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KA-3731-R

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

October / November – 2012

Numerical & Statistical Methods

(Old Course)

Time : Hours] [Total Marks : **70**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ SECOND YEAR B. C. A. (SEM. 3)

Name of the Subject :

☛ NUMERICAL & STATISTICAL METHODS (OLD)

☛ Subject Code No. : 3 7 3 1 ☛ Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

(2) Attempt **all** questions.
(3) Figures to **right** indicate full marks.
(4) Mention your options clearly.

1 Do as directed : **10**

(i) State the condition for the iteration method to be successful for $F(x) = 0$.

(ii) The approximate root of the equation $x^3 - 3x + 4 = 0$ has between _____ and _____.

(iii) For a Simpson's 1/3 and 3/8 rule, interval is divided in how many subintervals ?

(iv) Construct Backward difference table of $Y(0)=1$. $Y(1)=0$, $Y(2)=1$, $Y(3)=10$, $Y(4)=33$.

(v) Find an interval in which root of equation $x^3 - x - 1 = 0$

(vi) Compute mean from the following data :
45, 41, 40, 45, 43, 43, 45

(vii) In rank correlation coefficient if $\Sigma d^2 = 0$, $\rho =$ _____

(viii) If mean = 68, mode = 28.5 and c.v = 58 then median = _____

(ix) What is measure of central tendency ?

(x) If byx = 0.52 and bxy = 2.5. Is it true ?

2 (a) Using the Bisection method obtain approximate root correct upto three decimal space of $F(x) = x^2 - 7x + 8 = 0$. **6**

(b) The following values of the function F(x) for values x are given $F(1)=4$, $F(2)=5$, $F(7)=5$, $F(8)=4$. Find the value of $F(6)$ by using lag ranges interpolation formula. **6**

OR

2 (a) Find approximate root correct upto three decimal space for the equation $F(x) = x^3 - 3x - 5 = 0$ using Newton Rapson Method. **6**

(b) Find log 301 from given data by using Newtons divide difference : **6**

X	300	304	305	307
$F(x) = \log X$	2.4771	2.4829	2.4843	2.4847

3 (a) Calculate the approximate values of $\int_{-3}^{3} x^4 \, dx$ by using **6**

(i) Tropezoidal Rule

(ii) Simpson's $\frac{1}{3}$ rule by dividing.

(b) Solve the following system of equations by Gauss Seidal Method (Perform four iteration) **6**

$$6x + y + z = 105$$
$$4x + 8y + 3z = 155$$
$$5x + 4y - 10z = 65$$

OR

3 (a) Solve the following system of equations by Gauss Elimination method : **6**

$$2x + y + z = 10$$
$$3x + 2y + 3z = 18$$
$$x + 4y + 9z = 16$$

(b) Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ when $x = 0.1$ from the following data : **6**

x	0.0	0.1	0.2	0.3	0.4
$y(x)$	1.000	0.9975	0.9900	0.9776	0.9604

4 (a) Calculate mean and median from the following frequency distribution : **6**

Size	0-9	10-19	20-29	30-39	40-49	50-59
Frequency	3	4	8	7	6	3

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

	Group A	Group B
Σx	45	60
$\Sigma\left(x-\bar{x}\right)^2$	100	102
n	20	30

OR

4 (a) Define mean and mode and calculate mean and mode : **6**

Marks	0-10	10-20	20-30	30-40	40-50
No. of Students	2	4	9	7	3

(b) Calculate the mean deviation from mean 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

5 (a) Find the co-efficient of correlation between age and the sum assured from the following table : **6**

Age Group (years)	Sum Assured (in Rs.)					
	10000	20000	30000	40000	50000	Total
20-30	4	6	3	7	1	21
30-40	2	8	15	7	1	33
40-50	3	9	12	06	2	32
50-60	8	4	2	-	-	14
Total	17	27	32	20	4	100

(b) The ranking of 10 students in accordance with their performance in two subjects A and B are as follows. Calculate the rank correlation coefficient : **6**

A	6	5	3	10	2	4	9	7	8	1
B	3	8	4	9	1	6	10	7	5	2

OR

5 (a) Rank of 15 students in Mathematics and statistics are given below. The figure indicate ranks. Find correlation coefficient. **6**

(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).

(b) Find rank correlation coefficient between the data given below. If two or more items have the same rank then what adjustment made Spearman's formula : **6**

x	17	13	15	16	6	11	14	9	7	12
y	36	46	35	24	12	18	27	22	2	8

6 (a) Obtain the regression equations from the following data and estimate x for $y = 25$, correlation coefficient = 0.8 : **6**

	x	y
Average	25.5	40
S.D.	2.4	6

(b) Find the equation of regression lines from the following data and also estimate y for $x = 1$ and x for $y = 4$: **6**

x	3	2	−1	6	4	−2	5	7
y	5	13	12	−1	2	20	0	−3

OR

6 (a) Two regression lines are $x + 2y - 5 = 0$ and **6**

$2x + 3y - 8 = 0$ and $S_x^2 = 12$, find x, y, S_y^2 and ρ

(b) The following information is obtained for two variables X and Y. Find two regression equations. Also find correlation coefficient **6**

$$n = 25, \Sigma x = 125, \Sigma y = 100, \Sigma x^2 = 650, \Sigma y^2 = 440, \Sigma xy = 508$$