A		Reg. No. :											
		Question Pa	per	Coc	le: 9	302	24						
	B.E./B.Tech. DEGREE EXAMINATION, MAY 2022												
	Third Semester												
	Electrical and Electronics Engineering												
	19UMA324- Proba	bility, Statistics, Co	ompl	ex Ar	alysis	s and	d Nu	mer	ical	Met	hods		
		(Regula	ation	2019	)								
Dura	ation: Three hours							Μ	axin	num	: 100	Ma	rks
		Answer A	ll Qi	uestio	ns								
		PART A - (10	0x 1 =	= 10 1	Marks	5)							
1.	The degrees of freedom										CC	<b>)6-</b> U	
	(a) n-1	(b) n-2	(	c) n-3	1				(d)	n-4			
2.	Large sample size is											CO	6- U
	(a) 30	(b)>30	(c) <	<30					(d)	none	e of t	hese	
3.	The r <sup>th</sup> moment about	origin is										CO	6- U
	(a) $\mu(X)$	(b) $\mu(X^2)$		(c) µ	$(X^{r})$		(	d) N	lone	oft	he al	ove	
4.	Which of the following	discrete distributio	on ha	is equ	al me	an ai	nd va	ariar	nce?			CO	6- U
	(a) Binomial	(b) Poisson	(	c) Ga	mma				(d)	Unif	form		
5.	Iteration method conve	rges if $ g^1(x) $										CO	6- U
	(a) >1	(b)<1		(c)=0	)		(d)	)>0					
6.	Newton's method is als	o called method of	·									CO	6- U
	(a) tangents	(b) slope		(c) se	cants				(d)	false	;		
7.	Taylor Series method w Milne's and Adam's me		to g	ive so	me _		val	ues	for	RK,		CO	6- U
	(a) initial	(b)final		(c)int	erme	diate	e		(d) <sup>-</sup>	two			
8.	prior values are	required to predict	the n	next va	alue in	n Ad	lam's	s me	etho	d		CO	6- U
	(a) 1	(b)2		(c) 3					(d) 4				

9.	If $f(z)$ is analytic at all points inside and on a simple closed curve c, then CO6							
	$\int_{C} f(z) dz =$							
	(a) 2πi	(b) -2πi	(c) 4πi	(d) 0				
10.	The poles of z cot z	is			CO6- U			
	(a) 0	(b) $\pm n\pi$	(c) 1	(d) π				
		PART – B	(5 x 2= 10Marks)					
11.	Define Chi-square to	est of goodness of fi	it.		CO1- R			
12.	For Binomial distrib	ution mean is 6 and	l variance is 2,Find P[X=	-x].	CO2- App			
13.	Write the condition	of convergence of N	Newton's method.		CO3- U			
14.	Using Taylor's serie	s method find $y(1)$ .	1) given $y' = x + y$ with	1 y(1) = 0	CO4- App			
15.	Evaluate $\int_{c} \frac{z}{z-2} dz$ w	where C is $ z  = 2$			CO5 App			

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

16. (a) (i) The following data are collected on two characters. CO1- Ana (8)

	Smokers	Non Smokers
Literates	83	57
Illiterates	45	68

Using chi-square test to find is there any relation between smoking and literacy.

(ii) A random sample of 16 values from a normal population CO1- Ana (8) showed a mean of 41.5 inches and the sum of squares of deviations from this mean equal to 135 square inches. Show that the assumption of a mean of 43.5 inches for the population is not reasonable. Obtain 95 percent and 99 percent fiducial limits for the same.

Or

(b) (i) A group of 10 rats fed on diet A and another group of 8 rats CO1 - Ana (8) fed on diet B, recorded the following increase in weight.

Diet	5	6	8	1	12	4	3	9	6	10
Α										
Diet	2	3	6	8	10	1	2	8		
В										

Find the variances are significantly different.

(ii) Two researchers A and B adopted different techniques while CO1 -Ana (8) rating the student'slevel. Can you say that the techniques adopted by them are significant?

Researchers	Below	Below Average Above		Genius	Total
	Average		Average		
А	40	33	25	2	100
В	86	60	44	10	200
Total	126	93	69	12	300

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

						-	-	
X=x	0	1	2	3	4	5	6	7
P(X=x)	0	а	2a	2a	3a	$a^2$	$2a^2$	$7a^2+a$

Find (i) The value of 'a',

(ii)  $P(X < 6), P(X \ge 6), P(0 < X < 4),$ 

(iii) P(X < 6/X > 4),

(iv) Find the minimum value of ' $\lambda$  'such that  $P(X \le \lambda) > \frac{1}{2}$ .

Or

- (b) Define Poisson distribution. Find the moment generating function CO2 -App (16) and Hence find mean and variance.
- 18. (a) (i) Using Newton's Raphson method find the real positive root of CO3- App (8)  $x^4$  -x-10=0.

(ii) Solve 4x + 2y + z = 14, x + 5y - z = 10, x + y + 8z = 20 by CO3- App (8) Gauss Elimination method.

## Or

(b) (i) Solve 4x + 2y + z = 14, x + 5y - z = 10, x + y + 8z = 20 by CO3- App (8) Gauss Seidel method.

(ii) Using Power method find numerically largest Eigen value of CO3- App (8)  $\begin{pmatrix} 25 & 1 & 2 \\ 1 & 3 & 0 \end{pmatrix}$ 

 $\begin{vmatrix} 2 & 0 & -4 \end{vmatrix}$ 

19. (a) (i) Using Taylor's series method find y(0.1) for 
$$\frac{dy}{dx} = x^2 y - 1$$
, CO4-App (8)  
y(0) = 1  
(ii) Given  $\frac{dy}{dx} = 1 + y^2$ , y(0) =0, y(0.2) = 0.2027, y(0.4) =0.4228, CO4-App (8)  
y(0.6) = 0.6841 evaluate y(0.8) by Adams – Bash forth Method.  
Or  
(b) (i) Using R-K method of fourth order, solve  $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$  with CO4 -App (8)  
y(0) = 1 at  $x = 0.2$   
(ii) Using Milne's method find y(4.4) given  $5xy' + y^2 - 2 = 0$  CO4 -App (8)  
given y (4) = 1, y(4.1) = 1.0049, y(4.2)= 1.0097 and y(4.3)=  
1.0143  
20. (a) (i) Evaluate using Cauchy's Integral formula for CO5- App (8)  
f(z) =  $\int_{c} \frac{2z - 1}{z(z + 1)(z - 3)} dz$ , where 'C' :  $|z| = 2$ .  
(ii) Find the Laurent's series of  $f(z) = \frac{7z - 2}{z(z + 1)(z - 2)}$  valid in the region  $1 < |z + 1| < 3$   
Or (b) (i) Evaluate:  $\int_{-\infty}^{\infty} \frac{x^2}{(x^2 + 4)(x^2 + 9)} dx$ , using contour integration.  
(ii) Evaluate  $f(z) = \frac{1}{(z + 1)(z + 3)}$  in Laurent series valid for the CO5- App (8)  
region

region 1 < |z| < 3.