Register Number: ……

M.C.A DEGREE EXAMINATIONS: NOV / DEC 2010

Fifth Semester

MASTER OF COMPUTER APPLICATIONS

P07CAE01: Numerical and Statistical Methods

(Statistical tables may be permitted)

Time: Three Hours **Maximum Marks: 100**

Answer all Questions:-

PART A (10 x 2 = 20 Marks)

1. Solve the x + y = 2, 2x +3y = 5, using Gauss - elimination method.
2. What is meant by diagonal dominant system?
3. State Newton – Gregory forward difference interpolation formula.
4. State Lagrange's formula to find y (x) if three sets of values (x_0, y_0) (x_1, y_1) and (x_2, y_2) are given.
5. Find y (0.1) by Euler's method, given that $y^1 = 1-y$, y (0) = 0.
6. Which is better: Taylor series method or R.K method? why?
7. If from a pack of cards a single card is drawn what is the probability that it is either a spade or a king?
8. Define continuous Random variable.
9. Define alternative hypothesis.
10. Define small sample.

PART B (5 x 16 = 80 Marks)

11. a) (i) Solve the system by Gauss –Elimation method 2x +3y – z = 5, 4x+4y-3z = 3, 2x-3y + 2z = 2 (8)

(ii) Solve the following system by Gauss- Seidel method

10x – 5y – 2z = 3, 4x- 10y + 3z = - 3, x+6y+10z = -3 (8)

(OR)

b) (i) Using the Gauss – Jordan method solve the following equations 2x +y + 4z = 12, 8x - 3y+2z = 20, 4x+11y-z = 33 (8)

(ii) Solve the following equation using Jocobi's iteration method 28x +4 y – z = 32 2x+17y+4z = 35, x + 3y +10z = 24 (8)

12. a) (i) From the following data , estimate the number of persons earning weekly wages between 60 and 70 rupees. (8)

Wage (in Rs)	Below 40	40 - 60	60 - 80	80 -100	100 - 120
No of persons (in thousand)	250	120	100	70	50

(ii) Using Lagranges interpolation formula, find y(9.5) given the data following table

x	7	8	9	10
y	3	1	1	9

(8)

(OR)

b) (i) Find the value of $\log 2^{1/3}$ from $\int_0^1 \frac{x^2}{1+x^3}\,dx$ Using simpsons $\frac{1}{3}$ rule with h = 0.25 (8)

(ii) Evaluate I = $\int_2^3 \frac{dt}{1+t}$ using Gaussian two point formula (8)

13. a) Using Runge - Kutta method of fourth order solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ given y (0) = 1 at

x = 0.2, 0.4

(OR)

b) (i) Using Taylor series method, compute the value of y (0.2) correct to 3 decimal places from $y^1 = 1 - 2xy$ given that y (0) = 0 (8)

(ii) Using Adam's method find y (0.4) given $y^1 = \frac{1}{2}xy$, y (0) = 1, y (0.1) = 1.01,

y (0.2) = 1.022 y (0.3) = 1.023 (8)

14. a) (i) State and prove Baye's theorem (8)

(ii) A continuous random variable x has a p.d.f f (x) = $3x^2$ $0 \le x \le 1$ find a and b such that

(1) P ($x \le a$) = p ($x > a$) and (8)

(2) P ($x > b$) = 0.05

(OR)

b) (i) In a bolt factory machines A, B, C manufacture respectively 25 %, 35 % and 40 % of the total of their output 5 % , 4 % and 2 % are defective bolts. A bolt is drawn at random from the product and is found to be defective. What are the probabilities that it was manufactured by machine A, B and C (10)

(ii). Find the m.g.f of the random variable 'X' having p.d.f

$$F(x) = \begin{cases} x, & \text{for } 0<x<1 \\ 2- x, & \text{for } 1 < x < 2 \\ 0 & \text{otherwise} \end{cases}$$ (6)

15. a) (i) A machinist is making engine parts with axle diameters of 0.700 inch. A random sample of 10 parts shows a mean diameters of 0.742 inch with a S.D. of 0.040 inch. Compute the statistic you would use to test whether the work is meeting the specification. (8)

(ii) The time taken by workers in performing a job by method I and method II is given Below (8)

Method I	20	16	26	27	23	22
Method II	27	33	42	35	32	34	38

Do the data show that the variances of time distribution from population from which these samples are drawn do not differ significantly?

(OR)

b) Three different machines are used for a production. On the basis of the outputs, set up one - way ANOVA table and test whether the machines are equally effective.

Outputs		
Machine I	Machine II	Machine III
10	9	20
15	7	16
11	5	10
10	6	14

Given that the value of F at 5 % level of significance for (2, 9) d.f. is 4.26

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