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C16-EE-401

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BOARD DIPLOMA EXAMINATION, (C-16)  
AUGUST/SEPTEMBER—2021  
DEEE - FOURTH SEMESTER EXAMINATION  
AC MACHINES - I

Time : 3 hours ]

[ Total Marks : 80

PART—A

3×10=30

- Instructions : (1) Answer all questions.  
(2) Each question carries three marks.  
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Distinguish between shell type and core type transformers.
2. Draw the approximate equivalent circuit of a transformer.
3. State the losses taking place in a transformer and their variation w.r.t. load.
4. State the reasons for parallel operation of transformers.
5. Draw the schematic diagram of 3-phase delta-star transformer.
6. State the applications of auto transformer.
7. State the effect of chording factor.
8. State the reasons for voltage variations on load in an alternator.
9. List the different methods finding voltage regulation of an alternator.
10. Draw the diagram of synchronizing of alternators by lamp method.

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PART—B

10×5=50

Instructions : (1) Answer *any* five questions.

(2) Each question carries ten marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

11. A transformer has a primary winding of 800 turns and a secondary winding of 200 turns. When the load current on the secondary is 80 A at 0.8 power factor lagging, the primary current is 25 A at 0.707 power factor lagging. Determine the no load current of the transformer and its phase with respect to the voltage.

12. Obtain the equivalent circuit of a 10 kVA, 450/120 V, 50 Hz, 1-phase transformer referred to L.V. side from the following test data :

O.C. test (L.V. side) : 120 V, 4.2 A, 80 W

S.C. test (H.V. side) : 9.65 V, 22.2 A, 120 W

13. A 600 kVA, 1-phase transformer has an efficiency of 92% both at full load and half load at unity p. f. Determine its efficiency at 60% of full load at 0.8 p. f. lagging.

14. (a) Define all-day efficiency.

(b) A 100 kVA transformer has a full-load loss of 3 kW, the losses being equally divided between iron and copper. During a day, the transformer operates on full-load for 6 hrs, half-load for 8 hrs and no load for the remaining of the day. Calculate the all-day efficiency.

15. Explain the procedure of tap changing in On-load tap changer.

16. (a) Derive the emf equation of an alternator.

(b) Derive the expression for distribution factor.

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17. A 3-phase star connected alternator is rated at 1600 kVA, 13,500 V. The armature effective resistance and synchronous reactance per phase are 1.5 ohms and 30 ohms respectively. Calculate the percentage voltage regulation for a load of 1280 kW, at a p. f. of (a) 0.8 leading and (b) 0.8 lagging.
18. Explain the effect of change in excitation of an alternator on infinite busbars.

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