Unit test

Standard -XII

MATHEMATICS

Time : 1.30 Hrs **Marks : 50**

Part –A

I. Choose the correct answer from the given four alternatives. **10 x 1 = 10**

1. If $|adj\ (adjA)| = |A|^9$ then the order of the square matrix A is

1) 3 2) 4 3) 2 4) 5

2. If A is a 3 x 3 non singular matrix such that $AA^T = A^TA$ and $B = A^{-1}A^T$ then BB^T

1) A 2) B 3) I_3 4) B^T

3. $A = \begin{bmatrix} 2 & 3 \\ 5 & -2 \end{bmatrix}$ be such that $\lambda A^{-1}=A$ then λ is

1)17 2) 14 3) 19 4) 21

4. If $P = \begin{pmatrix} 1 & x & 0 \\ 1 & 3 & 0 \\ 2 & 4 & -2 \end{pmatrix}$ is the adjoint of 3 x 3 matrix A and $|A|=4$ then x is

1) 15 2) 12 3) 14 4) 11

5. A^TA^{-1} Symmetric then A^2= ?

1) A^{-1} 2) $(A^T)^2$ 3) A^T 4) $(A^{-1})^2$

6. $\tan^{-1}(\frac{1}{4}) + \tan^{-1}(\frac{2}{9})$ is equal to

1) $(½)\cos^{-1}\left(\frac{3}{5}\right)$ 2) $(½)\sin^{-1}(\frac{3}{5})$ 3) $(½)\tan^{-1}(\frac{3}{5})$ 4) $\tan^{-1}(\frac{1}{2})$

7. The Value of $\sin^{-1}(\cos x), 0 \le x \le \pi$is

1) $\pi - x$ 2) x-$\frac{\pi}{2}$ 3) $\frac{\pi}{2} - x$ 4) $x - \pi$

8. If $\cot^{-1} x = \frac{2\pi}{5}$for some $x \in R$ The Value of $\tan^{-1} x$

1) $\frac{-\pi}{10}$ 2) $\frac{\pi}{5}$ 3) $\frac{\pi}{10}$ 4) $\frac{-\pi}{5}$

9. $\sin(\tan^{-1} x).\ |x| < 1$; is equal to

1) $\frac{x}{\sqrt{1-x^2}}$ 2) $\frac{1}{\sqrt{1-x^2}}$ 3) $\frac{1}{\sqrt{1+x^2}}$ 4) $\frac{x}{\sqrt{1+x^2}}$

10. If $\sin^{-1} x + \sin^{-1} y = \frac{2\pi}{3}$ then $\cos^{-1} x + \cos^{-1} y$is

1) $\frac{2\pi}{3}$ 2) $\frac{\pi}{3}$ 3) $\frac{\pi}{6}$ 4) π

Part - B

II. Answer any four questions .Question No.16 is Compulsory **4 x 2 = 8**

11) Prove that $\begin{pmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{pmatrix}$ is orthogonal

12) Find the principal of $\tan^{-1}\sqrt{3}$

13) Find the value of $\cos^{-1}(\cos(\frac{7\pi}{6}))$

14) Find the domain of $\tan^{-1}(\sqrt{9-x^2})$

15) $If\ A = \begin{pmatrix} 8 & -4 \\ -5 & 3 \end{pmatrix}$ verify that $A(adjA) = (adjA)A = |A|I$

16) If adj A= $\begin{pmatrix} 0 & -2 & 0 \\ 6 & 2 & -6 \\ -3 & 0 & 6 \end{pmatrix}$ find A^{-1}

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Part - C

III. Answer any four questions .Question No.22 is Compulsory **4 x 3 = 12**

17) Verify $(A^T)^{-1} = (A^{-1})^T$ with $A = \begin{pmatrix} 2 & 9 \\ 1 & 7 \end{pmatrix}$

18) Find adj (adj A) If adj A= $\begin{pmatrix} 1 & 0 & 1 \\ 0 & 2 & 0 \\ -1 & 0 & 1 \end{pmatrix}$

19) Find the inverse of $\begin{pmatrix} 2 & 3 & 1 \\ 3 & 4 & 1 \\ 3 & 7 & 2 \end{pmatrix}$

20) Find the principal value of $\cos^{-1}(\frac{\sqrt{3}}{2})$

21) Find the value of $\cos(\cos^{-1}(\frac{4}{5}) + \sin^{-1}(\frac{4}{5}))$

22) Is $\cos^{-1}(-x) = \pi - \cos^{-1}(x)$ True ? Justify your answer.

Part - D

IV. Answer all the questions **4 x 5 = 20**

23) a)If A= $\frac{1}{7}\begin{pmatrix} 6 & -3 & a \\ b & -2 & 6 \\ 2 & c & 3 \end{pmatrix}$ Is Orthogonal find a, b and c and hence A^{-1}

b) If A = $\frac{1}{9}\begin{pmatrix} -8 & 1 & 4 \\ 4 & 4 & 7 \\ 1 & -8 & 4 \end{pmatrix}$ Prove that $A^{-1}=A^T$

24) a) If A = $\begin{pmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{pmatrix}$ Show that $A^{-1}=\frac{1}{2}(A^2 - 3I)$

or

b) Find the inverse of the matrix $\begin{pmatrix} 2 & -1 & 3 \\ -5 & 3 & 1 \\ -3 & 2 & 3 \end{pmatrix}$

25) a) Find the value of $sin\,(\tan^{-1}(\frac{1}{2}) - \cos^{-1}(\frac{4}{5}))$

or

b) Prove the $tan\,(\sin^{-1}x) = \frac{x}{\sqrt{1-x^2}}, -1 < x < 1$

26) a) Find the value of $\cos\,(\sin^{-1}(\frac{4}{5}) - \tan^{-1}(\frac{3}{4}))$

or

b) Find the value of $\tan^{-1}(-1) + \cos^{-1}\left(\frac{1}{2}\right) + \sin^{-1}\left(\frac{-1}{2}\right)$.

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