LAST MOMENT TUITIONS

APPLIED MATHS IV

NOV-2018

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

1. (a)A continuous random variable x has the pdf f(x)=kx2e-x where x≥ 0.Find k, Its mean and variance **(05)**

   (b)State true or false with reasoning 2x+y=3 and x=2y+3 cannot be lines of regression **(05)**

   (c)Find the relative maximum and minimum of the function $z = x_1^2 + x_2^2 + x_3^2 - 6x_1 - 8x_2 - 10x_3$. **(05)**

   (d)Find the eigen value of adj.A and A^2-2A+I where $A=\begin{bmatrix} 2 & 3 & 4 \\ 0 & 4 & 2 \\ 0 & 0 & 3 \end{bmatrix}$. **(05)**

2. (a)Obtain the rank correlation coefficient from the following data **(06)**

X:	10	12	18	18	15	40
Y:	12	18	25	25	50	25

   (b)The marks obtained by the students in Maths,Physics and Chemistry in an examination are normally distributed with the means 52, 50 & 48 and with standard deviations 10, 8 & 6. Find the probability that a student selected at random has secured a total of **(06)**

   i)180 or above ii)135 or less

   (c)IS the matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$ diagonalistic?If so,find yhe diagonal form and the transformation matrix **(08)**

3. (a)If $A=\begin{bmatrix} 1 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$, find A^{50}. **(06)**

   (b)A die was thrown 132 times and the following frequencies were observed **(06)**

NO' obtained	1	2	3	4	5	6
Frequencies	15	20	25	15	29	28

Test the hypothesis that the die is unbiased

(c)Use the duality to solve the following L.P.P **(08)**

Minimise $Z = 4x_1 + 3x_2 + 6x_3$,
subject to $x_1 + x_2 \geq 2$
$x_2 + x_3 \geq 5$
$x_1, x_2, x_3 \geq 0$

4. (a)A sample of 100 students is taken from a large population. The mean height of the students in this sample is 160cm.Can it be reasonable regarded that ,in the population, the mean height is 165cm and the SD is 10cm. **(06)**

(b)A transmission channel has a per digit error probability p=0.01 .Calculate the probability of more than one error in 10 received digitsa using **(06)**

i)Binomial distribution

ii)Poissions distribution.

(c)Evaluate $\int_0^{2\pi} \frac{1}{3+2cos\theta} d\theta$ **(08)**

5. (a)Evaluate $\int \frac{1}{z^2(z+4)}$dz where C is the circle $|z|$=2 **(06)**

(b)Show that the matrix A=$\begin{bmatrix} 5 & -6 & -6 \\ -1 & 4 & 2 \\ 3 & -6 & 4 \end{bmatrix}$ is derogatory. **(06)**

(c)Samples pf 2 types of electric bulbs were tested for length of life and following data were obtained **(08)**

	SIZE	MEAN	SD
Sample 1	8	1234h	36h
Sample 2	7	1036h	40h

Is the difference is the mean sufficient to warrant that type 1 bulbs are superior to type 2 bulbs?

6. (a)Using the Big-M penalty method ,solve the following L.P.P **(06)**

Minimize $Z = 10x_1 + 3x_2$
Subject to $x_1 + x_2 \geq 3$
$x_1 + 4x_2 \geq 4$
$x_1, x_2 \geq 0$

(b) Use the Kuhn-tucker conditions to solve the following N.L.P.P **(06)**

Maximize $Z = 2x_1^2 - 7x_2^2 + 12x_1x_2$
Subject to $2x_1 + 5x_2 \leq 98$
$x_1, x_2 \geq 0$

(c)Obtain taylor's and Laurent's expansion for f(z)=$\frac{z-1}{(z-3)(z+1)}$ indicating the regions of convergence. **(06)**