Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Basic Mathematics

Subject Code : 2TE01BMT3 **Branch: Diploma (All)**

Semester : 1 **Date : 21/03/2018** **Time : 02:30 To 05:30** **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) If A(– 5, 7) and B(7, – 2) then AB = _____.

(A) 15 (B) 169 (C) $\sqrt{29}$ (D) None of these

b) If A(1, 7) and B(3, 3) are the given points, then the midpoint of AB is _____.

(A) $(-2,5)$ (B) $(5,-2)$ (C) $(2,5)$ (D) $(5,2)$

c) y – intercept of line 3x +2y – 7 = 0 is _____.

(A) 7/2 (B) –7/2 (C) 7/3 (D) – 7/3

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

(A) 5 (B) 25 (C) 5/2 (D) None of these

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

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

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

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

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

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

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

(A) $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ (B) $\begin{bmatrix} -a & b \\ c & -d \end{bmatrix}$ (C) $\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$ (D) $\begin{bmatrix} d & b \\ c & a \end{bmatrix}$

i) $14C_{12}$ = _____

(A) 156 (B) 19 (C) 91 (D) 119

j) Number of terms in the expansion of $(x+y)^6$ = _____.

(A) 4 (B) 5 (C) 6 (D) 7

k) $\frac{\pi}{6}$ Radian = _____ Degree

(a) 30° (b) 90° (c) 120° (d) 150°

l) 330° = _____Radian.

(A) $\frac{6\pi}{11}$ (B) $\frac{11\pi}{6}$ (C) $\frac{22\pi}{6}$ (D) $\frac{13\pi}{6}$

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

(a) 1 (b) – 1 (c) 0 (d) None of these

n) $\sin\pi.\sin 2\pi.\sin 3\pi$ = _____

(a) –1 (b) 1 (c) 0 (d) None of these

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

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

a) Prove that the points (0, – 3), (1, – 2) and (10, 7) are collinear. **(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 approximate value of $\sqrt[3]{1003}$ using binomial theorem. **(4)**

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

a) Find equation of a circle passing through points (1, 0), (0, 1) and (0, 0). **(5)**

b) Using matrix method solve: 5x + 3y = 11 and 3x –2 y = – 1. **(5)**

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

2A + 3B – 4C = 0.

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

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

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

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

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

a) If $A=\begin{bmatrix}2 & 1 & 5\\ 0 & 3 & -1\\ 2 & 5 & 0\end{bmatrix}$ then find adjA. **(5)**

b) Find the 4^{th} term of $\left(\frac{x}{a}-\frac{a}{x}\right)^{10}$. **(5)**

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

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

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

b) Draw the graph of $y=\sin x \quad (0\le x\le \pi)$. **(5)**

c) Prove that tan5A – tan3A – tan2A = tan5A.tan3A.tan2A **(4)**

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

a) Find co ordinates of the points of trisection of the line segment joining points A(4, 5) and B(13, – 4). **(5)**

b) Prove that $\frac{\sin\theta+\sin 2\theta+\sin 3\theta}{\cos\theta+\cos 2\theta+\cos 3\theta}=\tan 2\theta$. **(5)**

c) If $A=\begin{bmatrix}1 & 2 & 0\\ -3 & 0 & 4\end{bmatrix}$, $B=\begin{bmatrix}0 & -1 & -3\\ 3 & 2 & 4\end{bmatrix}$ then solve the equation **(4)**

2(X + A) + 3B = 0.

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

a) Prove that $\frac{\sin(\pi+\theta)}{\sin(2\pi-\theta)}+\frac{\tan\left(\frac{\pi}{2}+\theta\right)}{\cot(\pi-\theta)}+\frac{\cos(2\pi+\theta)}{\sin\left(\frac{\pi}{2}+\theta\right)}=3$. **(5)**

b) If $\tan\theta=\frac{1}{2}$, prove that $7\cos 2\theta+8\sin 2\theta=\frac{53}{5}$. **(5)**

c) If radius of a circle $x^2+y^2-4x-8y+k=0$ is 4, find k. **(4)**