S.Y.I.T SEM-IV – Quantitative Techniques 2½HRS 75 MARKS

22/09/2016

Note -: *All questions are compulsary.

*Right indicates full marks.

Q.1) Solve the following (any two) (10)

a) Solve by using false position method . If $f(x) = x^3-2x^2+3x-7$ Using initial roots $x_1 = 1$ & $x_2 = 2$ up to 5 iteration.

b) Use the N-R method to estimate root of equation. $f(x)=x^3-x+4$ using $x_0 = 0$ to obtain an accuracy up to 0.00001.

c) Evaluate integral $\int_0^1 (4 + 2sinx)dx$ using simpson's $3/8^{th}$ rule & $1/3^{rd}$ rule where n=5.

d) By using Bisection for $f(x)=xe^x - \cos(3x)-0.51$ use initial roots $x_1=0$ & $x_2=1$ perform 5 iteration.

Q.2) Solve the following (any two) (10)

a) Apply simple Euler method to solve $\frac{dy}{dx} = 1 - xy^3$ if y(0)=2 find y at x=1 with h=0.1.

b) Obtain by taylor series the numerical solution of $\frac{dy}{dx} = 3x + y^2$ y(0)=1 find y at x=0.1

c) Solve by Gauss seidal $28x_1+4x_2-x_3=432$; $2x_1+17x_2+4x_3=35$; $x_1+3x_2+10x_3=24$

d) Solve by Gauss Jordan $2x+2y+3z=4$; $4x-2y+z=9$; $x+5y+4z=3$.

Q.3 Solve any Two. 16

a) Fit a equation of line by least square method

x	0	1	2	3	4	5	6
y	1	1.8	1.3	2.5	2.3	3.3	3.7

b) For a bivariate data n=25 $\sum x=125$ $\sum x^2=650$ $\sum y=100$ $\sum y^2=460$ $\sum xy=508$ find correlation coefficient.

c) Marks in to subject A & B in a test for 10 students are given. find the spearman rank coefficent.

Marks A	57	58	59	59	60	61	62	64	58	62
Marks B	70	78	50	50	57	50	75	75	68	67

d) The following data give the number of years in the pit & the daily earning of 10 minutes.

Years in the pit	5	6	9	5	8	3	7	5	1	1
Daily earning (In Rs)	32	25	30	34	30	39	26	23	15	11

Find the regression equation x on y and y on x and also find regression coefficient.

Q.4) Solve the following (any two) (10)

a) 1200 children were classified according to intelligence and clothes they wore the following table gives the necessary information.

Clothing

Intelligence	Poorly clad	Well clad	Very well clad	Total
Dull	72	90	78	240
Intelligent	184	305	111	600
Very intelligent	144	105	111	360
Total	400	500	300	1200

Test whether intelligence is associated with clothing 1% of significance (x^2 at 0.01=13.28)

b) Survey of 320 families with 5 children each revealed the following distribution.

No. of Boys	5	4	3	2	1	0
No. of Girls	0	1	2	3	4	5

fit a poission distribution & test the goodness of fit. ($v=5$ x^2 at 5% is 11.07)

c) In an experiment on vaccination of human being form polio the following table are obtained.

	Affected	Non-affected	Total
Inoculated	12	26	38
Not inoculated	16	6	22
Total	28	32	60

Given ($v=1$, x^2 at 5% is 3.84)

d) In a radio listeners survey 120 persons were interviewed and their opinions about preference to Marathi or english music were asked. The results are as follows.

Type of music	Marathi	English	Total
I	18	40	58
II	34	28	62
Total	52	68	120

Examine whether the preference for music type is dependent on language. Use 5% level of significance (x^2 at 5% =3.84).

Q.5) Solve the following (any two) (10)

a) Define : i) Central limit theorem.

ii)poission distribution &Normal distribution with properties & condition.

b) A typist kept a record of mistake made per day during 300 working days of a year

Mistake per day	0	1	2	3	4	5	6
No of days	143	90	42	12	9	3	1

fit a binomial distribution distribution to the data.

Calculate 1st four moments about the mean and also find β_2 from data.

M	0	1	2	3	4	5	6	7	8
F	1	8	20	156	170	56	28	8	1

The mean and variance of binomial distribution are 6 & 3find probability that variate takes values

i) Less than or equal to 2 ii) Greater than equal to 7

Q.6) Solve the following (any two) (10)

a) Define student t-distribution with conditions and properties.

b) 11 students of B.com were given a test in Economics analysis they were imparted a months special coaching and a second test was held at the end of it the result as follows.

Student No	1	2	3	4	5	6	7	8	9	10	11
Marks in 1st test	36	40	36	34	46	32	38	46	40	38	42
Marks in 2nd test	40	44	40	40	46	40	34	48	38	44	36

Do the marks given an evidence that the students have benefited by extra coaching.(v=10 T at 5%=2.228)

c) A random sample of 100 patients suffering from a certain diease was given aserum treatment . It was observed that 75 patient were relived of the diease Find 95% confidence limt for the percentage of patient cured. (95% =1.96)

d) A test given to two groups of students the marks obtained are as

1st group	25	32	30	32	24	14	32			
2nd group	24	34	22	30	42	31	40	30	32	35

Examine the significance of difference between the marks secured the students of above two group. (t at 5% when V=14 is 1.753)

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Q.7 Solve any three.

a) Solve by using Langranges interpolation if
f(1)=1.2 , f(2)=1.4, f(3)=1.8 , f(6)=1.9 find f(5).

b) Using R-K 4th order method find y if $\frac{dy}{dx} = x^2 + 5y^2 + 2$ when y(1)=0 at x=1.2 taking h=0.1

c) Find the equation of2nd degree of parabola with the help of data

x	1	2	3	4	5	6	7	8
y	1.1	1.4	1.6	1.7	1.8	2	2.2	2.3

d) Let X be a discrete random variable with probability mass function

$p(X=x)=x/7$ $X=1,2,3,4,5$

$=0$ otherwise

find E(x) & $E(x^2)$.

e) Solve by Simplex method,

Max $z= 2x_1+3x_2+x_3$

sub to $3x_1+2x_2+4x_3 \leq 100$

$x_1+4x_2+2x_3 \leq 100$

$x_1+x_2+3x_3 \leq 100$

$x_1\ x_2\ x_3 \geq 0$

f) 20,25,19,17,14 constituted a random sample from a population Estimate the mean and S.D of the population also find the estimate of S.E of sample mean.