25.5.17 (13)

Q.P. Code : 794801

B.E. Electrical VII CBSGS

(3 Hours)   [Total Marks : 80

N.B. : (1) **Question no.1** is compulsory.
      (2) Solve any three out of remaining.
      (3) Assume the suitable data in required and mention the same.

1. **Answer the following :-**   20
  a. What is the significance of Carters Coefficient?
  b. What are the design modifications in stator of energy efficient more as compared to standard motor.
  c. Why the various mechanical forces are developed in the winding of transformer.
  d. Discuss the significance of various "Electrical Properties" of transformer oil.

2. a. Discuss the various factors affecting the choice of flux density and current 10
      density in transformer design.

2. b. Calculate the overall dimensions of a 200 KVA, 6600/440V, 50 Hz, 3 phase 10
      core type transformer with data, emf per turn = 10V, maximum flux density= 1.3 Wb/m^2, current density = 2.5 A/mm^2, window space factor = 0.3, overall height = overall width, stacking factor = 0.9. Use three step core.

3. a. A 15000 KVA; 50 HZ; 33/6.6 KV; 3 phase star delta; core type of transformer 10
      has following data net iron area of each limb = 1.5* 10^{-3} m^2; neat area of yoke = 1.8* 10-3 m^2; mean length of flux path in each limb = 2.3m; mean length of flux path in each yoke =1.6m; no of turns in HV = 450. calculate the no load current. Use the data provided. Dencity of iron=7.8×10^{3}Kg/m^3.

BmWb/m2	0.9	1.0	1.2	1.3	1.4
MmfNm	130	210	420	660	1300
Iron Loss W/Kg	0.8	1.3	1.9	2.4	2.9

3. b. Derive the output equation for a three phase transformer and specify the 10
      various terms used.

4. a. What are the different circuits and parts of electrical machines. Discuss the 10
      various limitations on the design of these circuits.

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4. b. Discuss the designing of end rings in three phase squirrel cage induction 10 machine. How it affects the slip of machine.

5. a. What is frame and frame size in case of induction motor. Draw a figure 10 showing structural dimensions of standard frame.

5. b. Discuss the No Load Current calculation procedure in three phase induction 10 motor design.

6. a. Derive the output equation for a three phase induction motor and specify the 10 various terms used.

6. b. Determine the main dimensions, turns per phase, no of slots, conductor 10 cross section, and area of a slot, for a 250 HP, 400V, 3 phase, 4 pole, 50Hz, 1410rpm, delta connected squirrel cage induction motor with the data, average flux density in air gap = 0.5 Wb/m², ampere conductor per meter=30,000A/m, efficiency = 0.9, power factor = 0.9, winding factor = 0.955, current density = 3.5A/mm², slot space factor = 0.4, ratio of length of core to pole pitch = 1.2, assume 5 slots per pole per phase.