

Enrollment No: _____

Exam Seat No: _____

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Basic Mathematics

Subject Code : 2TE01BMT2

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) $AB = \text{_____}$ Where A(- 5, 7) and B(7, 2).
(a) 13 (b) 169 (c) $\sqrt{29}$ (d) None of these
- b) Midpoint of A(2, -7) and B(4, 3) = _____ .
(a) (-2, 5) (b) (3, -2) (c) (2, 5) (d) (5, 2)
- c) Slope of the line $2x + 3y - 7 = 0$ is _____ .
(a) $2/3$ (b) $-2/3$ (c) $3/2$ (d) $-3/2$
- d) Radius of the circle $x^2 + y^2 = 25$ is _____ .
(a) 25 (b) 52 (c) 5 (d) None of these
- e) 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
- f) If $\begin{vmatrix} x & -2 \\ 3 & -5 \end{vmatrix} = -4$ then $x = \text{_____}$.
(a) $-2/5$ (b) $2/5$ (c) -2 (d) 2
- 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 $A = \begin{bmatrix} -7 & 6 \\ 5 & -2 \end{bmatrix}$ 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) $25C_{22} = \text{_____}$
(a) 2300 (b) 230 (c) 575 (d) 275



- j) Number of terms in the expansion of $(4x+y)^5$ = _____.
 (A) 4 (B) 5 (C) 6 (D) 7
- k) 45° = ____ Radian
 (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{2}$ (d) $\frac{\pi}{4}$
- l) $\frac{\pi}{6}$ Radian = ____ Degree
 (a) 60° (b) 30° (c) 45° (d) 90°
- m) $\sin^2 51^\circ + \cos^2 39^\circ$ = ____
 (a) 1 (b) -1 (c) 0 (d) None of these
- n) $\cot\left(\frac{21\pi}{4}\right)$ = ____
 (a) $\frac{-1}{\sqrt{3}}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) $\sqrt{3}$

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

Q-2

Attempt all questions

(14)

- a) Show that $(-2, -1), (5, -4), (-1, -18)$ and $(-8, -15)$ form a rectangle.

(5)

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

(5)

- c) Find the approximate value of $\frac{1}{\sqrt[3]{997}}$ using binomial theorem.

(4)

Q-3

Attempt all questions

(14)

- a) Find the equation of circle having centre $(1, 1)$ and passing through $(-2, 4)$.

(5)

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

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

(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 5th term of $\left(x^2 + \frac{1}{x}\right)^6$.

(5)



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

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

- a) Find the equation of perpendicular bisector to line joining points (-1, 2) and (1, -2). (5)

- b) Draw the graph of $y = \cos x (0 \leq x \leq \pi)$. (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) 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 $\frac{\cos 4\theta + 2\cos 5\theta + \cos 6\theta}{\sin 4\theta + 2\sin 5\theta + \sin 6\theta} = \cot 5\theta$. (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 $\frac{\sin(\pi+\theta)}{\sin(2\pi-\theta)} + \frac{\tan\left(\frac{\pi}{2}+\theta\right)}{\cot(\pi-\theta)} + \frac{\cos(2\pi+\theta)}{\sin\left(\frac{\pi}{2}+\theta\right)} = 3$. (5)

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

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

