



BA-1861

Second Year B. C. A. (Sem. III) Examination

September / October – 2009

Computer Oriented Numerical & Statistical Methods

Time : 3 Hours]

301

[Total Marks : 70

Instructions :

(1)

नीचे दशावलि निशानीवाणी विगतो उत्तरवही पर अवश्य लभवी.  
Fillup strictly the details of signs on your answer book.

Name of the Examination :  
S. Y. B. C. A. (Sem. 3)

Name of the Subject :  
Computer Oriented Numerical & Statistical Method

Subject Code No. : 1 8 6 1 Section No. (1, 2,.....): Nil

Seat No. : 5 0 0 5 7 9

Student's Signature : [Signature]

- (2) Attempt all questions.
- (3) Figures to the right indicate full marks.
- (4) Mention your options clearly.
- (5) Question No. 1 is compulsory.

1 Do as directed :

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- (1) If  $\sum d^2 = 0$  then value of correlation coefficient is \_\_\_\_\_.
- (2) What is the standard deviation of 5, 5, 5, 5 and 5.
- (3) The correlation coefficient is \_\_\_\_\_ mean of two regression coefficients.
- (4) The roots of equation  $x^3 - 9x + 1 = 0$  lies between \_\_\_\_\_ and \_\_\_\_\_.
- (5) Construct forward difference table of the polynomial  $y = x^2$  when  $x = 1, 3, 5, 7, 9$ .
- (6) A regression equation is given by  $x + 5y = 10$ . If  $x = 5$  then find  $y$ .
- (7) If two variables have perfect positive correlation then  $r =$  \_\_\_\_\_.
- (8) For use of Simpson's rule, interval is divided in how many subintervals ?
- (9) Write Newton's forward difference interpolation formula.
- (10) If the ranks of two variables are equal then correlation coefficient  $r =$  \_\_\_\_\_.

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[Contd...

- 2 (a) Find a real root of the equation  $x^3 - 2x - 5 = 0$  upto 3 decimal places using Newton Raphson method. 6
- (b) Certain corresponding values of  $x$  and  $\log_{10} x$  are (300, 2.4771), (304, 2.4829), (305, 2.4843) and (307, 2.4871), find  $\log_{10} 301$ . 6

OR

- 2 (a) Find a real root of the equation  $x^3 - x - 4 = 0$  by using false position method correct to three decimal places. 6
- (b) The population of a town goes as given below. Estimate the population for the year 1925 : 6

year ( $x$ )	1891	1901	1911	1921	1931
Population (thousand)	46	66	81	93	101

- 3 (a) From the following table of values of  $x$  and  $y$  obtain  $\frac{dy}{dx}$  and  $\frac{d^2y}{dx^2}$  for  $x = 1.6$ . 6

$x$	1.0	1.2	1.4	1.6	1.8	2	2.2
$y$	2.7183	3.3201	4.0552	4.9530	6.0496	7.3891	9.0250

- (b) Solve the following system of equations by using Gauss-Seidal method (upto 5 iteration) : 6
- $$83x + 11y - 4z = 95$$
- $$7x + 52y + 13z = 104$$
- $$3x + 8y + 29z = 71$$

OR

- 3 (a) Find the value of  $\int_0^1 \frac{1}{1+x^2} dx$  using Trapezoidal rule 6
- by taking  $h = 0.5, 0.25, 0.125$ .
- (b) Solve the following linear system by using Gauss-elimination method : 6
- $$3x_1 + 6x_2 + x_3 = 16$$
- $$2x_1 + 4x_2 + 3x_3 = 13$$
- $$x_1 + 3x_2 + 2x_3 = 9$$

- 4 (a) Define mean. Calculate mean and median for the following data : 6

Class	20-24	25-29	30-34	35-39	40-44	45-49
Frequency	3	5	2	6	2	2

- (b) From a group of 200 candidates, the mean and S.D. are 40 and 15 respectively. Later on it was found that the score misread as 34 instead of 43. Find the correct mean and correct S.D. 6

OR

- 4 (a) Define mean and median. Calculate mean and median for the following data : 6

Income (Rs.)	100	150	80	200	250	180
Number of persons	24	26	16	20	6	30

- (b) Given the following results, which of two group is better in individual observation : 6

	Group-A	Group-B
$\Sigma x$	45	55
$\Sigma x^2$	118	132
$n$	20	30

- 5 (a) Rank of 15 students in Mathematics and Statistics are given below. The figure indicate ranks : (1, 2), (7, 9), (2, 1), (9, 7), (12, 15), (8, 8), (6, 5), (3, 3), (13, 13), (15, 14), (14, 11), (10, 10), (11, 12), (4, 6), (5, 4). Find correlation coefficient. 6

- (b) Calculate correlation coefficient : 6

$x$	300	350	400	450	500	550	600	650	700
$y$	800	900	1000	1100	1200	1300	1400	1500	1600

OR

- 5 (a) The following data are obtained for the variables  $x$  and  $y$ .  $n = 30$ ,  $\Sigma x = 120$ ,  $\Sigma y = 90$ ,  $\Sigma x^2 = 600$ , 6

$\Sigma y^2 = 250$ ,  $\Sigma xy = 356$ . Later on it was observed that two pairs were wrongly taken as (8, 10) and (12, 7) instead of (8, 12) and (10, 8). Find the correct value of correlation coefficient.

(b) Calculate correlation coefficient :

6

Marks in Economics → Marks in Account ↓	40-49	50-59	60-69	70-79	80-89	90-99
40-49	3	5	4	—	—	—
50-59	2	6	6	2	—	—
60-69	1	4	10	5	2	—
70-79	—	—	5	10	8	1
80-89	—	—	1	4	6	5
90-99	—	—	—	2	4	4

6 (a) Obtain two regression lines and correlation coefficient from the following data : 6

$x$	65	66	67	67	68	69	71	73
$y$	67	68	64	68	72	70	69	70

(b) From the following data find two regression equations and estimate  $y$  when  $x = 29$  and  $x$  for  $y = 45$  : 6

	$x$	$y$
Mean	25	40
Variance	9	36

Correlation coefficient is 0.99.

OR

6 (a) The equations of two regression lines are  $5y = 9x - 22$ ,  $20x = 9y + 350$  then find (1) mean of  $x$  and  $y$  (2) correlation coefficient between  $x$  and  $y$ . 6

(b) The following information is obtained for two variables  $x$  and  $y$ . Find two regression equations. Also find correlation coefficient  $n = 25$ ,  $\sum x = 125$ ,  $\sum y = 100$ ,  $\sum x^2 = 650$ ,  $\sum y^2 = 440$ ,  $\sum xy = 508$ . 6