



B.E/B.TECH DEGREE EXAMINATIONS: MAY 2015

(Regulation 2009)

Fourth Semester

MAT108: NUMERICAL METHODS

(Common to AE/AUTO/CE/EEE/EIE/MCT/ME&TXT)

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Another name of method of false position is :
 - a) Newton's method
 - b) Exact method
 - c) False method
 - d) Regula-Falsi method
2. Solution obtained by iterative method is
 - a) Exact
 - b) Correct
 - c) Good
 - d) approximate
3. For Newton's forward difference formula is suitable for the data is
 - a) Equal intervals
 - b) Unequal interval
 - c) Both
 - d) Exact
4. The n^{th} divided difference of a polynomial of degree n is _____
 - a) 1
 - b) 2
 - c) Constant
 - d) Zero
5. The integrand obtained by Simpson's (1/3) rule is
 - a) 2
 - b) Exact
 - c) Constant
 - d) Approximate
6. In Newton-cote's formula, for Simpson's (1/3) rule , the value of n is
 - a) 4
 - b) 2
 - c) 3
 - d) 0
7. The following is a single-step method
 - a) Taylor
 - b) Milne
 - c) Gauss
 - d) Triangular
8. The Milne's method is a _____
 - a) Single step
 - b) Multi step
 - c) Exact
 - d) Special

- b) i) From the table find $y(21)$ & $y(28)$: (7)

x	20	23	26	29
y	0.3420	0.3907	0.4384	0.4848

- ii) Given : x : 14 17 31 35 (7)
 y : 68.7 64 44 39.1 , using Lagrange's formula find $f(27)$.

23. a) i) Find the first derivative at $x=30$ from (7)

x :	30	31	32	33	34	35	36
y :	85.90	86.85	87.73	88.64	89.52	90.37	91.1

- ii) Using Simpson's (1/3) rule evaluate $\int_0^1 \frac{x^2}{1+x^3} dx$ by (7)

Choosing 11 ordinates.

(OR)

- b) i) Given: (7)

x :	1.0	1.05	1.10	1.15	1.20	1.25	1.30
$f(x)$:	1	1.0247	1.0488	1.0723	1.0954	1.1180	1.1401

find the first and second derivatives at $x=1.05$.

- ii) Evaluate $\int_0^1 \int_0^1 e^{(x+y)} dx dy$ by using Trapezoidal rule. (7)

24. a) i) Given $y' = y^2 + x^2$, $y(0) = 1$, find $y(0.1)$ by Taylor series method. (7)

- ii) Given $y' = x + y$, $y(1.2) = 2$, find $y(1.4)$ by fourth order Runge-Kutta method. (7)

(OR)

- b) Given $y' = \frac{1}{2}(1+x)y^2$, $y(0) = 1$, find $y(0.2)$, $y(0.4)$, $y(0.6)$ by Euler's method, and $y(0.8)$ by Milne's method.

25. a) Solve $\nabla^2 u = -10(x^2 + y^2 + 10)$, over the square mesh with sides $x=0, y=0$, $x=3, y=3$ with $u=0$ on the boundary with mesh length 1 unit.

(OR)

- b) Using Crank-Nicholson method, solve $16u_t = u_{xx}$, $0 < x < 1, t > 0$, subject to $u(x,0)=0$, $u(0,t)=0$ and $u(1,t) = 100t$, for one time step with $h=0.25$.
