Roll No ....

MCADD - 302

M.C.A. (Dual Degree), III Semester

Examination, June 2016

Computer Oriented Numerical Methods

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B carry 2 marks, part C carry 3 marks, part D carry 7 marks.

1. a) Define algebraic and transcendental equation.   2
    b) Let $x = 0.0074869$ find :   2
        i) Absolute error,
        ii) Relative error, of x is truncated to 3 decimal places.
    c) Apply false position method to solve the equation $3x - \cos x - 1 = 0$ correct to three decimal places.   3
    d) Using Newton's Raphson method find the root of $x \log_{10} x = 1.2$ correct to five decimal places.   7

                            OR

    Proof that Newton's Raphson method has Quadratic convergence.   7

2. a) Explain interpolation and extrapolation with example.   2
    b) Find the cubic polynomial which takes the following values :   2

x	0	1	2	3
$f(x)$	1	2	1	10

c) From the following data.

x	1.8	2.0	2.2	2.4	2.6
y	2.9	3.6	4.4	5.5	6.7

find x when $y = 5$ using iterative method.   3

d) Calculate the value of $\int_0^{\pi/2} \sin x \, dx$ by Simpson's

$1/3$ and $3/8$ rule using 11 ordinates.   7

OR

Compute the integral $\int_0^3 x^2 \cos dx$ using three point

Gaussian Quadrature formula for   7

$$\mu_{-1} = -\sqrt{3/5} \quad , \quad \mu_0 = 0 \quad , \quad \mu_1 = \sqrt{3/5}$$

$$\omega_{-1} = 5/9 \quad , \quad \omega_0 = 8/9 \quad , \quad \omega_1 = 5/9$$

3. a) Establish whether the system $1.01x + 2y = 2.01$; $x + 2y = 2$ is well conditioned or not.   2

   b) Apply Gauss elimination method to solve the equations $2x+y+z = 10$; $3x+2y+3z = 18$; $x+4y+9z = 16$.   2

   c) Using modified Euler's method find on approximate value of y when $x = 0.2$ given that $\frac{dy}{dx} = x + y$ and $y = 1$, when $x = 0$.   3

   d) Find on approximate value of y when $x = 0.1$. If $\frac{dy}{dx} = x - y^2$ and $y = 1$ at $x = 0$ using Picard's method.   7

OR

MCADD-302   Contd...

Using R - K method of fourth order find y (0.2) for the

equation $\dfrac{dy}{dx} = \dfrac{y-x}{y+x}$, y (0) = 1 take $h = 0.2$.　　　7

4.　a)　Find mean of Binomial distribution.　　　2

　　b)　Find the Probability that at-most 5 defective fuses will be found in a box of 200 fuses if experience shows that 2 percent of such fuses are defective.　　　2

　　c)　Calculate the mean and variance of rectangular distribution, whose frequency function is given by :　　3

$$f(x) = \begin{cases} \dfrac{1}{(2h)}, & \text{If } 10-h < x < 10th \\ 0, & \text{Otherwise} \end{cases}$$

what is distribution function of random variate x; whose frequency distribution is $f(x)$.

　　d)　Five dice were thrown 192 times and the number of times 4, 5, or 6 were as follows :　　　7

No. of dice throwing 4, 5, 6	5	4	3	2	1	0
f_0	6	46	70	48	20	2

Calculate χ^2.

OR

A Bag contains 9 Black and 5 white balls, If 7 balls are with drawn, find the frequency function for the number of black balls obtained :　　　7

　　i)　If drawings are made with replacement,

　　ii)　If Drawings are made without replacement.

5. a) What is composite or alternative Hypothesis.   2

   b) Find the Student's t for the following variable values in a sample of eight –4, –2, –2, 0, 2, 2, 3, 3 taking the mean of the universe to be zero.   2

   c) A coin is tossed 400 times and it turns up head 216 times, discuss whether the coin may be unbiased one.   3

   d) Write a note on testing the significance of the difference between the means of two large samples.   7

<div align="center">OR</div>

Show how you would use student's t-test and fisher z-test to decide whether the two sets of observation:

17, 27, 18, 25, 27, 29, 27, 23, 17

and 16, 18, 20, 16, 20, 17, 15, 21.

indicate sample drawn from the same universe   7

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MCADD-302