Enrollment No:-_____ Exam Seat No:-_____

C.U.SHAH UNIVERSITY

Summer-2015

Subject Code: 2TE01BMT2 Subject Name: Basic Mathematics

Course Name: Diploma Date : 04/05/2015

Semester: 1 Marks: 70

Time: 10:30 To 01:30

Instructions:

1) Attempt all Questions of both sections in same answer book/Supplementary.
2) Use of Programmable calculator & any other electronic instrument prohibited.
3) Instructions written on main answer book are strictly to be obeyed.
4) Draw neat diagrams & figures (if necessary) at right places.
5) Assume suitable & perfect data if needed.

Q – 1 Do as directed. (14)

(1) AB = _____ where A(1, 2) and B(2, 3).

(2) Find the midpoint of (2, 3) and (4, 7).

(3) If A(–3, 5) and B(2, – 4) are two points, find slope of AB.

(4) Find x intercept of the line 2x + 3y – 4 = 0.

(5) Order of matrix $\begin{bmatrix} 1 & 2 & 5 \\ 2 & 3 & 7 \end{bmatrix}$ is = _____.

(6) If $A = \begin{bmatrix} -7 & 6 \\ 5 & -2 \end{bmatrix}$ then AI = _____.

(7) If $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ then adjA = _____.

(8) If $\begin{vmatrix} x & 1 \\ 4 & 2 \end{vmatrix} = 0$ then x = _____.

(9) Number of terms in the expansion of $(x+y)^5$ = _____.

(10) $\sin^2\theta + \cos^2\theta$ = _____.

(11) ${}^6C_2$ = _____.

(12) $\cos\frac{\pi}{2}\ \sin\frac{3\pi}{2}\ \sin\frac{5\pi}{2}$ = _____.

(13) 20° = _____ radian.

(14) $\frac{\pi}{9}$ radian = _____degree.

Attempt any four

Q – 2

(1) Show that the points (4, 8), (4, 12) and $(4 + 2\sqrt{3}, 10)$ are the vertices of an equilateral triangle. (5)

(2) Find co ordinates of the point of trisection of the line segment joining points (4, 5) and (13, – 4). (5)

(3) Show that (3, 2), (5, 4) and (7, 6) are collinear. (4)

Q – 3

(1) Find the equation of line perpendicular to line $4x - y + 5 = 0$ and passing through $(1, -2)$. (5)

(2) Find centre and radius of circle $x^2 + y^2 - 2x + 4y - 1 = 0$. (5)

(3) Find the equation of circle having centre (2, 3) and passing through (3, 4). (4)

Q – 4

(1) If $A = \begin{bmatrix} 2 & 3 & 6 \\ -1 & 2 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 2 & -8 \\ 2 & 4 & -2 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & 3 & -3 \\ 1 & 4 & 1 \end{bmatrix}$, prove that $2A + 3B - 4C = 0$. (5)

(2) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, prove that $A^2 - 5A - 2I = O$. (5)

(3) If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 2 & 1 \\ 1 & 2 \end{bmatrix}$, find AB and BA. (4)

Q – 5

(1) Solve the equations using matrix method: $2x - y = 4$
$3x + y = 1$ (5)

(2) If $A = \begin{bmatrix} -4 & -3 & -3 \\ 1 & 0 & 1 \\ 4 & 4 & 3 \end{bmatrix}$, prove that adjA = A. (5)

(3) If $A = \begin{bmatrix} 2 & 3 \\ 1 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 1 \\ 2 & -3 \end{bmatrix}$, prove that $(A + B)^T = A^T + B^T$. (4)

Q – 6

(1) Find the middle term of $\left(\frac{x}{2} + \frac{2}{y}\right)^{12}$. (5)

(2) Find the constant term of $\left(x^2 - \frac{1}{x}\right)^6$. (5)

(3) Find the approximate value of $\sqrt[5]{1003}$ using binomial theorem. (4)

Q – 7

(1) Draw the graph of $y = sinx \ (0 \leq x \leq \pi)$. (5)

(2) Prove that $\frac{\cos(90^\circ - A)\cos(180^\circ - A)\tan(180^\circ + A)}{\sin(90^\circ - A)\sin(180^\circ - A)\tan(180^\circ - A)} = 1$. (5)

(3) Prove that $\tan 20^\circ + \tan 25^\circ + \tan 20^\circ \tan 25^\circ = 1$. (4)

Q – 8

(1) Prove that $\sin 3\theta = 3\sin\theta - 4\sin^3\theta$. (5)

(2) Prove that $\frac{\sin 4x + \sin 5x + \sin 6x}{\cos 4x + \cos 5x + \cos 6x} = \tan 5x$. (5)

(3) Prove that $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{3}\right) = \frac{\pi}{4}$. (4)

**********4-5-2015**********