

All Questions are Compulsory.

Q.1 A. Select the most appropriate answer from the given alternatives from each sub - questions.

1. $\left(\frac{5\pi}{12}\right)^\circ =$ (2)

- a. 75° b. 105° c. 45° d. 65°

2. $\cos \theta = \frac{4}{5}$, $\frac{3\pi}{2} < \theta < 2\pi$ then $\sin \theta =$ (2)

- a. $\frac{3}{5}$ b. $\frac{-3}{5}$ c. $\frac{1}{5}$ d. $\frac{-4}{5}$

3. The value of $\frac{\tan \theta}{\sec \theta + 1} + \frac{\sec \theta + 1}{\tan \theta}$ is (2)

- a. $2\operatorname{cosec} \theta$ b. $2\sec \theta$ c. $2\sin \theta$ d. $2\cos \theta$

B. Attempt any THREE of the following. (6)

1. The area of the circle is 25π sq.m. Find the length of its arc subtending an angle of 144° at the centre.

2. Prove that: $\cot^2 60^\circ + \sin^2 45^\circ + \sin^2 30^\circ + \cos^2 90^\circ = \frac{13}{12}$

3. If $2\sin x = 1$; $\frac{\pi}{2} < x < \pi$. Find the Value of $\tan x$.

4. Prove that: $\frac{\sin 3A}{\cos A} + \frac{\cos 3A}{\sin A} = 2\cot 2A$

5. Prove that: $\frac{\sin 2\theta}{1 - \cos 2\theta} = \cot \theta$

Q.2 A. Attempt any THREE of the following. (9)

1. Find matrices A & B, if

$$2A - B = \begin{bmatrix} 6 & -6 & 0 \\ -4 & 2 & 1 \end{bmatrix} ; \quad A - 2B = \begin{bmatrix} 3 & 2 & 8 \\ -2 & 1 & -7 \end{bmatrix}$$

2. Find Minors & co - factors of the elements of the determinant.

$$\begin{vmatrix} 1 & 0 & 3 \\ -3 & 4 & -2 \\ 2 & -1 & 0 \end{vmatrix}$$

3. Solve Graphically,

$$2x + 3y \leq 6, \quad x + 4y \geq 6, \quad x \geq 0, \quad y \geq 0$$

4. Find the feasible solution.

$$x + 4y \leq 24, \quad 3x + y \leq 21, \quad x + y \leq 9, \quad x \geq 0, \quad y \geq 0$$

5. If $A = \begin{bmatrix} 1 & -5 \\ 6 & 7 \end{bmatrix}$; $B = \begin{bmatrix} 2 & -3 \\ 4 & 8 \end{bmatrix}$ Find $AB - 2I$

B. Attempt Any ONE of the following.

(4)

1. If $A = \begin{bmatrix} 2 & 1 & 4 \\ 3 & 0 & 2 \\ 1 & 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} -1 & 1 & 1 \\ 2 & 3 & 0 \\ 1 & -3 & 1 \end{bmatrix}$, State whether $AB = BA$.

Justify your answer.

2. Solve equations by Cramer's Rule.

$$x + 2y + 3z = 6$$

$$2x + 4y + z = 7$$

$$3x + 2y + 9z = 14$$

Q.3 A. Select the most appropriate answer from the given alternatives from each sub - questions.

1. The value of $\log_5 \sqrt[3]{5}$ is

(2)

a. $\frac{1}{3}$

b. $\frac{3}{2}$

c. $\frac{1}{2}$

d. $\frac{2}{3}$

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

2. The value of $\frac{2 + \sqrt{3}}{4 + \sqrt{3}}$ is

(2)

a. $\frac{11+2\sqrt{3}}{19}$

b. $\frac{-11+2\sqrt{3}}{19}$

c. $\frac{11-2\sqrt{3}}{19}$

d. $\frac{-11-2\sqrt{3}}{19}$

3. $\frac{1}{4!} + \frac{3}{6!} = \frac{x}{8!}$ then the value of x is

(2)

a. 1848

b. 1860

c. 1840

d. 1850

B. Attempt Any THREE of the following.

(6)

1. find the value of $(3 + 3w + 5w^2)^6 - (2 + 6w + 2w^2)^3$

$\frac{119}{2}$
 $\frac{238}{2}$

3. Calculate the range of the following data regarding the heights (in cms) of 8 men .

175, 172, 190, 170, 185, 180, 182, 195.

4. For a G.P. $a = \frac{2}{3}$ & $t_6 = 162$. Find 'r'.

5. If ${}^{x \cdot y}P_2 = 56$ and ${}^{x \cdot y}P_2 = 12$, Find x and y.

Q.4 A. Attempt any THREE of the following.

(9)

1. Calculate quartile deviation for the following frequency distribution.

| | | | | | | |
|-------|---|---|----|----|----|----|
| x_i | 2 | 4 | 6 | 8 | 10 | 11 |
| f_i | 3 | 8 | 12 | 14 | 11 | 8 |

2. Find the square root of $2(1 - \sqrt{3}i)$

3. IF $a^x = b^y = c^z$ & $b^2 = ac$ P.T. $y = \frac{2xz}{x+z}$

4. Find three numbers in G.P. such that their sum is 35 and their product is 1000.

5. Find sum $1.3 + 5.7 + 9.11 + \dots$ upto 'n' term.

Q.4 B. Attempt Any ONE of the following.

4 (4)

1. Calculate Mean deviation about mean and median for the following data.

| | | | | | | | |
|--------------|---|---|---|----|----|----|----|
| Size of item | 2 | 6 | 8 | 10 | 12 | 14 | 16 |
| frequency | 2 | 1 | 3 | 6 | 4 | 3 | 1 |

2. Determine how many words can be formed using the letter of the word LOGARITHM if,

1. Vowels are always together.
2. No two vowels are together.
3. Consonants occupy even position.
4. Begin with 'O' and end with 'T'.

