LAST MOMENT TUITIONS

APPLIED MATHS IV

NOV-2017

S.E.SEM-IV

Total marks: 80

Total time: 3 Hours

INSTRUCTIONS:
(1) Question 1 is compulsory.
(2) Attempt any three from the remaining questions.
(3) Draw neat diagrams wherever necessary.
(4)Use of statistical table allowed

Q.1(a)Evaluate $\int_c \ logz\, dz$ where C is the unit circle in the Z-plane **(05)**

(b)Find the eigen vaue od the adjiont of A=$\begin{bmatrix} 2 & 0 & -1 \\ 0 & 2 & 0 \\ -1 & 0 & 2 \end{bmatrix}$ **(05)**

(c)If the arithmetic mean of regression coefficient is p and their difference is 2q ,find the correlation coefficient. **(05)**

(d)Wriye the dual of the following L..P.P **(05)**
Maximize Z=$2x_1$-x_2+$4x_3$
Subject to $x_1+2x_2-x_3 \leq 5$
$2x_1+x_2+x_3 \leq 6$
$x_1+x_2+3x_3 \leq 10$
$4x_1+x_3 \leq 12$
$x_1, x_2, x_3 \geq 0$

Q.2(a)Evaluate $\int_c \frac{\cot z}{z} dz$ where C is the eclipse 9x2+4y2=1 **(06)**

(b)Show that A=$\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \\ 3 & 4 & 5 \end{bmatrix}$ is non derogatory. **(06)**

(c)If X is a normal variate with mean 10 and standard deviation 4,find **(08)**

i. P($|X-14|$<1) ii. P(5≤X≤18) iii. P(X≤12)

Q.3(a) find the expectation of number of failures preceeding the first success in an infinite series 06 of

independent trails with constant probabilities p&q of success and failures respectively. **(06)**

(b)Using simplex Method solve the following L.P.P **(06)**

Maximize $Z=10x_1+x_2+x;$

Subject to $x_1+x_2-3x_3 \leq 10$

$4x_1+x_2+x_3 \leq 20$

$x_1,x_2, x_3 \geq 0$

(c)Expand $f(z)=\frac{1}{z(z+1)(z+2)}$ **(08)**

i. Within the unit of the circle about the origin.

ii. Within the annulus region between the concentric circles about the origin having radii 1 and 2 respectively.

iii. In the exterior of the circle with centre at the origin and radius 2.

Q.4(a)If X is the binomial distributed with mean=2 and variance=4/3 ,find the probability distribution of X.**(06)**

(b)Calculate the value of rank correlation coefficient from the following data regarding score of 6 students in physics and chemistry test. **(06)**

MARKS IN PHYSICS: 40, 42, 45, 35, 36, 39

MARKS IN CHEMISTRY: 46, 43, 44, 39, 40, 43

(c)Is the matrix $A=\begin{bmatrix}2 & 1 & 1\\ 1 & 2 & 1\\ 0 & 0 & 1\end{bmatrix}$ diagonisable? If so find the diagonal form and the transforming matrix. **(08)**

Q.5 (a)A random sample of 50 items gives the mean 6.2 and standard deviation 10.24 **(06)**

Can it be regarded as drawn from a normal population with mean 5.4 at 5% level of significance?

(b)Evaluate $\int_0^\infty \frac{dx}{(x^2+a^2)^3}$,a>0. Using Cauchy's residue theorem **(06)**

(c)using Kuhn-Tucker condition to solve the following L.P.P **(08)**

Maximize $Z=8x_1+10x_2 - x_1^2 - x_2^2$

Subject to $3x_1 + 2x_2 \leq 6$

$x_1, x_2 \geq 0$

Q.6(a)The following tables give the number of accidents in a city during a week. Find whether the accidents are uniformly distributed over a week **(06)**

DAYS	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	TOTAL
No. of ACCIDENTS	13	15	9	11	12	10	14	84

(B)If two independent random samples of sizes 15 & 8 have respectively the following means and the population standard deviations, **(06)**

$\overline{X_1} = 980$ $\overline{X_2} = 1012$

$\sigma_1 = 75$ $\sigma_2 = 80$

Test the hypothesis that $\mu_1 = \mu_2$ at 5% level of significance.

(Assume the population to be normal)

(c)Using Pennaly (Big M) to solve the following L.P.P. **(06)**

Minimize Z=$2x_1 + x_2$
Subject to $3x_1 + x_2 = 3$
$4x_1 + 3x_2 \geq 6$
$x_1 + 2x_2 \leq 3$
$x_1, x_2 \geq 0$