Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY
Winter Examination-2018

Subject Name : Basic Mathematics

Subject Code : 2TE01BMT2 **Branch: Diploma (All)**

Semester : 1 **Date : 28/11/2018** **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 = _____ Where A(– 5, 7) and B(7, 2).
(A) 13 (B) 169 (C) $\sqrt{29}$ (D) None of these

b) If A(2, – 7) and B(8, 3) are the given points, then the midpoint of AB is _____.
(A) $(-2,5)$ (B) $(5,-2)$ (C) $(2,5)$ (D) $(5,\ 5)$

c) y – intercept of line 2x – 6y + 4 = 0 is _____.
(A) –2/3 (B) 2/3 (C) –2 (D) 2

d) Centre of the circle $2x^2+2y^2=5$ is _____ .
(A) $(0,0)$ (B) $(5,0)$ (C) $(0,5)$ (D) $(5/2,5/2)$

e) If $\begin{vmatrix} x & -2 \\ 3 & -5 \end{vmatrix} = -4$ then x = _____.
(A) – 2/5 (B) 2/5 (C) – 2 (D) 2

f) 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

g) If $A=\begin{bmatrix} -8 & 4 \\ -6 & 3 \end{bmatrix}$ then A^{-1} = _____.
(A) $\begin{bmatrix} -8 & 4 \\ -6 & 3 \end{bmatrix}$ (B) $\begin{bmatrix} -3 & 4 \\ -6 & 8 \end{bmatrix}$ (C) $\begin{bmatrix} -8 & 6 \\ -4 & 3 \end{bmatrix}$ (D) Does not exist

h) If $A=\begin{bmatrix} 7 \\ 2 \end{bmatrix}$ and $B=\begin{bmatrix} 3 & 4 \end{bmatrix}$ then A + B = _____.
(A) $\begin{bmatrix} 10 & 6 \end{bmatrix}$ (B) $\begin{bmatrix} 10 \\ 6 \end{bmatrix}$ (C) $\begin{bmatrix} 21 & 8 \end{bmatrix}$ (D) Not possible

i) Number of terms in the expansion of $(5x+7y)^6$ = _____.
(A) 6 (B) 7 (C) 8 (D) 9

j) $25C_{22}$ = _____.
(A) 3200 (B) 2500 (C) 2300 (D) 2100

k) 240° = _____Radian.
(A) $\frac{4\pi}{3}$ (B) $\frac{3\pi}{4}$ (C) $\frac{4\pi}{5}$ (D) $\frac{5\pi}{4}$

l) $\frac{5\pi}{3} =$ _____°
(A) 160° (B) 300° (C) 150° (D) 145°

m) $\tan\left(\frac{21\pi}{4}\right) =$ _____
(A) $\frac{-1}{\sqrt{3}}$ (B) $\frac{1}{\sqrt{3}}$ (C) 1 (D) $\sqrt{3}$

n) $\sec^2\theta - \tan^2\theta =$ _____
(A) – 1 (B) 0 (C) 1 (D) None of these

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

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

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

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

c) Find the 5^{th} term of $\left(x^2 + \frac{1}{x}\right)^6$. **(4)**

Q-3 **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) 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) 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-4 **Attempt all questions** **(14)**

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

b) Using binomial theorem, find the approximate value of $\sqrt[3]{126}$ and $\sqrt{17}$. **(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-5 **Attempt all questions9** **(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) If $A=\begin{bmatrix} -4 & -3 & -3 \\ 1 & 0 & 1 \\ 4 & 4 & 3 \end{bmatrix}$ then find adjA. **(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 $2(X + A) + 3B = 0$. **(4)**

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

a) Solve the following equations by matrix method: $2x – y = 4$ and $3x + y = 1$. **(5)**

b) Draw the graph of $y=\sin x \quad (0 \le x \le \pi)$. **(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-7 **Attempt all questions** **(14)**

a) Find co ordinates of the points of trisection of the line segment joining points (4, 5) and (13, –4). **(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) $\tan 20° + \tan 25° + \tan 20°\tan 25° = 1$ **(4)**

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

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

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

c) If the centroid of a triangle whose vertices are (– 2, 3), (a, 5) and (– 1, b) is (5, 5) then find the values of a and b. **(4)**