

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZIANAGARAM
II B. Tech II Semester Supplementary Examinations November-2025
PROBABILITY AND COMPLEX VARIABLES
(ME)

Time: 3 hours

Max. Marks: 70

The Question paper consists of Part A & Part B.

Part A is compulsory, Answer all questions. Part B Answers any one question from each unit.

1 PART-A (20Marks)

- a) Find the mean of two regression lines $2Y-X-50=0, 3Y-2X-10=0$ [2]
- b) Find the Q_1 for the data { 100,110,120,160,170,180,220} [2]
- c) Four cards are drawn at random from a pack of 52 cards find the probability that there is one ace and one jack [2]
- d) If $\text{Var}(X) = 2$ then find $\text{Var}(2X+4)$ [2]
- e) Write the mean and variance of binomial distribution [2]
- f) Find the area right to the $z = -1.78$ for a normal variate [2]
- g) Verify whether $f(z) = z^2$ is analytic [2]
- h) Check whether $x^2 - y^2 + xy$ is harmonic [2]
- i) Evaluate $\int_c \frac{ze^{2z}}{(z-\pi i)^3} dz$ where c is a circle of radius 2 [2]
- j) Find the residue of $f(z) = \frac{z}{(z+1)(z-2)}$ at $z=2$ [2]

PART-B

(50Marks)

Question from **Unit - I**

2 a) Find the Mean and S.D of following data [10]

Marks	0-10	10-20	20-30	30-40	40-50	50-60
frequency	5	15	20	35	12	8

(OR)

3 a) Calculate Rank correlation among the following [10]

X	10	15	15	10	13	12	14	19	10	7
Y	13	15	18	14	17	10	12	11	16	14
Z	16	14	19	18	11	12	13	10	16	15

Question from **Unit - II**

4 a) Three urns are given each contain red and white balls as follows [10]

Urn I : 5 Red , 4 white

Urn II : 4 Red , 6 white

Urn III: 5 Red, 8 white

An urn is chosen at random and ball drawn from this is red. Find the probability that urn chosen was I, II and III

(OR)

5 a) A sample of 4 items is selected at random from a box containing 12 items of which 5 are defective. Find [10]

(i) The distribution function for defective item

(ii) Mean of the distribution

(iii) Variance

(iv) $\text{Var}(2X-3)$ Question from **Unit - III**

6 a) In a certain city only 50% of the students are capable of doing college work actually go to college. Find the probability that among 18 such students [10]

(i) Exactly 10 (ii) At least 2 (iii) At most 17 .

(OR)

- 7 a) Given that $P(X = 2) = 9P(X = 4) + 90P(X = 46)$ for a Poisson distribution Find (i) $P(X < 2)$ (ii) $P(X > 4)$ (iii) $P(X \geq 1)$ [10]

Question from **Unit - IV**

- 8 a) Show that for $f(z) = \begin{cases} \frac{(x^3 - y^3) + i(x^3 + y^3)}{x^2 + y^2} & \text{if } z \neq 0 \\ 0 & \text{if } z = 0 \end{cases}$ [10]

$f^1(z)$ does not exist at origin although C-R equations are satisfied at the origin.

or

- 9 a) Find analytic $f(z)$ whose real part $u(x, y) = e^x[(x^2 - y^2)\cos y - 2xy\sin y]$ [10]

Question from **Unit - V**

- 10 a) Evaluate $\int_C 1/z^2 dz$ around the square with vertices $(0,0), (1,0), (1,1), (0,1)$, taken in positive sense. [10]

(OR)

- 11 a) Evaluate $\oint_C \frac{1+z}{z(1-z)} dz$ Where $C : |z| = 2$ using residue theorem [10]