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# Subject Code—9691-X

#### M.C.A. (Third Year) EXAMINATION

(5 Years Integrated Course)

#### MATHEMATICS-III

MCA-305

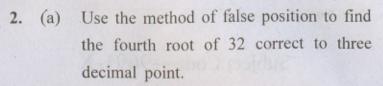
Computer Oriented Numerical and Statistical Methods Using 'C'

Time: 3 Hours Maximum Marks: 100

Note: Attempt any Five questions. All questions carry equal marks.

- (a) Explain the types of error that may occurs in any numerical computation.
  - (b) Find the absolute error and the relative error in the product of 432.8 and 0.12584 using four digit mantissa.
  - (c) Describe floating point representation of numbers.

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(b) Using Newton-Raphson method find the smallest positive root of  $x^3 - 5x + 3 = 0$ .

Branch Sport ( a)

3. (a) Apply Gauss-Seidal iteration method to solve the system of equations:

$$2x + 10y + z = 13$$
  
 $2x + 2y + 10z = 14$   
 $10x + y + z = 12$ 

Perform three iterations only.

(b) Using Runge-Kutta methods, solve:

$$\frac{dy}{dx} = \frac{1}{x+y}$$

for x = 0.5 to 2 with the increment h = 0.5, if  $y_0 = 1$ ,  $x_0 = 0$ .

4. (a) Find first and second derivative of y at x = 0 from the following data:

- (b) Using three points Gaussian quadrature formula evaluate  $\int_{0}^{1} \frac{dx}{1+x}$ .
- 5. (a) Find value of y at x = 218 and 410 from the given data:

(b) Fit a second degree parabola to the following data:

y
1.1
1.3
1.6
2.0
2.7
3.4
4.1

### 6. (a) Evaluate

$$\int_0^6 \frac{dx}{1+x^2}$$

by using (i) Trapezoidal rule,.

(ii) Simpson's 1/3 rule, (iii) Simpson's 3/8 rule and compare the result with its actual value.

(b) Find x when f(x) = 13, given that :

x: 44 45 46 47

f(x): 13.40 13.16 12.93 12.68

## 7. (a) Explain the following;

- (i) Test for number of successes
- (ii) Test for proportion of successes
- (iii) Test for difference between proportions and, if a machine produced 20 defective articles in a batch of 400 which after overhauling produced 10 defectives in a batch of 300, show that machine has not improved after overhauling.

(b) The life time of electric bulbs for a random sample of 10 from a large consignment gave the following data:

Item	Life (in 000 hrs				
1	4.2				
2	4.6				
3	3.9				
4	4.1				
5	5.2				
6	3.8				
7	3.9				
8	4.3				
9	4.4				
10	5:6				

Can we accept the hypothesis that the average life time of bulbs is 4000 hours.  $(v = 9, t_{0.05} = 2.262)$ 

8. (a) Two independent samples of 8 and 7 items gave the following values:

Sample A: 9 11 13 11 15 9 12 14

Sample B: 10 12 10 14 9 8 10

Examine whether the difference between the means of the two samples is significant at 5% level ?

$$(v = 13, t_{0.05} = 2.16)$$

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(b) Perform a two-way ANOVA on the data given:

Plots of			7	reatr			
	Land		A	В	C	D	
	I		38	40	41	39	
	II		45	42	49	36	
	III.	,	40	38	42	42	
For	(3, 6)	d.f.	F <sub>(0.05</sub>	5) = 4	76 ar	nd for	(2,

For (3, 6) d.f.  $F_{(0.05)} = 4.76$  and for (2, 6) d.f.  $F_{(0.05)} = 5.14$ .