

CBCS Scheme

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15EE33

Third Semester B.E. Degree Examination, June/July 2018 Transformers and Generators

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Assume Missing data if any.

Module-1

- 1 a. Draw and explain the full load phasor diagrams of single phase transformer for lagging and leading process factor loads. (06 Marks)
- b. Find the All day efficiency of single phase transformer having maximum efficiency of 98% at 15 KVA at UPF and loaded as follows :
12 hours -- 2KW at 0.5 power factor lagging
6 hours -- 2KW at 0.8 power factor lagging
6 hours -- no load. (06 Marks)
- c. Draw the approximate Equivalent circuit of a transformer referred to primary side. (04 Marks)

OR

- 2 a. State the advantages of single three phase transformers over bank of single phase transformer. (05 Marks)
- b. Explain with the help of connection and phasor diagrams, how scott connections are used to obtain two base supply from three phase supply mains. (06 Marks)
- c. The following results were obtained on a 50 KVA, 2400/120V, transformer
O.C test : 396W, 9.65A, 120V
S.C test : 810W, 20.8A, 92V
Determine : i) The circuit constants
ii) The efficiency at full load, 0.8 p.f. lagging
iii) The approximate vtg regulation. (05 Marks)

Module-2

- 3 a. Discuss the necessary conditions for the parallel operation of 2 transformers. (05 Marks)
- b. Drive an expression for the currents shared by between 2 transformers connected in parallel supplying a common load when no load voltages of these transformers are un equal. (06 Marks)
- c. How stabilization is achieved due to tertiary winding. (05 Marks)

OR

- 4 a. With the help of neat sketches, explain the working of ON load tap changer and OFF load tap changer. (10 Marks)
- b. Define auto transformer? Derive an expression for the saving of copper in an Auto transformer. (06 Marks)

Module-3

- 5 a. Discuss the causes of noise in transformers? How to reduce the noise in transformers. (05 Marks)
- b. Explain current Inrush phenomenon in transformers. (05 Marks)
- c. With a circuit diagram, explain in detail Sumpner's test for determining the efficiency and voltage regulation of transformer. (06 Marks)

OR

- 6 a. With a neat circuit diagram, explain armature reaction in DC machines. (06 Marks)
 b. Draw and explain the characteristics of DC shunt generator. (05 Marks)
 c. Derive EMF Equation of synchronous generator. (05 Marks)

Module-4

- 7 a. With phasor diagram, explain the concept of two reaction theory in a salient pole synchronous machine. (08 Marks)
 b. Define voltage regulation of an alternators. (03 Marks)
 c. What is synchronization of alternators? Need for parallel operation of alternators. (05 Marks)

OR

- 8 a. With a neat circuit diagram explain the slip test on salient pole synchronous machine to determine X_d and X_q from slip test. (08 Marks)
 b. Write a note on V-curves of synchronous generator. (04 Marks)
 c. Define electrical load diagram of a synchronous generator. (04 Marks)

Module-5

- 9 a. What are the various methods of determining the voltage regulation for 3 ϕ alternator and explain any one method in detail. (08 Marks)
 b. The open and short circuit test reading for a 3 ϕ - star connected 1000 KVA, 200V, 50Hz synchronous generator are,

Field amps	10	20	25	30	40	50
OC terminal vtg	800	1500	1760	2000	2350	2600
SC armature current in amp	-	200	250	300	-	-

The armature effective resistance is 0.2ohm per phase. Draw the characteristic curves and estimate the full load percentage regulation i) 0.8 p.f lagging ii) 0.8 p.f leading. (08 Marks)

OR

- 10 a. Write a short note on capability curves of synchronous generator. (06 Marks)
 b. Discuss about hunting in synchronous machines. Also explain the role of damper winding. (06 Marks)
 c. Discuss about short circuit ratio and its significance. (04 Marks)
