A   Reg. No. :

Duration: Three hours   Maximum: 100 Marks

Answer All Questions

PART A - (10x 1 = 10 Marks)

1. The degrees of freedom in t-tests is   CO6-U

    (a) n-1   (b) n-2   (c) n-3   (d) n-4

2. In Chi-square the sample observations should be   CO6- U

    (a) dependent   (b)   (c) equal   (d) none of these
                           independent

3. The rth moment about origin is   CO6- U

    (a) $\mu(X)$ (b) $\mu(X^2)$ (c) $\mu(X^r)$ (d) None of the above

4. Which of the following discrete distribution has equal mean and variance?   CO6- U

    (a) Binomial   (b) Poisson   (c) Gamma   (d) Uniform

5. Iteration method converges if $|g^1(x)|$ _____   CO6- U

    (a) >1   (b)<1   (c)=0   (d) >0

6. Newton's method is also called method of _____   CO6- U

    (a) tangents   (b) slope   (c) secants   (d) false

7. Taylor Series method will be very useful to give some _____ values for RK,   CO6- U
    Milne's and Adam's methods

    (a) initial   (b)final   (c)intermediate   (d) two

8. _____ prior values are required to predict the next value in Adam's method   CO6- U

   (a) 1   (b)2   (c) 3   (d) 4

9. Find the poles of $f(z) = \dfrac{z^2 + 1}{1 - z^2}$ CO6- U

   (a) 1,0   (b) 1,-1   (c) 1,2   (d) 0,0

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. What are the parameters and statistics in sampling?   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. Find the Residues of $f(z) = \dfrac{z + 1}{z(z - 2)}$ CO5 App

PART – C (5 x 16= 80Marks)

16. (a) (i) A sample analysis of examination results of 500 students was   CO1- Ana   (8)
         made. It was found that 220 students have failed, 170 have
         secured a third class, 90 have secures a second class and the rest,
         a first class. So these figures support the general belief that the
         above categories are in the ratio 4:3:2:1 respectively?
         (ii) The following data are collected on two characters.   CO1- Ana   (8)

	Skilled	Non Skilled
Male	40	20
Female	10	30

    Using chi-square test to find is there any relation between skilled
    and Non Skilled.

                                    Or

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(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) The theory predicts the population of beans in the four groups A, B, C and D should be 9:3:3:1. In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287 and 118. Does the experimental result support the theory?   CO1 -Ana   (8)

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 'λ' such that $P(X \leq \lambda) > \dfrac{1}{2}$.

Or

(b) Calculate the correlation coefficient for the following heights (inches) of fathers X and their sons Y.   CO2 -App   (16)

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

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 $\dfrac{dy}{dx} = x^2 y - 1$,   CO4-App   (8)

y(0) = 1

(ii) Given $\dfrac{dy}{dx} = 1 + y^2$, 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 $\dfrac{dy}{dx} = \dfrac{y^2 - x^2}{y^2 + x^2}$ 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 Residue theorem for   CO5- App   (8)

$f(z) = \int_C \dfrac{e^z \, dz}{(z^2 + \pi^2)^2}$, where 'C' is $|z| = 4$.

(ii) Find the Laurent's series of $f(z) = \dfrac{7z - 2}{z(z + 1)(z - 2)}$ valid in   CO5- App   (8)

the region $1 < |z + 1| < 3$

Or

(b) (i) Using contour integration, to find the value of $\displaystyle\int_0^{2\pi} \dfrac{d\theta}{13 - 5\cos\theta}$.   CO5- App   (8)

(ii) Expand $\dfrac{1}{z(z - 1)}$ as Laurent's series valid in the regions   CO5- App   (8)

$0 < |z| < 1$

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