

## Question Bank (G scheme)

Name of subject: Basic Mathematics  
Subject code: 17104  
Semester: I

Unit Test :I  
Course :CH/CM/EJ/IE/IF/IS/ME

### Ch1.(Determinants)[4 marks]

#### 3marks Question

1) Solve  $\begin{vmatrix} 1 & x & x^2 \\ 1 & 2 & 4 \\ 1 & 3 & 9 \end{vmatrix} = 0$

2) Solve for x  $\begin{vmatrix} 1 & x & x \\ 1 & 1 & 1 \\ 1 & 2 & 4 \end{vmatrix} = \begin{vmatrix} 2 & 1 \\ 2 & 1 \end{vmatrix}$ .

3) Solve using Cramer's Rule for x and y :  
 $x + 2y = 6 - 3z, 2y + z = 7 - 4x, 9z + 2y = 14 - 3x$

#### 4marks Question

4) Solve using Cramer's Rule:  
 $x + y + z - 6 = 0, 2x + y - 2z + 2 = 0, x + y - 3z + 6 = 0$

5) Solve using Cramer's Rule:  
 $x + y + z = 3, x - y + z = 1, x + y - 2z = 0$

### Ch2 (Matrices)[16 marks]

#### 3marks Question

6) Find Inverse of  $\begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}$ .

7) If  $A = \begin{bmatrix} 3 & 9 \\ -1 & -9 \end{bmatrix}$  then show that  $A^2$  is a Null matrix.

8) If  $A = \begin{bmatrix} 4 & 2 \\ 8 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 6 \\ -4 & -12 \end{bmatrix}$  Show that AB is null matrix.

9) If  $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 \\ 9 \\ 8 \end{bmatrix}$  Evaluate AB.

10) If  $A = \begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$  Find  $A^2 - 9A + 14I$ , Where I is unit matrix.

11) If  $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$  verify that  $A^2 - 5A + I = 0$ , Where I is unit matrix.

#### 4marks Question

12) Solve using matrix Inversion Method:

$$x + y + z = 3, 3x - 2y + 3z = 4, 5x + 5y + z = 11.$$

13) Solve using matrix Inversion Method:

$$x + y + z = 6, x + y - z = 2, x - y - z = 0$$

14) Solve using matrix Inversion Method :

$$x + y + z = 3, x + 2y + 3z = 4, x + 4y + 9z = 6$$

15) If  $A = \begin{bmatrix} 2 & -3 \\ 1 & 5 \end{bmatrix}$  and  $B = \begin{bmatrix} 3 & -1 & 2 \\ 1 & 0 & 1 \end{bmatrix}$  Verify that  $(AB)^T = B^T A^T$

16) Find  $A^{-1}$  by Adjoint method if  $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$

17) Find the value of x and y if  $\begin{bmatrix} 1 & 2 \\ 3 & 2 \end{bmatrix} \begin{bmatrix} x & 5 & -3 \\ 2 & y & 5 \end{bmatrix} = \begin{bmatrix} 5 & -3 & 7 \\ 7 & 7 & 1 \end{bmatrix}$

18) If  $A = \begin{bmatrix} 1 & 2 & -1 \\ 3 & 0 & 2 \\ 4 & 5 & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$  Verify  $(AB)^T = B^T A^T$

19) If  $A = \begin{bmatrix} 0 & 1 & -1 \\ 4 & -3 & 4 \\ 3 & -3 & 4 \end{bmatrix}$  Find  $A^{-1}$  by Adjoint method.

20) If  $A = \begin{bmatrix} 2 & 3 & -1 \\ 1 & 0 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} -3 & 7 \\ -5 & 6 \\ -4 & 4 \end{bmatrix}$  Verify that  $(AB)^T = B^T A^T$ .

21) If  $A = \begin{bmatrix} 2 & -2 & -4 \\ -1 & 3 & 4 \\ 1 & -2 & -3 \end{bmatrix}$  show that  $A^2 = A$

### Ch 3(Partial Fractions)[12 marks]

#### 3marks Question

22) Resolve in partial Fractions  $\frac{x+4}{x^2+x}$

23) Resolve in partial Fractions  $\frac{1}{x^2-x}$

24) Resolve in partial Fractions  $\frac{5x+1}{(x-1).(x+2)}$

#### 4marks Question

25) Resolve into partial fractions  $\frac{x^2}{(x+1)(x-2)^2}$

26) Resolve into partial fractions  $\frac{1}{(x+2)^2(x-2)}$

27) Resolve into partial fractions  $\frac{(x^2+23x)}{(x+3).(x^2+1)}$

28) Resolve into partial fractions  $\frac{x}{(x^2-4)(x-2)}$

29) Resolve into partial fractions  $\frac{x+2}{(x^2-9)(x+4)}$

## Ch 4-(Trigonometry)

### 3marks Question

- 30) Without using calculator, find the value of  $\tan 15^\circ$  and  $\cos 105^\circ$
- 31) Without using calculator, find the value of  $\tan 105^\circ$  and  $\cos 720^\circ$
- 32) Without using calculator, find the value of  $\sin 150^\circ$  and  $\sin(-765^\circ)$

### 4marks Question

- 33) Prove that  $\cos(A - B) = \cos A \cos B + \sin A \sin B$
- 34) In any  $\Delta ABC$ , prove that  $\tan A + \tan B + \tan C = \tan A \cdot \tan B \cdot \tan C$
- 35) Without using calculator, prove that  
$$\sin 420^\circ \cdot \cos 390^\circ + \cos(-300^\circ) \sin(-330^\circ) = 1$$