



10EE65

Sixth Semester B.E. Degree Examination, August 2020  
(ELECTRICAL & ELECTRONICS ENGINEERING)

**COMPUTER AIDED ELECTRICAL DRAWING**

Time: 3 hrs

Max. Marks: 100

**Instructions:**

1. Answer Question 1 and Question 2 from Part A
2. Answer Question 3 or Question 4 from Part B
3. Use of CAD tool that satisfies the requirements of the syllabus is permitted. Suitable data may be assumed if not given.

**Part A**

1. Draw a developed winding diagram for a 4 pole, 28 slots, single layer, progressive, simplex wave winding for DC generator armature. Show the poles, sequence diagram, connection table and the other details. **30 Marks**

**OR**

Draw the developed winding diagram of an AC machine having the following details. **30 Marks**

No. of phase = 3

No. of poles = 6

No. of slots = 36 Unbifurcated winding in 2 tiers.

2. Draw single line diagram of a generating substation having the following main equipments: **20 Marks**
  - a) Alternators : Four, 10MVA, 11kV, 3phase, 50Hz, Y connected
  - b) Step-up transformers: Four, 12MVA, 11/110kV,  $\Delta / Y$ , 3 phase, 50Hz
  - c) Bus: 110kV double bus with a bus coupler
  - d) Outgoing transmission lines: Five, 110kV
  - e) Station auxiliary transformers : Two, 500kVA, 11kV/400V,  $\Delta / Y$ , 3 phase, 50Hz

Also indicate the positions of CT, PT, isolating switches, lighting arresters, circuit breakers.

## Part B

3. Draw to suitable scale, the half sectional elevation and plan of a 10KVA, 50 Hz, 1100/110V single phase, shell type transformer with following data: **50 Marks**

**Magnetic circuit:**

Central leg = 70mm x 93.5 mm  
 Outer leg = 70 mm x 46.7mm  
 Yoke = 70 mm x 57.2 mm  
 Window = 200 mm x 75 mm

**HV winding:**

Number of turns = 1000  
 Number of layers = 12  
 Dimensions of insulated conductor = 2.1 mm x 2.1 mm  
 Height of the coil = 178.5 mm  
 The coil is divided into two sections with 6.35mm duct in between, through which the HV leads are brought out.  
 Depth of each section = 15.6 mm

**LV winding:**

Number of turns = 100  
 Wound in two sections, layers/section = 2  
 Dimensions of insulated conductor = 4.67 mm x 7 mm  
 Height of the coil = 182 mm  
 Depth of each section = 9.94 mm

**Insulation:**

Between layers = 0.6 mm  
 Between core and LV winding = 2.5 mm  
 Between LV and HV = 3.81 mm  
 Between yoke and end of coils: for LV coils 4mm mica pad and 5 mm pressboard spacer blocks, for HV coils: 3.175 mm mica pad & 7.575 mm pressboard spacer blocks.

OR

4. Draw the General Assembly of a DC Machine in end view. The machine has the following data- **50 Marks**  
 Rating: 18.5 kW, 4 Pole, 220 v, 1500 rpm  
 Armature diameter = 0.18 m  
 Core length = 0.2 m  
 36 slots of dimension 8mm x 24 mm  
 Shaft diameter = 55 mm  
 Pole arc/ Pole pitch = 0.6666 Pole height = 65 mm Pole width = 60 mm  
 Yoke Thickness = 35 mm Air gap between stator and rotor = 2 mm i)The armature is directly resting on the shaft. ii)10 Nos. of ventilating holes, on a PCD of 96mm.

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