+1 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 5 \\ 1 & 6 \\ 4 & 3 \end{bmatrix}$. If $A=B'$ then the value of x is _____.

7) The value of x if $\begin{vmatrix} 3 & x \\ 2 & 8 \end{vmatrix} = -2$ is _____.

8) If 3 : 5 is a ratio, the consequent is _____.

9) $\lim_{x \rightarrow 2} \left[\frac{x^3 - 8}{x - 2} \right] =$ _____.

10) $\lim_{x \rightarrow 1} \left(\frac{ax^2 + bx + c}{cx^2 + bx + a} \right) =$ _____.

(P.T.O.)

PART-B

III : Answer any FOUR questions :

4x2=8

11) If $A = \begin{bmatrix} 3 & -2 & 5 \end{bmatrix}$. Find AA' .

12) Find x if the matrix $\begin{bmatrix} 3 & 2 & x \\ 4 & 1 & -1 \\ 0 & 3 & 4 \end{bmatrix}$ is singular.

13) What must be added to each term in the ratio 2:3, so that it becomes 5:6?

14) If $a : b = 2 : 3$, $b : c = 3 : 5$, $c : d = 5 : 7$. Find $a : d$.

15) Evaluate : $\lim_{x \rightarrow 3} \left(\frac{x^2 - 4x + 3}{x^2 - 2x - 3} \right)$.

16) Evaluate : $\lim_{x \rightarrow 0} \frac{\sin 4x}{\sin 2x}$.

PART-C

IV Answer any FOUR questions :

4x3=12

17) If $A = \begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix}$. Prove that $A^2 - 4A - 5I = 0$ where I is unit matrix and 0 is the null matrix of order 2×2 .

18) Solve by Cramer's rule $3x + 2y = 8$, $4x - 3y = 5$.

19) Monthly income of A and B are in the ratio 2 : 3 and their expenditure are in the ratio 3:5. If each save ₹ 100 per month. Find the monthly incomes of A and B.

20) If ₹ 150 maintain a family of 4 persons for 30 days. How long ₹ 600 maintain a family of 6 persons?

21) Evaluate $\lim_{x \rightarrow \infty} \left[\frac{3x^2 - 4x + 5}{2x^2 + 5x - 1} \right]$.

22) Find 'k' for which $f(x) = \begin{cases} k+x, & x=1 \\ 4x+3, & x \neq 1 \end{cases}$ is continuous at $k=1$

PART-D

V Answer any TWO questions :

2x5=10

23) Solve the following equations using matrix method :

$$x + y - z = 1, \quad 3x + y - 2z = 3, \quad x - y - z = -1$$

24) Resolve $\frac{x^2}{(x+1)(x+2)(x+3)}$ into partial fractions.

25) Resolve $\frac{2x+5}{(x+2)(x-1)^2}$ into partial fractions.

26) ABC company requires 1000 hours to produce the first 30 engines. If the learning effect is 90%, Find the total labour cost at ₹ 20 per hour to produce total of 120 engines

27) Evaluate $\lim_{x \rightarrow 2} \left[\frac{x^2 - 4}{\sqrt{x+2} - \sqrt{3x-2}} \right]$.