Sub Code:RAS304

Paper Id: 199312 Roll No:

B. TECH.
(SEM III) THEORY EXAMINATION 2019-20
ENGINEERING MATHEMATICS-III

Time: 3 Hours *Total Marks: 70*

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

a.	Write the formula of Regula –Falsi Method.
b.	Describe second order divided difference of the function $f(x)=\frac{1}{x^2}$ for $x=a,b$
c.	Show with the help of one example that LU decomposition method is not applicable to all the Linear systems.
d.	Discuss the following statement: For a Binomial distribution, mean is 9 and variance is 15.
e.	Discuss normal equation of the curve $y=ax^2+\frac{b}{x}$.
f.	Define essential singular points with example.
g.	Define shifting property of Z - transform.

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

a. Population of a town was given as

Years(x)	1891	1901	1911	1921	1931
Population(y)	46	66	81	93	101

Estimate the population for the year 1919.

b. Discuss Runge-Kutta method of fourth order, and solve the differential equation $\frac{dy}{dx}=x+y; y(0)=1$ to evaluate $y(0.4)$ by using Runge-Kutta method of fourth order.

c. Fit the parabola of y=a+bx to the data

x	1	2	3	4
y	1.7	1.8	2.3	3.2

By the method of least squares.

d. State and prove Cauchy integral formula. Also evaluate $\oint_c \frac{z^2+1}{z^2-1}dx$ where c is the circle:

$|z-1|=1.$

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e.	Evaluate the solution of the equation $\frac{\partial u}{\partial t}=\frac{\partial^2 u}{\partial x^2}$,x>0,t>0 subject to the conditions (i) $u=0; x=0, t>0$ (ii) $u=\begin{cases}1, 0<x<1\\ 0, x\geq 1\end{cases}$ for t=0 and (iii) $u(x,t)$ is bounded.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Apply Lagrange's interpolation formula to find the Interpolating polynomial for the data.

x	3	8	9	10
$f(x)$	3	1	1	9

(b)	Find a root of the equation $xe^x=\cos x$ using Newton Raphson method

4. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Calculate the solution of the system of equations, By Crout's method method: $2x+3y+z=9; x+2y+3z=6; 3x+y+2z=8$.
(b)	Apply Simpson's 3/8 formula to evaluate $\int_0^6 \frac{1}{2+x^2}$.

5. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Prove that Poission distribution is the limiting case of Binomial distribution.
(b)	Samples of sizes 12 and 16 were taken from two normal populations with S.D. 4.5 and 6.2. The sample means were found to be 20.8 and 12.6. Apply Test whether the means of the two populations are the same at 5% level given $t_{0.05}=2.0739$ for 22 d.f..

6. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Examine the nature of the function $f(z)=\frac{x^3y(y-ix)}{x^6+y^2}; z\neq 0$ and f (0) =0 at the origin.
(b)	Discuss analytic function f(z).If $f(z)=u-v=\frac{\cos x+\sin x-e^{-y}}{2\cos x-2\cosh y}; f(\frac{\pi}{2})=0$.

7. Attempt any *one* part of the following: 7 x 1 = 7

(a)	Show that the Fourier transform of $\frac{e^{-ax}}{x}, a>0$ is $\tan^{-1}(p/a)$.
(b)	Show that $Z(\cos(\alpha k))=\frac{z(z-c\cos\alpha)}{z^2-2cz\cosh\alpha+c^2}, k\geq 0.$