Seat No. | | | | | | |

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मजल - 064

Numerical Analysis (Method) & Computer Application
(Old) (1020)

P. Pages : 3

Time : Three Hours **Max. Marks : 100**

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** question from each unit each carries 10 marks.
5. Use of non-programmable calculator is allowed.
6. Assume suitable data if necessary.

UNIT - I

1. a) Solve by Seidal method. **10**

$$2x_1 - x_2 + 2x_3 = 3$$
$$x_1 + 3x_2 + 3x_3 = -1$$
$$x_1 + 2x_2 + 5x_3 = 1$$

b) Find the root of the equation $x e^x = \cos x$ using regula Falsi method. **10**

c) Find the positive root of $x = \cos x$ by Bisection method. **10**

UNIT - II

2. a) Explain : **10**

i) Slack variable.

ii) Surplus variable.

iii) Artificial variable.

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b) Solve the following LPP by simplex method. **10**

Minimize $Z = x_1 - 3x_2 + 3x_3$

subject to $3x_1 - x_2 + 2x_3 \leq 7$, $2x_1 + 4x_2 \geq -12$

$-4x_1 + 3x_2 + 8x_3 \leq 10$

$x_1, x_2, x_3 \geq 0$

c) Find maximum value of $z = 2x + 3y$
subject to the constraints $x + y \leq 30$
by using simplex method

$y \geq 3$

$0 \leq y \leq 12$

$x - y \geq 0$ and **10**

$0 \leq x \leq 12$

UNIT - III

3. a) Fit a second degree parabola to the following data : **10**

x	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y	1.1	1.3	1.6	2.0	2.7	3.4	4.1

b) From the following data find θ at $x = 43$ & $x = 84$.

x	40	50	60	70	80	90
y	184	204	226	250	276	304

also express θ in term of x. **10**

c) The following table give the value of x & y. **10**

x	1.2	2.1	2.8	4.1	4.9	6.2
y	4.2	6.8	9.8	13.4	15.5	19.6

UNIT - IV

4. a) What do you mean by Numerical Integration & differntiation. Derive formula for Trapezoidal rule. **10**

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b) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using

i) Trapezoidal Rule
ii) Simpson 1/3rd rule.
iii) Simpson 3/8 rule. **10**

c) By Gaussian Two point & three point formula. **10**

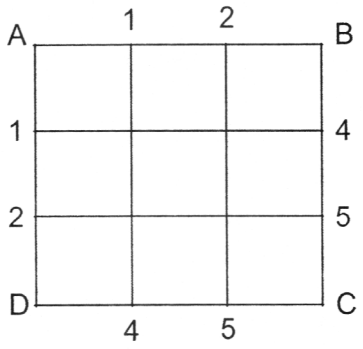
$$\int_2^3 \frac{dt}{1+t}$$

UNIT - V

5. a) Using modified Euler Method find y(0.2), y(0.1) given $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$ **10**

b) Applying Runge - Kutta method to find approximate value of y for x = 0.2 in step of 0.1 if $\frac{dy}{dx} = x + y^2$ give $y(0) = 1$. **10**

c) Solve $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary value as shown in fig. **10**



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