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Course Code **AHS004**



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Four Year B.Tech IV Semester CIE – II, APRIL – 2018

Regulations: IARE-R16

COMPLEX ANALYSIS AND PROBABILITY DISTRIBUTION

(Common to AE | EEE)

Time: 2 Hours

Max Marks: 25

Answer all question from Part – A
Answer any four questions from Part – B
All parts of the question must be answered in one place only

PART – A

1. (a) Discover the points at which $w = \cosh z$ is not conformal. [BL: Remember | CO: 2 | Marks: 1]
- (b) List the important properties of probability mass function. [BL: Understand | CO: 2 | Marks: 1]
- (c) Define the term probability density function of a probability distribution. [BL: Remember | CO: 7 | Marks: 1]
- (d) Determine the Binomial distribution for which the mean is 4 and variance 3 [BL: Remember | CO: 9 | Marks: 1]
- (e) Draft the applications of Normal distribution. [BL: Understand | CO: 11 | Marks: 1]

PART – B

2. (a) Calculate the value of $\oint_c \frac{\coth z}{z-i} dz$ where c is $|z| = 2$. [BL: Understand | CO: 4 | Marks: 2]
- (b) Determine the Bilinear transformation that maps the points $(\infty, i, 0)$ in the z -plane into the points $(0, i, \infty)$ in the w -plane. [BL: Understand | CO: 4 | Marks: 3]
3. (a) A continuous random variable has the probability density function
$$f(x) = \begin{cases} kxe^{-\lambda x}, & \text{for } x \geq 0, \lambda > 0 \\ 0, & \text{otherwise} \end{cases}$$
Determine [BL: Understand | CO: 1 | Marks: 2]
 - i. k
 - ii. Mean
 - iii. Variance
- (b) Out of 24 mangoes, 6 mangoes are rotten. If we draw two mangoes, then obtain probability distribution of number of rotten mangoes that can be drawn. [BL: Remember | CO: 1 | Marks: 3]

4. (a) Let X denotes the minimum of the two numbers that appear when a pair of fair dice is thrown once. Find [BL: Understand | CO: 8 | Marks: 2]
 i) Discrete probability distribution
 ii) Expectation
 iii) Variance
- (b) The probability density function of a random variable X is $f(x) = \frac{K}{x^2+1}, -\infty < x < \infty$. Find K and the distribution function $F(x)$. [BL: Understand | CO: 8 | Marks: 3]
5. (a) Average number of accidents on any day on a national highway is 1.8. Determine the probability that the number of accidents is [BL: Understand | CO: 8 | Marks: 2]
 i. At least one
 ii. At most one
- (b) Show that the mean, mode and median are equal in Poisson distribution. [BL: Understand | CO: 8 | Marks: 3]
6. (a) In a Normal distribution, 7% of the item are under 35 and 89% are under 63. Compute the mean and standard deviation of the distribution [BL: Understand | CO: 11 | Marks: 2]
- (b) The marks obtained in statistics in a certain examination found to be normally distributed. If 15% of the students greater than or equal to 60 marks , 40% less than 30 marks. Find the mean and standard deviation. [BL: Understand | CO: 13 | Marks: 3]

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