Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name : Basic Mathematics

Subject Code : 2TE01BMT2 Branch: Diploma(All)

Semester : 1 Date : 22/03/2017 Time : 10:30 To 01:30 Marks : 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

a) Radius of the circle $x^2 + y^2 = 25$ is _____ .

(a) 5 (b) 25 (c) 25/2 (d) None of these

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

(a) –9/5 (b) 9/5 (c) – 5/9 (d) 5/9

c) x – intercept of line 2x – 6y + 4 = 0 is _____.

(a) –2/3 (b) 2/3 (c) –2 (d) 2

d) If A(–7, 2) and B(3, 8) then mid point of AB = _____.

(a) $(-2,5)$ (b) $(5,-2)$ (c) $(2,5)$ (d) $(5,2)$

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

(a) 2×3 (b) 3×2 (c) 2×2 (d) None of these

f) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 1 \\ 4 & 2 \end{bmatrix}$ then A^T = _____.

(a) $\begin{bmatrix} 2 & 1 \\ 1 & 3 \\ 2 & 4 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 3 & 4 \\ 2 & 1 & 2 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 2 \\ 3 & 1 \\ 4 & 2 \end{bmatrix}$ (d) None of these

g) If $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then A^2 = _____.

(a) $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ (c) $\begin{bmatrix} 0 & -1 \\ -1 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$

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

(a) $\begin{bmatrix} -7 & 6 \\ 5 & -2 \end{bmatrix}$ (b) $\begin{bmatrix} 7 & -6 \\ -5 & 2 \end{bmatrix}$ (c) $\begin{bmatrix} 7 & 6 \\ 5 & 2 \end{bmatrix}$ (d) None of these

i) $12C_5$ = _____

(a) 729 (b) 792 (c) 297 (d) 927

j) Number of terms in the expansion of $(x+y)^7$ = _____.

(a) 7 (b) 8 (c) 9 (d) none of these

k) $\cos^2 39^\circ + \sin^2 51^\circ$ = _____

(a) 1 (b) -1 (c) 0 (d) None of these

l) $\tan\left(\frac{21\pi}{4}\right)$ = _____

(a) $\frac{-1}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) $\sqrt{3}$

m) 270° = _____ Radian

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{3\pi}{2}$ (d) $\frac{\pi}{4}$

n) $\frac{3\pi}{2}$ Radian = _____ Degree

(a) 30° (b) 45° (c) 60° (d) 270°

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

a) Prove that (12, 8), (– 2 , 6) and (6, 0) are the vertices of an isosceles right angled triangle. **(5)**

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

c) Find the 4th term of $\left(\frac{x}{a} - \frac{a}{x}\right)^{10}$. **(4)**

Q-3 **Attempt all questions** **(14)**

a) Find the equation of circle having centre (4, 3) and passing through (7, – 2). **(5)**

b) Solve the following equations by matrix method: 5x + 3y = 11 and 3x – 2y = – 1 **(5)**

c) If $A = \begin{bmatrix} 2 & 2 & 2 \\ 2 & 1 & -3 \\ 1 & 0 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 3 & 3 & 3 \\ 3 & 0 & 5 \\ 9 & 9 & -1 \end{bmatrix}$ and $C = \begin{bmatrix} 4 & 4 & 4 \\ 5 & -1 & 5 \\ -7 & 8 & -1 \end{bmatrix}$ then find **(4)**

2A – 3B + C.

Q-4 **Attempt all questions** **(14)**

a) If $A + B = \begin{bmatrix} 1 & -1 \\ 3 & 0 \end{bmatrix}$ and $A - B = \begin{bmatrix} 3 & 1 \\ 1 & 4 \end{bmatrix}$ then find $(AB)^{-1}$. **(5)**

b) Using binomial theorem, find the approximate value of $(102)^{\frac{1}{2}}$ and $\sqrt[3]{126}$. **(5)**

c) Prove that $\tan^{-1}(\infty)+\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)+\cos^{-1}\left(\frac{1}{2}\right)=\frac{7\pi}{6}$. **(4)**

Q-5 **Attempt all questions** **(14)**

a) If $A=\begin{bmatrix}2 & 3\\ 0 & 1\end{bmatrix}$, $B=\begin{bmatrix}3 & 4\\ 2 & 1\end{bmatrix}$ then prove that $(AB)^T=A^TB^T$. **(5)**

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

c) If A(2, 3), B(4, 7) and C(–5, –1) are the vertices of ΔABC, find the length of its median AD. **(4)**

Q-6 **Attempt all questions** **(14)**

a) Find the equation of straight line passing through (– 1 , – 2) and perpendicular to line $\frac{x}{3}+\frac{y}{4}=1$. **(5)**

b) Draw the graph of $y=\cos x \quad \left(-\frac{\pi}{2}\le x\le\frac{\pi}{2}\right)$. **(5)**

c) Prove that $\tan 55°=\frac{\cos 10°+\sin 10°}{\cos 10°-\sin 10°}$. **(4)**

Q-7 **Attempt all questions** **(14)**

a) In which ratio X – axis divides line segment joining points (2, 2) and (–3, 6)? Find co ordinates of division point. **(5)**

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

c) If $A=\begin{bmatrix}1 & 2 & 1\\ 3 & 4 & 2\end{bmatrix}$, $B=\begin{bmatrix}3 & -2 & 4\\ 1 & 5 & 0\end{bmatrix}$ then find matrix X from X + A + B = 0. **(4)**

Q-8 **Attempt all questions** **(14)**

a) Prove that $8\sin 10°\sin 50°\sin 70°=1$. **(5)**

b) Prove that $\frac{\cos(90°-A)\cos(180°-A)\tan(180°+A)}{\sin(90°-A)\sin(180°-A)\tan(180°-A)}=1$. **(5)**

c) If (3, 8), (4, 2) and (–1, 5) are the vertices of a triangle, find the co ordinates of its centroid. **(4)**