

- b) Write a FORTRAN program to read a string and then determine whether it is a palindrone or not.

OR

- c) Write a FORTRAN program to print the digits of a number one below the other.
- d) Summarize the syntatic rules associated with the while statement.
- e) Given a sequence of 100 random numbers. Write a C program to arrange them in an ascending order.

Code No. BT IN 066

*B.Tech. Degree II Semester (Supplementary) Examination in Instrumentation,
June 2000*

IN 201 APPLIED MATHEMATICS - II

Time: 3 Hours

Max. Marks: 100

PART - A

(Answer any FIVE. Each question carries 5 marks)

- I Expand $f(z) = \sin z$ as Taylor's series about $z = \pi/4$ indicating the radius of convergence.

- II Using Residue theorem, evaluate $\int_c \frac{1-e^{2z}}{z^4} dz$ where c is the circle $|z|=1$

- III Show that the transformation $y_1 = 2x_1 + x_2 + x_3$, $y_2 = x_1 + x_2 + 2x_3$, $y_3 = x_1 - 2x_3$ is regular.

- IV In a Poisson distribution $P(1) = P(2)$. Find $P(4)$ and variance.

- V Show that the correlation coefficient r between two variables x and y always lies between -1 and $+1$.

- VI Discuss the error in Simpson's one third formula.

- VII What are the rules for the naming of variables.

PART - B

(Answer all questions. Each question carries 15 marks)

- VIII a) Determine the region of the w -plane into which the first quadrant of z -plane is mapped by the transformation $w = z^2$.
- b) State Laurent's theorem. Find the Laurent's series of $f(z) = \frac{z}{(z+1)(z+2)}$ in the region $0 < |z+2| < 1$

OR

- c) Calculate the residues at the poles of the function

$$f(z) = \frac{z \cdot e^z}{(z-1)^3(z+2)^2}$$

- d) Show that $\int_0^{\infty} \frac{x \sin x}{x^2 + a^2} dx = \frac{\pi}{2} e^{-a}$

- IX a) If λ is an eigen value of a non singular matrix A show that

$\frac{|A|}{\lambda}$ is an eigen value of adj. A.

- b) Find the values of λ and μ so that the equations $2x + 3y + 5z = 9$, $7x + 3y - 2z = 8$, $2x + 3y + \lambda z = \mu$ have (i) no solution (ii) a unique solution and (iii) an infinite number of solutions.

OR

- c) Find the eigen values and eigen vectors of the matrix

$$\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$$

- d) Reduce the matrix $\begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$ to the diagonal form.

- X a) Define Poisson probability distribution. Show that for a Poisson probability distribution, the mean and variance are equal.

- b) Find the correlation coefficient between x and y from the given data.

x	78	89	97	69	59	79	68	57
y	125	137	156	112	107	138	123	108

OR

- c) Eight unbiased coins were tossed simultaneously. Find the probability of getting (i) exactly 4 heads (ii) no heads at all (iii) 6 or more heads (iv) utmost two heads.
- d) For a normal distribution with mean 1 and S.D.3 find the probabilities that
(i) $3.43 \leq x \leq 6.19$
(ii) $-1.43 \leq x \leq 6.19$

XI

- a) Derive Newton's backward interpolation formula.

- b) Find the missing figure in the following table

x	0	1	2	3	4
f(x)	1	3	9	-	81.

OR

- c) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using (i) Simpson's $\frac{1}{3}$ rule taking $h = \frac{1}{4}$
(ii) Simpson's $\frac{3}{8}$ rule taking $h = \frac{1}{6}$
- d) Apply Euler's method to solve $\frac{dy}{dx} = x + y$, $y(0) = 0$ choosing the step length = 0.2 (carry out 6 steps).

XII

- a) The formula used to calculate the amount of interest on a bank account that compound interest daily is $i = p(1+r)^d - p$, where i is the total interest earned, p - is the principal (the amount originally deposited in the account) r - is the rate of interest as a decimal less than 1, d - is the number of days the money is earning interest. Write a program that accepts values for p, r and d and calculate the interest earned.