

Enrollment No: _____

Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2017

Subject Name : Basic Mathematics

Subject Code : 2TE01BMT3

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) Centre of the circle $x^2 + y^2 = 25$ is _____.
(a) (0,5) (b) (5,0) (c) (0,0) (d) None of these
- b) If A(-3, 5) and B(2, -4) are two points, find slope of AB = _____.
(a) -9/5 (b) 9/5 (c) -5/9 (d) 5/9
- c) y – intercept of line $2x - 6y + 4 = 0$ is _____.
(a) -2/3 (b) 2/3 (c) -2 (d) 2
- d) If A(2, -7) and B(8, 3) then mid point of AB = _____.
(a) (-2,5) (b) (5,-2) (c) (2,5) (d) (5,2)
- e) Order of matrix $\begin{bmatrix} 1 & 2 & 5 \\ 2 & 3 & 7 \end{bmatrix}$ is _____.
(a) 2×3 (b) 3×2 (c) 2×2 (d) None of these
- f) If $A = \begin{bmatrix} 1 & 3 & 4 \\ 2 & 1 & 2 \end{bmatrix}$ then $A^T = \text{_____}$.
(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
- g) If $A = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ then $A^2 = \text{_____}$.
(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 $AI = \text{_____}$.
(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) $12C_5 = \underline{\hspace{2cm}}$
 (a) 729 (b) 792 (c) 297 (d) 927

j) Number of terms in the expansion of $(\sqrt{x} + \sqrt{y})^7 = \underline{\hspace{2cm}}$.
 (a) 7 (b) 8 (c) 9 (d) none of these

k) $\cos^2 51^\circ + \sin^2 39^\circ = \underline{\hspace{2cm}}$
 (a) 1 (b) -1 (c) 0 (d) None of these

l) $\tan\left(\frac{21\pi}{4}\right) = \underline{\hspace{2cm}}$
 (a) $\frac{-1}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) $\sqrt{3}$

m) $30^\circ = \underline{\hspace{2cm}}$ Radian
 (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) $\frac{\pi}{4}$

n) $\frac{\pi}{4}$ Radian = $\underline{\hspace{2cm}}$ Degree
 (a) 60° (b) 30° (c) 45° (d) 90°

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 $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ then prove that $A^2 - 5A + 7I = O$. (5)

c) Find middle term of $\left(\frac{x}{2} + \frac{2}{y}\right)^{12}$. (4)

Q-3

Attempt all questions

(14)

- a)** Find equation of a circle passing through points $(2, 0)$, $(0, 2)$ and $(0, 0)$. (5)

b) Solve the following equations by matrix method: $3x - 2y = 8$ and $5x + 4y = 6$. (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-4

Attempt all questions

(14)

- a) If $M = \begin{bmatrix} 2 & 3 \\ 0 & 1 \end{bmatrix}$, $N = \begin{bmatrix} 3 & 4 \\ 2 & 1 \end{bmatrix}$ then prove that $(MN)^T = N^T M^T$. (5)

b) Using binomial theorem, find the approximate value of $(102)^{\frac{1}{2}}$ and $\sqrt[3]{997}$. (5)

c) Prove that $\tan^{-1}\left(\frac{3}{4}\right) + \sin^{-1}\left(\frac{4}{5}\right) = \frac{\pi}{2}$. (4)

Q-5

Attempt all questions

(14)

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



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

$$\frac{x}{2} + \frac{y}{2} = 1.$$

b) Draw the graph of $y = \sin x$ $\left(-\frac{\pi}{2} \leq x \leq \frac{\pi}{2}\right)$. (5)

c) Prove that $\tan 62^\circ = \frac{\cos 17^\circ + \sin 17^\circ}{\cos 17^\circ - \sin 17^\circ}$. (4)

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

a) In which ratio Y – axis divides line segment joining points $(1, 2)$ and $(2, 1)$? Find co ordinates of division point. (5)

b) Prove that $\frac{\cos A + \cos 3A + \cos 5A}{\sin A + \sin 3A + \sin 5A} = \cot 3A$. (5)

c) If $A = \begin{bmatrix} 1 & 4 \\ 3 & 2 \\ 2 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} -1 & -2 \\ 0 & 5 \\ 3 & 1 \end{bmatrix}$ then find value of $2A - 3B$ and $3A - 2B$. (4)

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

a) Prove that $\cos 20^\circ + \cos 60^\circ + \cos 100^\circ + \cos 140^\circ = \frac{1}{2}$. (5)

b) Prove that $\frac{\sin(\pi - A)}{\tan(\pi + A)} \frac{\cot\left(\frac{\pi}{2} - A\right)}{\tan\left(\frac{\pi}{2} + A\right)} \frac{\cos(2\pi - A)}{\sin(-A)} = \sin A$. (5)

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

