



0405

Second Year B. C. A. (Sem. III) Examination  
October/November – 2005

P. No. 301 - Computer Oriented Numerical &  
Statistical Methods

Time : 3 Hours]

[Total Marks : 70

Instructions :

(1)

नीचे दशाविवेक निम्नलिखित विवरणों के अनुसार पर अवश्य लभनी.  
Fillup strictly the details of signs on your answer book.

Name of the Examination :  
B. C. A. - 3

Name of the Subject :  
Compu. Ori. Num. & Stati. Methods

Subject Code No. : 0 4 0 5 Section No. (1, 2, ...) : NIL

Seat No. : 0 0 0 3 0 0

Subharam  
Student's Signature

(2) Attempt all questions.

(3) Figures to the right indicate full marks.

1 Do as directed :

10

(i) Find the variance for the following data :

4, 6, 10, 12, 18.

(ii) The arithmetic mean of the runs scored by three batsmen A, B and C in the same series of 10 innings are 58, 48 and 39 respectively. The standard deviation of their runs are respectively 15, 12 and 6. Who is the most consistent of the three ?

(iii) Evaluate  $\Delta^3(1-x)(1-2x)(1-3x)$ .

(iv) Find the third divided difference with arguments 2, 4, 9, 10 of the function :

$$f(x) = x^3 - 2x.$$

(v) According to the census of 1971, following are the population figures (in thousands) of 10 cities :

2000, 1180, 1785, 1500, 560, 1200, 782, 385, 222, 1123.

Find the median.

(vi) Find the sum of deviations of the variate values 3, 4, 5, 7, 8, 14 from their mean.

(vii) Construct a difference table from the following

$x:$	0	0.1	0.2	0.3	0.4
$f(x):$	1	1.095	1.179	1.251	1.31

(viii) The arithmetic mean of a set of 40 values is 65. If each of the 40 values is increased by 5, what will be the mean of the set of new values.

(ix) Write the intervals in which the roots of the equation  $x^3 - 9x + 1 = 0$  lies.

(x) If the arithmetic mean of 6, 8, 5, 7,  $x$  and 4 is 7, then find the value of  $x$ .

2 (a) Use Simpson's  $\frac{1}{3}$ rd rule to find an approximate

6

value of  $\int_0^1 e^x dx$  and compare it with the exact value

by taking  $h = 1$ .

(b) The equation  $x^6 - x^4 - x^3 - 1 = 0$  has one real root

6

between 1.4 and 1.5. Find the root to four decimals by false position method.

OR

MP-0405]

2

[Contd...

$$h \left[ \Delta^2 y_0 - \frac{1}{2} \Delta^3 y_0 + \frac{1}{6} \Delta^4 y_0 \right]$$

2 (a) *divided differences*

Find the first and second derivatives of the function tabulated below :

6

x:	1.5	2.0	2.5	3.0	3.5	4.0
f(x):	3.375	7.0	13.625	24.0	38.875	59.000

$$\frac{1}{h^2} \left[ \Delta^2 y_0 - \Delta^3 y_0 + \frac{11}{12} \Delta^4 y_0 \right]$$

*Newton Raphson*

Find the root of  $x^2 - 5x + 2 = 0$  correct to five decimal places by Newton Raphson method by taking initial approximation as zero.

6

*Gauss elimination*

Solve the following system of equations by Gauss elimination method :

6

$$2x - 3y + 10z = 3$$

$$-x + 4y + 2z = 20$$

$$5x + 2y + z = -12$$

(2)

*Interpolation*

(b) The following values of the function  $f(x)$  for values of  $x$  are given :

6

$$f(1) = 4, f(2) = 5, f(7) = 5, f(8) = 4.$$

(2)

Find the value of  $f(6)$  by using Lagrange's interpolation formula.

