S.E. (sem IV) choice based Electrical Engg. 23/5/2018
Electrical machines-II

Q.P.Code: 50056 4/2

(3 Hours) [Total Marks:80]

Q.1 is compulsory.

Solve ANY THREE questions out of remaining.

ASSUME SUITABLE DATA wherever necessary.

Q.1 Answer **ANY FOUR.** (20Marks)

a) Mention types of winding used in transformer and explain any one in detail.

b) Define:**i)** Rated Burden **ii)** Accuracy Class in relation with current transformer (CT).

c) List out the conditions to be satisfied for successful parallel operation of three phase transformers.

d) Explain any one connection of phasor group number 4 in case of three phase transformer.

e) Write down the desirable properties of magnetic materials used in electric machine design.

Q.2 (20Marks)

a) Derive an expression for saving in copper in case of auto-transformer as compared to conventional transformer.

b) Explain 'Sumpner Test'in detail with diagram.

Q.3 (20Marks)

a) Write a short note on 'Scott Connection'.

b) Two 3 phase transformers having same turns ratio are connected in parallel to supply a load of 800 kW at 0.8 power factor lagging. Transformer 'A' is rated at 400 KVA with per unit resistance of 0.02 and per unit reactance of 0.04, transformer 'B' is rated at 600 KVA with per unit resistance of 0.01 and per unit reactance of 0.05. Determine power output and power factor of each transformer.

Q.4 (20Marks)

a) Explain the assumptions made in leakage reactance calculation of three phase core type transformer.

b) Write a short note on 'mechanical forces' in transformer.

Q.5 (20Marks)

a) A single phase, 50 KVA, 2400/120 V transformer gave following results:

Open Circuit test	120 V	9.65 A	396 W on LV side
Short Circuit test	92 V	20.8 A	810 W on HV side

Determine the equivalent circuit parameters, and voltage regulation at full load, 0.8 power factor lagging.

b) Write a short note on 'Oscillating neutral'.

TURN OVER

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Q.6

(20Marks)

a) Derive output equation for a 3 phase transformer. Also mention meaning of terms used in it.

b) Calculate approximate overall dimensions for a 200 KVA, 6600/440 V, 50 Hz, 3 phase core type transformer.
Assume following data: EMF per turn 10 V, 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, $a = 0.9\ d$ and $A_i = 0.6d^2$, where d is diameter of circumscribing circle.