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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Seventh Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; Dec. - 2015

Electrical Engineering Drawing

Time: 3 hrs. *Max. Marks: 100*

***Note**: Answer any **FIVE** full questions, selecting at least **TWO** full questions from each **part**.*

PART - A

1. a. Draw Single Line diagram of 33 kV substation. 10

b. Draw the typical layout of Nuclear Power Plant. 10

2. Draw the front elevation left half in section, sectional plan and end view of a transformer with the dimensions given below. Scale ½ full size. Single phase core type 15 kVA, 50 Hz distribution on type transformer.

Details of Magnetic Circuits

Cross section of core = 6 mm x 91.6 mm; Window = 298.5 mm x 114.5 mm ; Yoke height = 63.5 mm

Details of Electrical Circuits

i) LV windings : Number of coils on each leg = 1; Number of turns per coils = 72; Number of layers per coils = 3; Section of conductor = 2.79 mm x 10.6 mm 20

ii) HV Winding : Number of coils on each leg = 1; Number of turns per coil = 720; Number of layers per coil = 8; cross section of wire = 2.59 mm dia.

Details of Dielectrical Media

Air space around the core = 1.66 mm; Insulation between core and LT = 1.6 mm;

Insulation on HT = 3 mm; Insulation at the top and bottom winding and Insulation between layers = 0.35 mm

3. Draw to half scale sectional end elevation of a main pole of DC machine with following dimensions.

Width of the pole = 168 mm; Pole arc = 240 mm ; Radius of pole arc = 336 mm 20

Height of pole with shoe = 228 mm; height of pole core = 192 mm; Diameter of the rivet used = 9 mm; Axial length of pole arc = 216 mm; Thickness by yoke = 114 mm

Show the arrangement of fixing pole to yoke.

4. Draw to 1/4th scale the sectional end view (right half in section) of a 50 kW DC generator dimensions.

Thickness of Yoke = 5 cm, No. of main poles = 4, Total height of pole = 14 cm (including pole shoe), width of main pole =12 cm, Main pole winding = 7 cm x 3 cm, No. of inter pole = 4, Air gap = 0.4 cm, 20

Inter pole section = 10 cm x 4 cm, pole arc = 63% of pole pitch, external diameter of armature stamping = 38 cm, Internal diameter of armature stamping = 20 cm, size of slots = 3.5 cm x 1.5cm, No. of slots = 32, shaft diameter = 6 cm, Inter pole winding = 6 cm x 2 cm. Armature stampings are mounted on the cast Iron spider of external diameter 20 cm. Show few slots on armature.

PART - B

5. The rotor of an alternator consists of a shaft, a spider and poles. Draw the half sectional end view of the rotor assembly with the following dimensions. Scale = ½ full size.

i) Shaft = 3 cm.

ii) Spider = The angle between the centre line of the slots is 90. The spider is a square of sides = 20 cm.

Distance between the centre of the shaft and bottom of the dove tail slot = 8 cm.

Height of dove tail size of slot plate = 6 x 2 cm

Width of dove tail slot at the bottom = 5 cm

Width of the dove tail slot at the top = 2.5 cm 20

On both the sides of the dove tail slot there is a hole of diameter = 0.5 cm for fixing the retaining plate of spider.

iii) Pole core:

Height of the dovetail in the pole core = 2 cm; Height of the core above dovetail = 8 cm

Width of pole core =10 cm; Width of pole face = 5 cm

Radius of the pole arc at the top of the pole face from the centre of shaft = 20 cm.

iv) Pole winding:

Height of pole winding = 8 cm ; Width of the pole winding = 15 cm

Insulation between core winding = 0.2 cm.

6. Draw the developed diagram of a DC machine with the following data :

No. of pole = 4, No. of Slots = 26 20

The winding is a single layer lap type, fix the poles, draw the sequence diagram, fix the position of polarity of the brush.

7. Design and draw the developed winding diagram for an alternator with following details:

No. of poles = 2, No. of phase = 3, No of slots = 24, winding = single layer, lap, short pitched by one slot. 20

8. Draw the developed winding diagram of an A.C. machine having the following details.

No. of phases = 3, No. of poles = 4, No. of slots = 36. Full pitch lap winding, double layer and delta connected. 20

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