[Additional Exam] A-T-K-T S.Y.I.T Quantitative Techniques

VCD S.Y.I.T – Quantitative Techniques – SEM IV 2015 – 75 MARKS – 2 ½HRS

Q.1 Solve any Two. 10

a) Solve the equation $f(x) = e^x\cos x - 1.2\sin x - 0.5 = 0$ by false position take $x_0 = 0$ & $x_1 = 1$. Find the value of x for four iteration.

b) Solve by N-R method the equation $e^x\cos x - 1.2 = 0$ take $x_0 = 1.2$ to obtain the accuracy 0.0001.

c) Evaluate integral $\int_{-1}^{1} \frac{1}{1+x^2}$ .using Simpsons 3/8 th rule using eight equal subdivision.

d) Using 5 iteration of bisection determine root of equation $f(x) = \cos x - xe^x$ using $x_0 = 0$ & $x_1 = 1$.

Q.2 Solve any Two. 10

a) ApplySimple Euler method $dy/dx = 20 + y^2$, $y(0) = 0$ find y at $x = 1$ take $h = 0.1$.

b) Solve by Taylor if $\frac{dy}{dx} = x^3y + xy$ with $y(1) = 1$ find y at $x = 1.1$.

c) Solve by Gauss Seidal : $x + 6y + 2z = 19$; $-x - 2y - 5z = 10$; $4x + y + z = 5$.

d) Solve by Gauss Jorden : $2x + 3y + 3z = 4$; $4x - 2y + 3z = 6$; $x + 5y + 4z = 8$.

Q.3 Solve any Two. 10

a) Fit equation ofa 2nd degree of parabola by Least square method with following data.

x	2	4	6	8	10	12
y	2.1	2.2	2.3	2.4	2.5	2.6

b) Calculate Karl Pearsons coefficient of correlation between the indices of wages and cost of living from the following data:

Daily wages	100	101	102	102	100	99	97	98	96	95
Cost of living	98	99	99	97	95	92	95	94	90	91

c) Find cofficient of spearman rank corelation with the help of following data

x	44	49	52	52	47	76	65	60	63	58
y	48	58	45	60	43	82	58	50	77	46

d) Find two regression equation from the following data

$\sum(x - \bar{x})(y - \bar{y}) = 200$ n=5

$\sum(x - \bar{x})^2 = 180$ $\sum x = 200$

$\sum(y - \bar{y})^2 = 350$ $\sum y = 220$

Q.4 Solve any Two. 10

a) A certain oil corporation conducts a seismic test on land to assess the possibility of extraction oil from the land from the past 200 records the following test results and oil yields were obtained

oil yield frequencies

	High	Medium	Low	Total
Good	45	22	13	82
Fair	15	19	26	60
Bad	5	8	47	60
Total	65	49	86	200

Can we say at 1% significance level that oil yields and test result are associated

Given (x^2 at 0.01 when V=4 is 14.86)

b) A die was thrown 90 times with the following results

Face	1	2	3	4	5	6	Total
Frequency	10	12	16	14	18	20	90

Are these data consistent with the hypothesis that the die is unbaised?
(given x^2 at 5 %=11.07 when v=5)

c) In an experiment on immulization of cattle from tuberculosis the following table are obtained.

	Affected	Non-affected	Total
Inoculated	2	6	8
Not inoculated	10	6	16
Total	12	12	24

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

d) The eye-sight of 1000 randomly selected people from a town were tested

	Poor-eye-sight	Good-eye-sight	Total
Male	200	350	550
Female	200	250	450
Total	400	600	1000

Given (x^2 at 5%=3.84 when v=1)

Q.5 Solve any Two. **10**

a) Define- i) Central Limit theorem ii) Normal distribution with properties.

b) The mean and variance of binomial distribution are 3 and 2 respectively find the probaility that the variable takes values i)less than or equal to 2 ii) greater than or equal to 7.

c) Calculate first four moment & also find $\beta 2$ & $\beta 1$.

Class interval	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Frequency	5	1	20	25	17	11	8

d) The incidence of occupational disease in an industry is such that ten workers have a 20% chance of suffering from it what is the probability that out of six workers
i) 4 or more will contract disease.
ii) 2 or more will contract disease.

Q.6 Solve any Two. **10**

a) Define student t-distribution with condition & properties.

b) Measurement performed on random samples of two kinds of cigarettes yielded the following result on their nicontine content (in mgs)

Brand A	21.4	23.6	24.8	22.4	26.3
Brand B	22.4	27.7	23.5	29.1	25.8

Assuming that the nicontine is distributed normally. Test the hypothesis that Brand B has higher nicontine content than Brand A.
Given (When v=4 t at 5% = 2.228).

c) A brand matches is sold in boxes on which it is claimed that the average contents are 40 match stick A check on 5 boxes give the following result 41,39,37,40,38 test the

manufacturer's claim keeping the interest of both manufacturer and the customer in mind. (v=4 t at 5% = 2.776)

d) A group of seven week old chickens reared on high protein diet weight 12,15,11,16,14,14,16 ounces 2nd similarly treated they have low protein weighted 8,10,14,10,13 ounces whether there is sufficent evidence that additional protein has increased the weight of chicken (Given V=10 t at 5% is 2.33)

Q.7 Solve any Three **15**

a) Find f(4.4) by using Newton-Forward Interpolation

x	0	2	4	6	8	10	12
y	12	7	6	7	13	32	77

b) Using R-K 4th order solve $\frac{dx}{dy} = x + \sqrt{y}$ given y(0.1)=4 find y(0.2) take h=0.1.

c) Find equation of line using least square method

x	1	3	5	7	9	11	13
y	0.2	0.3	0.4	0.5	0.6	0.7	0.8

d) Define continous probability function if X be the continous random variable using probability density function $f(x)=f(x) = \begin{cases} \frac{3x(2-x)}{4}, & 0 < x < 2 \\ 0 & otherwise \end{cases}$

e) Solve by using simplex method

Max $z= 3x_1+2x_2+5x_3$

sub to $x_1+2x_2+x_3 \leq 430$

$3x_1+2x_3 \leq 460$

$x_1+4x_2 \leq 120$

$x_1\ x_2\ x_3 \geq 0$

f) A college conducts both day and night classes intended to be identical A sample of 100 day students yields exam result as under mean 75, 72.4 & S.D=14.8 & sample result as under mean 73.9 & S.D=17.9 are the two means are statistically equal at 10% level Given(at 10% level for two tail is 1.64)
