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Std

DJ-1861

Second Year B. C. A. Examination

September / October – 2007

Computer Oriented Numerical & Statistical Methods

Time : 3 Hours] Talaviya Jignesh [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 :
☛ S. Y. B. C. A.

Name of the Subject :
☛ Comp. Oriented Numerical & Stat. Method

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

Seat No. : 0 0 0 3 9 6

J. B. R.
Student's Signature

(2) Attempt **all** questions.

(3) Figures to the **right** indicate **full** marks.

(4) Mention your options clearly.

1 Answer as directed : **10**

(i) Compute mean and mode of the following data : 45, 41, 40, 45, 42, 43, 43, 45.

(ii) If two variables are perfectly correlated and one regression coefficient is 0.5, find another regression coefficient.

(iii) A regression equation given by $x + 5y = 10$. If $x = 5$ then find y.

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

(v) For use of Simpson's 1/3 and 3/8 rule, interval is divided in how many sub intervals?

(vi) Construct forward difference table of the polynomial $y=x^2$ when $x=1,3,5,7,9$.

(vii) If $y_0=1$, $y_1=5$, $y_2=19$, $y_3=55$ find $y(x)$.

(viii) Find the various divided difference of $f(x)$ given that :

x :	1	2	4	7	8
$f(x)$:	22	30	82	106	216

(ix) The approximate root of equation $x^3-2x-5=0$ lies between _____ and _____.

(x) Correlation coefficient of two variables x and y is 0.75, covariance is 270 and variance of x is 625 then find the standard deviation of y.

2 (a) Find an approximate root correct to four decimal places for the equation $x^3-x-2=0$ using False position method. 12

(b) Clearly mention the formula for Newton's forward method and estimate sale for the year 1952 from the given data :

Year x :	1950	1955	1960	1965
Sale (in lakh) :	250	285	328	444

OR

2 (a) Find an approximate root correct upto 3 decimal of $f(x) = x^2-7x+8=0$ by using Bisection method. 12

(b) Obtain the value of $f(5)$ from the following table :

x :	0	1	3	4	6
$f(x)$:	7	8	34	71	223

3 (a) From the following table obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x = 1.4$: 12

x :	1.4	1.6	1.8	2.0	2.2
y :	4.0552	4.9530	6.0496	7.3891	9.0250

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

$20x+2y+6z = 28$,

$x+20y+9z = -23$

$2x-7y-20z = -57$ (by 5 iteration)

OR

3 (a) Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ when $x = 0.1$ from the following table : 12

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

(b) Solve the following system of equations by using Gauss-elimination method :

$3x+2y+4z=7$, $2x+y+z=7$, $x+3y+5z=2$.

4. (a) Define mode and calculate mode of the following frequency distribution : **12**

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

(b) Calculate the approximate value of $\int_{-3}^{3} x^4 dx$ by using :

(i) Trapezoidal rule

(ii) Simpson's rule by dividing this range in six intervals.

OR

4 (a) Define mean and mode and calculate mean and mode : **12**

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 :

Class :	0-3	3-6	6-9	9-12	12-15	15-18	18-21
Frequency :	2	7	10	12	9	6	4

5 From the table given below calculate the coefficient of correlation between the ages of husbands and wifes : **12**

Age of Husband

Ages of Wifes / *Y-series*	*X- Series* 20-30	30-40	40-50	50-60	60-70	Total
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

(b) What is correlation? Find correlation coefficient between the height of father and height of son from the given data :

Height of father (in inches) :	64	65	66	67	68	69	70
Height of son (in inches) :	66	67	65	68	70	68	72

OR

5 (a) Calculate the coefficient of correlation between x and y series from the following data : 12

	X-series	Y-series
No. of pairs of observation	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 deviation of x and y series from their respective arithmetic mean is 122.

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

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. 12

	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 $y = 4$:

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 $2x+3y-8=0$ and $s_x^2 = 12$, find $\bar{x}$, $\bar{y}$, s_y^2 and r. 12

(b) From the following data obtain regression equations between height and weight. Estimate the height of a person whose weight is 60 kg and the weight of a person whose height is 160 cm.

Height in cm :	165	174	170	162	166	165	168	155	150	180
Weight in kg :	64	70	66	65	69	63	66	58	55	73