

AE-1341

B.C.A. Old Course (Part - II)
Term End Examination, 2016-17

Paper - IV

Numerical Methods for Computer Application

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

Note : Answer **five** questions, selecting **one** question from each Unit. All questions carry equal marks. Use of calculator is allowed.

Unit-I

1. (a) If

$$A = \begin{bmatrix} 1 & 1 \\ 0 & 2 \end{bmatrix}, \quad B = \begin{bmatrix} 2 & 1 \\ 1 & 2 \end{bmatrix}$$

find $A * B$.

(b) If $A = \begin{bmatrix} 9 & 8 & 7 \\ 6 & 5 & 4 \\ 3 & 2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$

(2)

find :

(i) $A - B$

(ii) $B * A$

2. (a) If $y = e^{2x-5}$, find $\frac{dy}{dx}$.

(b) If $y = (\sin x) (1 - \cos^2 x)$, find $\frac{dy}{dx}$.

Unit-II

3. Use Newton's divided difference interpolation formula to calculate $f(3)$ from the following table :

x	:	0	1	2	4	5	6
$f(x)$:	1	14	15	5	6	14

4. With the help of following table, evaluate $f(2, 4)$ using 3rd order Newton's divided difference interpolation polynomial :

l	:	0	1	2	3	4
x_i	:	0	1	2	3	4
$y_i = f(x_i)$:	1	2.25	3.75	4.25	5.81

(3)

Unit-III

5. Find a real root of the equation $f(x) = x^3 - x - 1 = 0$ correct to the three decimal places using bisectional method.
6. Find the root between (2, 3) of $x^3 - 2x - 5 = 0$ by using Regula-Falsi method.

Unit-IV

7. Using Runge-Kutta fourth order method, solve

$$\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$$

with $y(0) = 1$ at $x = 0.2$.

8. Using Taylor's series method, find the solution of the differential equation

$$\frac{dy}{dx} = 1 - 2xy$$

with $y(0) = 0$.

Unit-V

9. The value of y and its corresponding value shown as bellow :

x	:	0	1	2	3	4
y	:	2	3	5	4	6

(4)

Find the least square regression line
 $y = ax + b$.

10. Define curve fitting method. Explain with suitable example.
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