Total No. of Pages: 2

Register Number:

Name of the Candidate:

M.C.A. DEGREE EXAMINATION, May 2015

(FIRST SEMESTER)

111. NUMERICAL METHODS

Time: Three hours

Maximum: 100 marks

SECTION -A Answer any FIVE questions

- Given the following equations $x^4-x-10=0$, determine the initial approximations to 1. find the smallest positive root. Use these to find the roots correct to their decimal places with the regular-Falsi method.
- 2. Determine the roots correct to two decimals of $x^3-x-4=0$ by using bisection method.
- 3. Solve the equations $x_1 + x_2 + x_3 = 6$ $3x_1 + 3x_2 + 4x_3 = 20$ $2x_1 + x_2 + 3x_3 = 13$ by using Guass elimination method,
- From the following data calculate the difference and obtain the forward difference 4. polynomials. Interpolase at x=0.25

х	0.1	0.2	0.3	0.4	0.5
f(x)	1.40	1.56	1.76	2.0	2.28

- 5. Evaluate $\int_{0}^{1} \frac{dx}{1+x^2}$ using Simpson's three-eight rule
- Evaluate $\int_{-\infty}^{1} \left(1 + \frac{\sin x}{x}\right) dx$ correct to three decimal places using trapezoidal rule. 6.
- 7. Solve the initial value problem y'=(t/y), y(0)=1 by using Euler's method with h=0.2 to get y(0.2).
- 8. Given the initial value problem $u'=e^t$, u(1)=2 estimate u(1.4) with h=0.2 using the fourth order Runge-Kutta method.

SECTION -B Answer any THREE questions

 $(3 \times 20 = 60)$

- 9. Employ the Newton-Raphson method to determine a real root for a) $f(x) = -2.0+6x-4x^2+0.5x^3$ using initial guesses of (a) 4.2 (b) 4.43
 - b) Derive Newton Raphson method.

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 $(5 \times 8 = 40)$

7256

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10. Solve by using (a) Guass- Jordan and (b) Guass-Seidel method the system of equation $2x_1+x_2-x_3=1$

$$5x_1+2x_2+2x_3=-4$$

 $3x_1+x_2+x_3=5$

- 11. Find the unique polynomial P(x) of degree 2 or less such that P(1)=1, P(3)=27, P(4)=64 using the following methods (a) Lagrange interpolarity formula (b) Newton divided difference formula.
- 12. The following data for the function $f(x)=x^4$ is given

	Х	0.4	0.6	0.8					
	f(x)	0.0256	0.1296	0.4096					
Find f '(0.8) and f "(0.8) using quadratic interpolation. Compare with exact									
	soluti	on. Obtai	n the bo	und on tł	ne truncation errors.				

13. Use Hues method to integrate y'=4e^{0.8x}-0.5y from x=0 to x=4 with a step size of 1 the initial condition at x=0 is y=2.

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