

Enrollment No: \_\_\_\_\_

Exam Seat No: \_\_\_\_\_

# C.U. SHAH UNIVERSITY

## Summer Examination-2022

Subject Name: Basic Mathematics

Subject Code: 2TE01BMT3

Branch: Diploma (All)

Semester: 1

Date: 22/04/2022

Time: 11:00 To 02:00

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) The distance between two points  $A(1,1)$  and  $B(2,2)$  is \_\_\_\_\_. 1  
 (a) 2 (b)  $\sqrt{2}$  (c) 3 (d)  $\sqrt{3}$
- b) The slope of line  $3x + 2y + 5 = 0$  is \_\_\_\_\_. 1  
 (a)  $-\frac{3}{2}$  (b)  $-\frac{2}{3}$  (c) -2 (d) -3
- c) A line  $l$  is perpendicular to the line  $2x + y + 3 = 0$  then the slope of line  $l$  is \_\_\_\_\_. 1  
 (a)  $\frac{1}{3}$  (b)  $-\frac{1}{3}$  (c)  $\frac{1}{2}$  (d)  $-\frac{1}{2}$
- d) The value of determinant  $\begin{vmatrix} 100 & 99 \\ 1 & 1 \end{vmatrix}$  is \_\_\_\_\_. 1  
 (a) 2 (b) -2 (c) 1 (d) -1
- e) If  $A = \begin{bmatrix} 2 & 7 \\ 1 & 4 \end{bmatrix}$  then  $A^{-1}$  is \_\_\_\_\_. 1  
 (a)  $\begin{bmatrix} 4 & 7 \\ 1 & 2 \end{bmatrix}$  (b)  $\begin{bmatrix} 4 & -7 \\ -1 & 2 \end{bmatrix}$  (c)  $\begin{bmatrix} 1 & 4 \\ 2 & 7 \end{bmatrix}$  (d)  $\begin{bmatrix} -1 & 4 \\ 2 & -7 \end{bmatrix}$
- f) The value of determinant  $\begin{vmatrix} \sin\theta & \cos\theta \\ -\cos\theta & \sin\theta \end{vmatrix}$  is \_\_\_\_\_. 1  
 (a) 1 (b) -1 (c) -2 (d) 2
- g) Total numbers of terms in expansion of  $(x + y)^9$  is \_\_\_\_\_. 1  
 (a) 8 (b) 9 (c) 10 (d) 11
- h)  $\binom{6}{1} + \binom{6}{2} + \binom{6}{3} =$  \_\_\_\_\_. 1  
 (a) 41 (b) 42 (c) 43 (d) 44
- i)  $\binom{8}{4} + 2 =$  \_\_\_\_\_. 1  
 (a) 70 (b) 71 (c) 72 (d) 73
- j) The degree measure of an angle  $\frac{2\pi}{3}$  is \_\_\_\_\_. 1  
 (a)  $110^\circ$  (b)  $120^\circ$  (c)  $130^\circ$  (d)  $140^\circ$



- k)  $\cos\left(\frac{\pi}{2} + \theta\right) = \underline{\hspace{2cm}}$ . 1  
 (a)  $-\cos \theta$  (b)  $-\sin \theta$  (c)  $\cos \theta$  (d)  $\sin \theta$
- l) The value of  $\tan 45^\circ + \cot 45^\circ$  is  $\underline{\hspace{2cm}}$ . 1  
 (a) 2 (b)  $\sqrt{2}$  (c)  $\frac{1}{2}$  (d)  $-\frac{1}{2}$
- m)  $\sin A \cos B - \cos A \sin B = \underline{\hspace{2cm}}$ . 1  
 (a)  $\sin(A - B)$  (b)  $\cos(A - B)$  (c)  $\sin(A + B)$  (d)  $\cos(A + B)$
- n)  $\sin(60^\circ) = \underline{\hspace{2cm}}$ . 1  
 (a)  $-\frac{1}{2}$  (b) 2 (c)  $\frac{1}{2}$  (d) -2

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

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

- a)  $A(1,1)$  and  $B(2,3)$  are the fixed points, Find the equation of perpendicular bisector of  $\overline{AB}$ . (05)
- b) Find the equation of straight line passing through the points  $A(2,6)$  and  $B(1,2)$  And also find its slope. (05)
- c) Find the equation of circle with centre  $(1,1)$  and radius 1. (04)

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

- a) If  $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ -2 & -4 & -6 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 4 & 6 \\ 1 & 3 & 5 \\ -1 & -2 & 0 \end{bmatrix}$  then find a matrix  $C$  such that  $2A + B = C$  (05)
- b) If matrix  $A = \begin{bmatrix} 3 & 1 & 2 \\ 2 & -3 & -1 \\ 1 & 2 & 1 \end{bmatrix}$  then find  $A^{-1}$ . (05)
- c) If  $A = \begin{bmatrix} 1 & 2 \\ 4 & 8 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & 6 \\ 9 & 12 \end{bmatrix}$  then find  $2A+B$  and  $B-2A$ . (04)

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

- a) Find the expansion of  $(x - 3y)^4$  by using Binomial theorem. (05)
- b) Find the constant term of expansion  $\left(x^2 - \frac{2}{x^2}\right)^8$ . (05)
- c) Find the  $4^{th}$  and  $5^{th}$  term of  $\left(\frac{x}{2} + \frac{y}{3}\right)^{12}$ . (04)

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

- a) Prove that  $\sin^2 \frac{\pi}{4} + \sin^2 \frac{3\pi}{4} + \sin^2 \frac{5\pi}{4} + \sin^2 \frac{7\pi}{4} = 2$  (05)
- b) Find the value of  $\frac{\sin\left(\theta - \frac{\pi}{2}\right)}{\cos(\theta - \pi)} + \frac{\tan\left(\frac{\pi}{2} - \theta\right)}{\cot(\pi - \theta)}$ . (05)
- c) Find the equation of straight line passing through the points  $A(2,3)$  and  $B(1,4)$ . (04)

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



a) Prove that  $\tan 50^\circ = \frac{\cos 5^\circ + \sin 5^\circ}{\cos 5^\circ - \sin 5^\circ}$ . (05)

b) If  $\tan x = \frac{5}{6}$  and  $\tan y = \frac{1}{11}$  then prove that  $x + y = \frac{\pi}{4}$ . (05)

c) If  $A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 6 & 1 \\ -3 & 0 & 6 \end{bmatrix}$  then find the value of  $A^2$ . (04)

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

a) If matrix  $A = \begin{bmatrix} 1 & 2 \\ 0 & 4 \end{bmatrix}$  then prove that  $A^2 + 5A + 2I = 0$ . (05)

b) Find the middle term of expansion  $\left(\frac{x}{2} - \frac{2}{y}\right)^8$ . (05)

c) Find the centre and radius of circle  $x^2 + y^2 + 4x + 6y - 7 = 0$ . (04)

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

a) If  $A = \begin{bmatrix} 2 & 1 & 3 \\ 4 & 5 & 6 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 2 \\ 2 & 1 \\ 1 & 2 \end{bmatrix}$  then find AB and BA. (05)

b) Prove that  $\tan 57^\circ = \frac{(\cos 12^\circ + \sin 12^\circ)}{(\cos 12^\circ - \sin 12^\circ)}$ . (05)

c) Find the expansion of  $(x - 2y)^4$  by using binomial theorem. (04)

