Hall Ticket No | | | | | | | | | | | Question Paper Code: AHSB06

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech IV Semester End Examinations (Regular), November – 2020

Regulation: IARE–R18

COMPLEX ANALYSIS AND PROBABILITY DISTRIBUTION

Time: 2 Hours **(EEE)** **Max Marks: 70**

Answer any Four Questions from Part A
Answer any Five Questions from Part B

PART – A

1. Calculate the value of k such that f(x, y) = x^3+$3kxy^2$ may be harmonic function. **[5M]**
2. Evaluate $\int\limits_c \frac{z^2-z+1}{z-1}dz$ where C is the Circle |z|=1 **[5M]**
3. Determine the Poles of the function $f(z) = \frac{ze^z}{(z+2)^4(z-1)}$. **[5M]**
4. List the important properties of probability density function. **[5M]**
5. Write the properties of the normal curve. **[5M]**
6. Obtain an analytic function f (z) whose imaginary part of the analytic function is v = e^x (xsiny+ycosy). **[5M]**
7. Find Taylor's expansion of f[z] = $\frac{1}{(z+1)^2}$ about point z= -i. **[5M]**
8. State Cauchy's Residue theorem of an analytic function f(z) within and on the closed curve. **[5M]**

PART – B

9. If is f(x) is an analytic function with constant modulus, show that f(z)is constant. **[10M]**
10. Find the bilinear transformation which maps the point z=1.i,-1 onto the points w=i,0,-i Hence find the invariant points of this transformation. **[10M]**
11. Verify Cauchy's theorem by integrating z^3 along the boundary of the triangle with the verticles at the point 1+ i , -1+i ,and -1, 1. **[10M]**
12. If f(z) is continuous in a region D and $\oint\limits_c f(z)dz = 0$ around every simple closed curve C in D , then f(z) is analytic in D. **[10M]**
13. Find the Laurents expansion of f[z] =$\frac{7z-2}{z(z+1)(z-2)}$ in the region 1<z+1<3. **[10M]**
14. What type of singularity have the following function i) 1/ 1-e^z ii)e^{2z} / $[z-1]^4$ iii)$e^{1/z}$ / z^2. **[10M]**
15. X is a continuous random variable with probability density function given by f(x)=$f(x) = \begin{cases} kx & 0 \le x \le 2 \\ 2k & 2 \le x \le 4 \\ kx+6k & 4 \le x < 6 \end{cases}$

    Find k and mean value of X. **[10M]**
16. In a lottery ,m tickets are drawn at a time out of n tickets numbered from 1 to n. Find the expected value of the sum of the numbers on the tickets drawn. **[10M]**
17. The probability that a pen manufactured by a company will be defective is 1/10, . If 12 such pens are manufactured, find the probability that i) Exactly two will be defective ii)At least two will be defective, iii)None will be defective . **[10M]**
18. Prove that poisson distribution is limiting case of binomial distribution . **[10M]**

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