		Reg. No:		
	Γ	Question Paper Co	ode :R3M24	
	B.E./I	3.Tech. DEGREE EXAM	r Code :R3M24XAMINATION, NOV 2024Semesterctronics EngineeringS, COMPLEX ANALYSIS AND NUMERICALHODSons R2021)Maximum: 100 Marksx 1 = 10 Marks)CO6-U(c) < 30	
		Third Seme	ster	
		Electrical And Electron	ics Engineering	
	R21UMA324-PROBABI	LITY, STATISTICS, CO METHOD	OMPLEX ANALYSIS OS	AND NUMERICAL
		(Regulations R	2021)	
Dura	tion: Three hours			Maximum: 100 Marks
		PART A - (10 x 1 =	= 10 Marks)	
1.	Small sample size is			CO6-U
	(a) 30	(b) >30	(c) < 30	(d) None of the above
2.	Choose the F-test statistic	is		CO6-U
	(a) $F = S_1^2 / S_2^2 if S_1^2 < S_2^2$	(b) $F = S_2^2 / S_1^2$ if S_2^2	$> S_1^2$ (c) F = 0	(d) None of the above
3.	If A and B are mutually ex	xclusive events then P(A)	∪B) =	CO6-U
	(a) 0	(b) $P(A) + P(B)$	(c) P (A) . P(B)	(d)) $P(A) - P(B)$
4.	If X and Yare independen	t random variables thenC	ov(X ,Y) is	CO6-U
	(a) 0	(b) 1	(c) 2	(d) None of the above
5.	For any root the order of a	convergence of Newton's	method is	CO6- U
	(a) 4	(b) 1	(c) 2	(d) 3
6.	Gauss Seidel method conv	verges faster than		CO6-U
	(a) Gauss Elimination	(b) Gauss Jacobi	(c) Gauss Jordan	(d) Newton's
7.	In Euler's method, if h is	small, the method is too _		CO6-U
	(a) fast	(b) slow	(c) average	(d) None of these
8.	Predictor-Corrector metho	ods are starting	methods	CO6-U
	(a) self	(b) not self	(c) identity	(d) None of these
9.	Simple pole is a pole of or	rder		CO6-U
	(a) 1	(b) 2	(c) 3	(d) 4

- 10. The residue of $f(z) = \frac{4}{z^3(z-2)}$ at its simple pole is _____ CO5-App
 - (a) $\frac{4}{7}$ (b) $\frac{1}{2}$ (c) $\frac{1}{7}$ (d) $\frac{3}{4}$

PART - B (5 x 2 = 10 Marks)

- 11. A sample of size 10 has mean 58, standard deviation18.4 and population mean 50, CO1-App Compute the calculated value of t' distribution.
- If X and Y are independent random variables with variance 2 and 3. Find the CO2-App variance of 3X + 4Y
- 13. What do you mean by diagonally dominant?
- 14. Using Taylor series method find y(0.1) given $\frac{dy}{dx} = 1 + y$, y(0) =0 CO4-App
- 15. Evaluate $\int_{c} \frac{e^{-z}}{z+1} dz$ where C is $|z| = \frac{1}{2}$ using Cauchy integral formula CO5-App

$$PART - C (5 \times 16 = 80 Marks)$$

16. (a) (i) A company keeps records of accidents. During a recent safety CO1-Ana (8) review, a random sample of 60 accidents was selected and classifieds by the day of the week on which they occurred.

Days	Mon	Tue	Wed	Thu	Fri
No.of. accidents	8	12	9	14	17

Find whether the accidents are uniformly distubuted over a week.

(ii) Two independent samples of sizes 9 and 7 from a normal CO1-Ana (8) population had the following values of the variables.

Sample I	18	13	12	15	12	14	16	14	15
SampleII	16	19	13	16	18	13	15		

Identify the sampling distribution, Do the estimates of the population variance differ significantly.

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CO6-U

(b) (i) On the basis of information noted below, find out whether the new CO1-Ana (8) treatment is comparatively superior to the conventional one. Identify the sampling distribution.

	Favorable	Non-Favorable	Total
conventional	40	70	110
New	60	30	90
Total	100	100	200

(ii) The following are the average weekly losses of working hours due CO1-Ana (8) to accidents in 10 industrial plants before and after an instruction of a safely program was in two operation.

• •	-			-						
Before	45	73	46	104	3	57	83	34	26	17
					3					
After	36	60	44	119	3	51	77	29	24	11
					5					

Use to 0.05 level of significance to test whether the safely is effective.

17. (a) A Random Variable X has the following probability distribution CO2-App (16)

X=x	0	1	2	3	4	5	6	7	8
P(X=x)	a	3a	5a	7a	9a	11a	13a	15a	17a

Find

(i) 'a'

(ii) p(x<3)

(iii) p(0<x<3)

(iv) $p(x \ge 3)$

(v) Find the Distribution function of X

Or

(b) (i) probability distribution function of a random variable X is CO2-App (8)

$$f(x) = \begin{cases} x, 0 < x < 1 \\ 2 - x, 1 < x < 2 \\ 0, x > 2 \end{cases}$$

Find the cumulative distribution function of X.

(ii) Using the probability mass function of Binomial distribution , CO2-App (8)Compute the moment generating function and hence find mean and variance

18. (a) (i) Solve for a positive root of $x \log_{10} x - 1.2 = 0$ by Newton's CO3-App (8) Raphson method (ii) Solve 27x + 6y - z = 85, 6x + 15y + 2z = 72, x + y + 54z = 110 by CO3-App (8) Gauss Jacobi method Or

(b) (i) Using Power method find numerically largest Eigen value of

 $\begin{pmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{pmatrix}$

(ii) Solve 27x + 6y - z = 85, 6x + 15y + 2z = 72, x + y + 54z = 110 by CO3-App (8) Gauss Seidel method

19. (a) (i) Using Taylor series method find y(0.2) for $\frac{dy}{dx} = 1 + xy$, y(0) = 2 CO4-App (8)

(ii) Given
$$\frac{dy}{dx} = \frac{y-x}{y+x}$$
 with $y(0) = 1$, find y for $x = 0.1$ by Euler's CO4-App (8)
Method

Or

(b) (i) Using Adam's Bash forth Predictor-Corrector method, find y(4.4) CO4-App (8) given that $5xy' + y^2 = 2$, y(4) = 1, y(4.1) = 1.0049, y(4.2) = 1.0097 and y(4.3) = 1.0143(ii) Using R.K Method of 4th order, solve $\frac{dy}{dx} = y - x^2$ with y(0) = 1 at CO4-App (8) x = 0.1, x = 0.2

20. (a) (i) Evaluate using Cauchy's Residue theorem for CO5-App (8)

$$f(z) = \int_{C} \frac{\cos \pi z^{2} + \sin \pi z^{2}}{(z+1)(z+2)} dz$$
, where 'C' is $|z| = 3$
(ii) Evaluate $f(z) = \frac{z}{(z+1)(z+3)}$ in Laurent's series valid for the region CO5-App (8)
 $1 < |z| < 3.$ Or

(b) Using Contour integration, to prove $\int_{-\infty}^{\infty} \frac{1}{(x^2 + a^2)(x^2 + b^2)} dx$ CO5-App (16)

CO3-App

(8)