



C09-EE-402

3474

BOARD DIPLOMA EXAMINATION, (C-09)  
MARCH/APRIL—2014  
DEEE—FOURTH SEMESTER EXAMINATION

AC MACHINES—I

Time : 3 hours ]

[ Total Marks : 80

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**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. Draw the phasor diagram of a single-phase transformer when it is supplying inductive load.

2. Define all-day efficiency.

3. Briefly explain the need to install two or more transformers in parallel than one large unit.

4. State any three advantages of three-phase transformer over bank of three single-phase transformers.

5. Mention any three applications of instrument transformers.

6. Briefly explain the principle of an auto-transformer.

- \* 7. Briefly explain the need for an exciter in an alternator.
- 8. Define distribution factor of a synchronous generator.
- 9. Define the term 'synchronous reactance'.
- 10. State the conditions for synchronization of an alternator.

**PART—B**

10×5=50

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

(2) Each question carries **ten** marks.

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

- 11. (a) Describe various losses in a transformer and explain how each loss varies with load current. 5
- (b) In a transformer, the core loss is found to be 52 W at 40 Hz and 90 W at 60 Hz, both losses being measured at the same flux density. Compute the hysteresis loss and eddy-current loss at 50 Hz. 5
- 12. A 33000/240 V single-phase transformer is supplied at 240 V on no-load on low voltage side. It takes no-load current of 2 A and the power of 60 W. The resistance of the low-voltage winding is 0.8 Ω. Find the—
  - (a) power factor on no-load;
  - (b) active current;
  - (c) magnetizing current;
  - (d) copper loss in the LV winding;
  - (e) core loss.

- \* **13.** Draw the equivalent circuit diagram for a 4 kVA, 200/400 V and 50 Hz single-phase transformer from the test results as follows :

OC Test : 200 V, 0.8 A, 80 W on LV side

SC Test : 20 V, 10 A, 100 W on HV side

Also find the secondary terminal voltage when delivering 10 A at 0.8 power factor lag.

- 14.** (a) Explain the principle of transformer action. 5  
(b) Describe with a neat sketch the construction of core transformer. 5
- 15.** (a) State the methods of cooling of power transformer. 5  
(b) Draw a neat sketch of Buchholz relay and label its parts. 5
- 16.** Explain with a neat sketch the construction details of a salient pole synchronous machine.
- 17.** Explain with neat diagrams the procedure to conduct open-circuit test and short-circuit test on 3 alternator.
- 18.** Explain the procedure of synchronization of alternator by using synchroscope.

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