

II PUC BASIC MATHEMATICS

PART-A

I. Answer all five questions.

$1 \times 5 = 5$

1) If $A = \begin{bmatrix} 1 & -3 & 5 \\ 6 & 2 & 4 \end{bmatrix}$ find $5A$.

2) Solve for x : $\begin{vmatrix} x & 7 \\ 7 & x \end{vmatrix} = 0$.

3) Find the value of $3\sin 10^\circ - 4\sin^3 10^\circ$.

4) Find the triplicate ratio of 9:4.

5) Define: Index of learning.

PART-B

II. Answer any five questions.

$2 \times 5 = 10$

1) Find A and B if $2A + B = \begin{bmatrix} 1 & -1 \\ 0 & 1 \end{bmatrix}$ and $A - 3B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$.

2) If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ find $\text{Adj}(AB)$.

3) Find value of $\sin 15^\circ$.

4) Show that $\frac{\cos 2A}{\sec A} - \frac{\sin 2A}{\text{cosec } A} = \cos 3A$.

5) Two numbers are in the ratio 3:5. If 5 is added to each, they are in the ratio 22:35. Find the numbers.

PART-C

III. Answer any five questions.

$2 \times 5 = 10$

1) Solve by Cramer's rule

$$3x + 4y = 7$$

$$7x - y = 6$$

2) Prove that $\begin{vmatrix} y+k & y & y \\ y & y+k & y \\ y & y & y+k \end{vmatrix} = k^2(3y+k)$

3) Resolve into partial fractions: $\frac{x+1}{(x-2)(x-3)}$

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5) If the monthly incomes of A and B are in the ratio 3:4 and their expenditures are in the ratio 1:2.

If each saves ₹1000 find the monthly incomes.

6) Two taps can separately fill a tank in 12 minutes and 15 minutes respectively. The tank when full can be emptied by a drain pipe in 20 minutes. When the tank was empty all the three were opened simultaneously. In what time will the tank be filled up.

7) Prove that $\sin 3A = 3\sin A - 4\sin^3 A$.

PART-D

IV. Answer any five questions.

$5 \times 4 = 20$

1) Resolve into partial fraction: $\frac{3x+5}{(x+2)^2(x-3)}$.

2) Solve by Matrix method:

$$x - y + 2z = 3$$

$$2x + z = 1$$

$$3x + 2y + z = 4$$

3) A can do a piece of work in 20 days B in 30 days and C in 60 days. All of them began to work together. However A left the job after 6 days and B quit work 6 days before the completion of work. How many days did the work last.

4) Prove that: $\frac{\sin 6A + \sin 2A + \sin 4A}{\sin 7A + \sin 3A + 2\sin 5A} = \frac{\sin 4A}{\sin 5A}$.

5) An engineering company has 80% learning effect and spends 500 hours for the prototype.

Estimate the labour cost of producing 7 engines of new order if the labour cost is ₹40 per hour.

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