OR

3 (a) By means of Newton's divided difference formula

6

find the values of  $f(8)$  and  $f(15)$  from the following table :

x:	4	5	7	10	11	13
f(x):	48	100	294	900	1210	2028

*Newton's divided difference*

- (b) Solve the following system of equations by Gauss Seidal method : 6

*Gauss Seidal*

$$27x + 6y - z = 85$$

$$6x + 15y + 2z = 72$$

$$x + y + 54z = 110.$$

5

- 4 (a) The first two samples has 100 units with mean 15 and standard deviation 3. If the whole group has 250 units with mean 15.6 and standard deviations  $\sqrt{13.44}$ , find the standard deviation of second group. 6

*S.D.*

- (b) The following data give the arithmetic averages and standard deviations of three subgroups. Calculate the arithmetic average and standard deviation of the whole group : 6

*C.S. D. 10*

Subgroup	No. of men	Average wages (Rs.)	Standard deviation (Rs.)
A	50	61	8
B	100	70	9
C	120	80.5	10

OR

- 4 (a) The scores of two batsmen A and B for 20 innings are tabulated below. Which of the two may be regarded as per more consistent player : 6

*mean*

Score		50	51	52	53	54	55	56	57
No. of innings	A	1	0	0	4	3	6	3	3
	B	1	2	2	6	3	4	2	0

*(C)*

- (b) If the median of the following frequency distribution is 46, find the missing frequencies : 6

Variable :	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Total
Frequency :	12	30	?	65	?	25	18	<del>80-90</del> 229

*Median*

*(E)*

6 (a) Find a suitable co-efficient of correlation for the following data : 6

*kar 2/5*  
*pearson*

Fertilizer Used	(Metric Tones)	15	18	20	24	30	35	40	50
Productivity	(Metric Tones)	85	93	95	105	120	130	150	160

6 (b) Ten competitors in a beauty contest are ranked by three judges in the following order: 6

*rank*

1 <sup>st</sup> Judge:	1	5	4	8	9	6	10	7	3	2
2 <sup>nd</sup> Judge:	4	8	7	6	5	9	10	3	2	1
3 <sup>rd</sup> Judge:	6	7	8	1	5	10	9	2	3	4

Use rank correlation coefficient to discuss which pair of judges have the nearest approach to beauty.

OR

6 (a) From the table given below calculate the coefficient of correlation between the ages of husbands and wives. 6

*Bivariate*

Age of Husband

Ages of Wives Y-series	X-Series					Total
	20-30	30-40	40-50	50-60	60-70	
15-25	5	9	3	-	-	17
25-35	-	10	25	2	-	37
35-45	-	1	12	2	-	15
45-55	-	-	4	16	5	25
55-65	-	-	-	4	2	6
Total	5	20	44	24	7	100

stat  
230  
229

- (b) Calculate the co-efficient of correlation between X and Y series from the following data :

	X - series	Y - series
No. of pairs of observations	15	15
Arithmetic Mean	25	18
Standard deviation	3.01	3.03
Sum of squares of deviations from mean	136	138

Summation of product of deviations of X and Y series from their respective arithmetic means is 122.

- (a) in a partially destroyed laboratory record of an analysis of correlation data, the following results only are legible :

Variance of X = 9

Regression equations :

$$80x - 10y + 66 = 0$$

$$40x - 18y = 214$$

- What were (i) the mean values of X and Y  
 (ii) the correlation coefficient between X and Y  
 and (iii) the standard deviation of Y ?

- (b) The following table gives the age of cars of a certain make and annual maintenance costs, obtain the regression equation for costs related to age.

Age of cars (in years) :	2	4	6	8
Maintenance costs (in hundreds of Rs.) :	10	20	25	30

OR

nd 6

6 (a) From the data given below, find  
(i) The two regression equations

*have  
Pearson*

(ii) The co-efficient of correlations between the marks in economics and statistics.

Marks in Economics :	25	28	35	32	31	36	29	38	34	32
Marks in Statistics :	43	46	49	41	36	32	31	30	33	39

(b) Given is the following information : 6

*regression*

	X	Y
Arithmetic Mean	36	85
Standard Deviation	11	8

Correlation coefficient between X and Y = 0.66

- (i) Find the regression equations
- (ii) Estimate value of X when Y = 75

ed...