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NEW SCHEME

Sixth Semester B.E. Degree Examination, July 2006
Electrical and Electronics Engineering
Electrical Drawing and CAD

Time: 3 hrs.] [Max. Marks:100

Note: *1. Answer any FOUR questions from PART-A and any ONE question from PART-B.*
2. Assume any missing data.

PART-A

1 Draw the single line diagram of a 33 KV / 11 KV substation with following equipments:
a. One 33 KV incoming line connected to 33 KV bus bar.
b. Two 3 winding transformers of ratings 5 MVA and 3 MVA with 33 KV / 11 KV each terminating at bus bar – 1 and bus bar – 2 respectively.
c. Two 11 KV OBC's.
d. Three 33 KV SOS units.
e. Four 11 KV outgoing feeders from bus bar 1 and 2 respectively. Provide lightning arrestors, isolators, circuit breakers, CT's and PT's wherever necessary. **(20 Marks)**

2 Draw a neat developed winding diagram for a PC machine with following details: Number of slots = 13; number of poles = 4; number of commutator segments = 13; winding type – simple double layer wave. Show the position of poles and mark the position of brushes. Also draw the sequence diagram. **(20 Marks)**

3 Draw the 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 lap with star connection. **(20 Marks)**

4 Draw the following views of a 3 phase, 250 KVA, 11 KV / 400 V transformer core type.
a) Front elevation full section and b) Plan full in section.
Dimensions of various parts are given below:
Core: Cross section of the core = 3 step core.
Diameter of circumcircle = 24 cm.
Distance between adjacent centers of yoke = 42.5 cm.
Yoke: Yoke height = 25 cm.
LT Winding: Outside diameter of LT coil = 28.3 cm; Inside diameter of LT coil = 25 cm; Height of LT winding = 43.5 cm.
Number of turns per phase =12.
HT Winding: Outside diameter of HT Coil = 41.5 cm; Inside diameter of HT coil = 34.3 cm; Height of HT Winding = 43.5 cm.
Number of turns per phase =572.
Total height of transformer =100 cm. **(20 Marks)**

5 Draw the half sectional end view of a DC generator with the following dimensions:
Diameter of the shaft = 5 cm; Outside diameter of armature = 36 cm; Axial length of armature = 25 cm; Armature winding over hang on each side = 7.5 cm; Number of radial cooling ducts = 2; Diameter of commutator = 23 cm; Axial length of commutator = 11.5 cm; Number of poles = 4; Pole height = 16 cm; Pole width = 12 cm; Pole arc = 0.65; Pole pitch = 90^0; Number of inter poles = 4; Inter pole dimensions = 4cm X 15cm; Thickness of Yoke = 3.5 cm; Depth of slot = 2.5 cm.
Show few slots on the armature. **(20 Marks)**

6 Choosing a suitable scale; draw the half sectional end view and half sectional longitudinal view of a 10 Hp, 3 phase, 50 Hz, 4 pole squirrel cage induction motor having the following dimensions:
Stator: Internal diameter = 18 cm; Outside diameter = 32 cm; Gross length of stator core = 13.5 cm; Number of slots = 36; Slot width = 0.77 cm; slot depth = 3.4 cm; Air gap length = 0.1 cm; The stator has ventilating duct of 1.3 cm width.
Rotor: Number of slots = 31; Rotor bars = 0.51cm X 1.52cm; End ring area = 1.69 sq.cm; Shaft diameter = 5.1 cm; Overall height of the motor = 47.5 cm.
(20 Marks)

PART-B

7 a. Write an Auto CAD program to draw 5 rows of five 10 mm circles each. All circles are shaped 20 mm from center to center. Use Array Command. **(10 Marks)**

b. Write the Auto CAD program to draw a semicircle of radius 50 mm and complete the circle using mirror command. **(10 Marks)**

8 Draw proportionate preparatory sketch and explain step by step procedure to draw the front elevation full in section of a single phase 220 V/ 110V, 5 KVA transformer using Auto CAD. The detailed dimensions are as follows:
Core: Cross section – One step core
Diameter of circumcircle = 7.5 cm
Distance between core centers = 15 cm
Yoke: Yoke height = 8 cm
LT Winding: Outside diameter of coil = 9 cm
Inside diameter coil = 8 cm
Height of the coil = 23 cm
Number of turns / limb = 50
HT Winding: Outside diameter of the coil = 13.5 cm
Inside diameter of the coil = 11.1 cm
Height of the coil = 23 cm
Number of turns / limb = 100
Total height of transformer = 40 cm. **(20 Marks)**

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