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Sixth Semester B.E. Degree Examination, July/August 2005

Electrical & Electronics Engineering  
**Electric Drawing and CAD**

Time: 3 hrs.]

[Max.Marks : 100

- Note:** 1. Answer any **FOUR** questions from Part - A on drawing sheets.  
 2. Answer any **ONE** question form Part - B in answer booklet  
 3. All questions carry equal marks.

**PART - A**

1. Draw a neat single line diagram of a 33kV/11kV substation with following equipment.
- One 33kV incoming line connected to 33 kV bus bar.
  - Two 3 winding transformers rated 2MVA and 1MVA of 33kV/11kV each terminating respectively at bus-bar 1 and bus - bar -2 of 11kV each
  - Two 11kV OCB's connected on LT side
  - Three 33 kV GOS units
  - Four 11 kV outgoing feeders from bus-bar 1 and bus-bar 2

Provide lightning arrestors, isolators, circuits breakers, CT's and PT's wherever necessary.

(20 Marks)

2. Draw a neat developed winding diagram for a DC machine along with the brushes and poles with following data:

Number of slots : 20

Number of commutator segments : 10

Number of poles : 4

Winding type : Simplex progressive lap

(20 Marks)

3. Draw a developed winding diagram for an AC motor with following data

Number of slots : 12

Number of poles : 4

Number of phases : 3

Winding type : double layer, full pitched wave winding with star connection.

(20 Marks)

4. Draw the half sectional plan of one limb of an oil immersed 3-phase transformer, showing winding on a core and also the arrangements of insulation and oil ducts, keeping the coil in position. The transformer design data is given below

Core :

Diameter of core : 60 with 3 steps

Width of largest stamping : 55

Width of intermediate stamping: 45

Width of smallest stamping : 35

Centre bolt thickness : 4

Winding :

Outer dia of HT winding : 100

HT winding thickness : 5

Outer dia of LT winding : 76

LT winding thickness : 5

Insulation:

LT insulation thickness : 3

HT insulation thickness, including oil duct : 7

(All dimensions are in cm. Use appropriate scale to draw or 1:5 scale to draw on drawing sheets)

(20 Marks)

5. Draw a top half sectional end elevation from the shaft end of a 100 kW 4 pole D.C. generator with the following data:

External diameter of armature stampings : 42cm

Internal diameter of armature stamp : 20cm

No. of slots : 39 (ear notched, open type)

Size of slot :  $4 \times 1.2\text{cm}$

Height of pole : 16cm

Width of pole l: 12cm

Interpole size :  $4.5 \times 15\text{cm}$

Air gap at main pole : 0.5cm

Air gap at interpole : 0.7cm

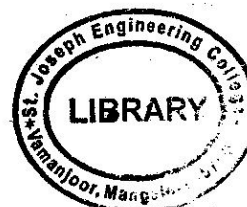
Thickness of yoke : 6.8cm

Outer dia of stamping : 85cm

Diameter of shaft : 9cm

(Missing data may be assumed. Use appropriate scale)

(20 Marks)



6. Draw the half sectional end-view of a 25kVA 400V, 1500 rpm, 50Hz, 3-phase alternator. The rotor is of salient pole type. The dimensions are given below:

Out side dia of stator stamping : 40

Inside dia of stator stamping : 29

External dia of stator frame : 49

Number of slots : 48 (open type)

Slot dimensions :  $3.2 \times 1.2$

Air gap : 0.2

Width of the pole : 7

Height of pole with shoe : 7.5

Pole Shoe height : 1.8

Diameter of shaft at centre : 7.0

Diameter of shaft at bearing : 5.5

Alternator is housed on a base plate of 48cm width

All dimensions are in cms. Appropriate scale may be used. Missing data may be assumed.

(20 Marks)

### PART - B

7. Explain the following Auto CAD commands with appropriate examples.

- Dimensioning
- Stretch
- TRIM
- Mirror
- Array

(4×5=20 Marks)

8. Draw the proportionate preparatory sketch (without instrument transformer and lightning arrester) and list out the logical commands used in Auto CAD to create a single line diagram of a generating station having the following details :

- 100 MVA, 11kV,  $3\phi$  star connected generator : 01
- One bus bar
- 100MVA, 11/220 kV  $3\phi$  star-Delta transformer : 01
- 220 kV outgoing lines : 02.

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(20 Marks)