

# AE-1324

B.C.A. (Part - III)  
Term End Examination, 2016-17

## NUMERICAL ANALYSIS

*Time : Three Hours]                      [Maximum Marks : 100*  
*[Minimum Pass Marks : 33*

**Note** : Answer **all** questions. All questions carry equal marks.

## Unit-I

1. (a) Solve the equation  $x^3 - 8x^2 + 9x + 18 = 0$  given that two of its roots are in the ratio 1:2.
- (b) Find the root of the equation  $x^3 - x^2 - 1 = 0$  using Newton-Raphson method. (correct upto two decimal places)

***OR***

Find the root of the equation  $x^3 - 4x - 9 = 0$  by Regula Falsi method. (correct upto three decimal places)

( 2 )

**Unit-II**

2. (a) Apply Gauss-Jordan method to solve the equation :

$$x + y + z = 9$$

$$2x - 3y + 4z = 13$$

$$3x + 4y + 5z = 40$$

- (b) Find largest eigenvalue of the matrix

$$\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \text{ using power method.}$$

**OR**

- (a) Find the eigenvalue and eigenvector of

$$\text{the matrix } A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}.$$

$$(b) \text{ Find the inverse of } A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{bmatrix}.$$

( 3 )

**Unit-III**

3. Find  $f(22)$  using Gauss forward formula :

$x$	:	20	25	30	35	40	45
$f(x)$	:	354	332	291	260	231	204

**OR**

Construct Newton's forward interpolation polynomial for the following data :

$x$	:	4	6	8	10
$y$	:	1	3	8	16

**Unit-IV**

4. Find  $y'(0)$  and  $y''(0)$  from the following table :

$x$	:	0	1	2	3	4	5
$y$	:	4	8	15	7	6	2

**OR**

Evaluate  $\int_0^1 \frac{dx}{1+x}$  by using —

- (a) Trapezoidal rule;
- (b) Simpson's  $1/3^{\text{rd}}$  rule;
- (c) Simpson's  $3/8^{\text{th}}$  rule.

( 4 )

**Unit-V**

5. Find approximate value of  $y$  when  $x = 0.1$  if

$\frac{dy}{dx} = x - y^2$  and  $y = 1$  at  $x = 0$  using Taylor series method.

**OR**

Apply Euler's method to solve  $y' = x + y$  at  $y(0) = 0$ .

\_\_\_\_\_