**Subject Code: R16EE2105**

## II B.Tech I Semester Supplementary Examinations, May-2018.
### COMPLEX VARIABLES AND STATISTICAL METHODS
### (EEE)

**Time: 3 hours**

**Max Marks: 60**

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

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## PART-A

1. a) Is the function $f(z)=\dfrac{z-ib}{z^2+b^2}$ continuous at $bi$ ?

    b) State Cauchy's Integral formula

    c) Find the Residues at the singular points of $\left(\dfrac{z+1}{z^2+b^2}\right)^2$

    d) If the probability of a defective bolt is $\dfrac{1}{8}$ , find the mean for the distribution of defective bolts of $640$ .

    e) Find the value of the finite population correction factor for $n=10$ and $N=100$ .

    f) Explain Type-I and Type-II error.

    **[2+2+2+2+2+2]**

## PART–B

**4 X 12 = 48**

2. a) Find all values of k, such that f(z)=e^x (cosh ky+ i sinh ky) is analytic.

    b) Show that $u(x,y) = x^3 - 3xy^2$ is harmonic and find its harmonic conjugate and the corresponding analytic function f(z) in terms of Z.

3. a) Verify Cauchy's theorem for the integral of $z^3$ taken over the boundary of the rectangle with vertices -1, 1, 1+i, -1+i.

    b) Evaluate $\oint_c \dfrac{z^3+z^2+2z-1}{(z-1)^3}dz$ , where c is $|z|=3$ using Cauchy's integral formula.

4. a) Find the poles and residue at each pole of $f(z)=\dfrac{z}{(z+2)(z-1)^2}$

    b) Using method of contour integration, prove that $\displaystyle\int_0^\infty \dfrac{dx}{x^6+1} = \dfrac{\pi}{3}$ .

5. a) Derive mean of the Binomial distribution

    b) 2% of the items of a factory are defective. The items are packed in boxes. What is the probability that there will be (i) 2defective items (ii) at least three defective items, in a box of 100 items.

6. a) A random sample of size 100 is taken from an infinite population having the mean $\mu=76$ and $\sigma=16$. what is the probability that $\bar{x}$ will be between 75 and 78

   b) A random sample of size 100 has a standard deviation of 5. What can you say about the maximum error with 95% confidence.

7. a) A sample of 64 students have a mean weight of 70 kgs. Can this be regarded as a sample from a population with mean weight 56 kgs and standard deviation 25 kgs.

   b) Samples of students were drawn from two universities and from their weights in kgs, mean and S.Ds are calculated and show below. Make a large sample test to test the significance of the difference between the means.

| | Mean | S.D | Size of sample |
|---|---|---|---|
| University A | 55 | 10 | 400 |
| University B | 57 | 15 | 100 |

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NEC

**Subject Code: R16EE2106**

## II B.Tech I Semester Supplementary Examinations, May-2018.
### ELECTRICAL MACHINES - I
### (EEE)

Time: 3 hours

Max Marks: 60

Question Paper Consists of **Part-A** and **Part-B**.
Answering the question in **Part-A** is Compulsory & Four Questions should be answered from Part-B
All questions carry equal marks of 12.

### PART-A

1.  (a)  What are the methods used to improve the commutation in DC Machines
    (b) What is significance of critical field resistance of a DC Shunt Generator?
    (c) Write the limitations of Swinburne's Test.
    (d) What are the conditions for proper parallel operations of single phase transformers?
    (e) What are the applications of auto transformers?
    (f) Write the applications of Scott connection of transformer.

[2+2+2+2+2+2]

### PART-B

4 X 12 = 48

2.  a) What is armature reaction? Describe the effects of armature reaction on the operation of DC Machines? [6M]
    b) Distinguish between self excited and separately excited DC generators. How are Self excited DC generators classified? Give their circuit diagrams. [6M]

3.  a) Distinguish between external and internal characteristics of a DC Generators. How can Internal characteristics be derived from external characteristics of (i) Separately excited generator (ii) Series Generator [6M]
    b) A shunt generator gives full load output of 30kW at a terminal voltage of 200V. The armature and shunt field resistances are 0.05Ω and 50 Ω respectively. The iron and friction losses are 1000W. Calculate (i) Generated EMF (ii) Copper Losses (iii) Efficiency [6M]

4.  a)What is the necessity of a starter  for a DC motor and Explain the working of three point starter with a neat diagram. [6M]
    b) Describe Swinburne's test with the help of a diagram to find out the efficiency of a DC machine. [6M]

5.  a)  Describe the various losses in a transformer and explain how each loss varies with the load current, supply voltage and frequency. [6M]
    b) The voltage per turn of a single phase transformer is 1.1V. When the primary winding is connected to a 220V, 50Hz AC supply, the secondary voltage is found to be 550V. Find (i) Primary and secondary turns (ii) Core area if the maximum flux density is 1.1T.[6M]

6.  a) Explain regenerative test on transformer. How can it be used for measurement of efficiency? [6M]
    b) Draw the phasor diagram and equivalent circuit of an auto transformer. [6M]

7.  a) What is an open delta system? What are the applications of this system? [6M]
    b) What is the difference between no load and on load tap changers? Describe No load tap changer with a suitable diagram. [6M]

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