



9. If  $f(z)$  is analytic at all points inside and on a simple closed curve  $c$ , then CO6- U  
 $\int_c f(z) dz = \text{-----}$   
 (a)  $2\pi i$  (b)  $-2\pi i$  (c)  $4\pi i$  (d)  $0$
10. The poles of  $z \cot z$  is CO6- U  
 (a)  $0$  (b)  $\pm n\pi$  (c)  $1$  (d)  $\pi$

PART – B (5 x 2= 10Marks)

11. Define Chi-square test of goodness of fit. CO1- R
12. For Binomial distribution mean is 6 and variance is 2, Find  $P[X=x]$ . CO2- App
13. Write the condition of convergence of Newton's method. CO3- U
14. Using Taylor's series method find  $y(1.1)$  given  $y' = x + y$  with  $y(1) = 0$  CO4- App
15. Evaluate  $\int_c \frac{z}{z-2} dz$  where  $C$  is  $|z|=2$  CO5 App

PART – C (5 x 16= 80Marks)

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 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. CO1- Ana (8)

Or

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

Diet A	5	6	8	1	12	4	3	9	6	10
Diet B	2	3	6	8	10	1	2	8		

Find the variances are significantly different.

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

Researchers	Below Average	Average	Above Average	Genius	Total
A	40	33	25	2	100
B	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	$a$	$2a$	$2a$	$3a$	$a^2$	$2a^2$	$7a^2+a$

Find (i) The value of 'a',

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

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

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

Or

- (b) Define Poisson distribution. Find the moment generating function and Hence find mean and variance. CO2 -App (16)

18. (a) (i) Using Newton's Raphson method find the real positive root of  $x^4 - x - 10 = 0$ . CO3- App (8)

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

Or

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

- (ii) Using Power method find numerically largest Eigen value of CO3- App (8)

$$\begin{pmatrix} 25 & 1 & 2 \\ 1 & 3 & 0 \\ 2 & 0 & -4 \end{pmatrix}$$

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