



C14-EE-402

4462

BOARD DIPLOMA EXAMINATION, (C-14)  
OCT / NOV-2017  
DEEE-FOURTH SEMESTER EXAMINATION  
AC MACHINES - I

Time : 3 Hours ]

[ Total Marks : 80

**PART - A**

3 x 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. Classify transformers based on number of phases and construction.
2. Why O.C. test is always conducted on L.V. side of a transformer?
3. Draw the vector diagram of a transformer.
4. Define regulation of a transformer working with lagging P.F.
5. Draw the connection diagram of Star – Star connection of a three phase transformer.
6. Write the condition for Parallel operation of a three phase transformer.
7. Write any three advantages of stationary armature over rotating armature.
8. What are the factors that cause a change in alternator terminal voltage when it is loaded?
9. Explain the working principle of an alternator.
10. Define Synchronization of an alternator.

**PART - B**

10 x 5 = 50

**Instructions :** (1) Answer any **five** questions.  
(2) Each question carries **ten** marks.  
(3) Answers should be comprehensive and the criteria for valuation is the content but not the length of the answer.

11. A 220/440 V, 10 KVA, 50 Hz single phase transformer has at full-load, a

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- \* copper loss of 120 W. If it has an efficiency of 98% at full load and unity power factor. Determine
- i) The iron losses.
  - ii) What would be the efficiency at  $\frac{3}{4}$  full load, and 0.8 power factor lagging.
12. Derive the  $S_A/S_B = Z_B/Z_A$  of the load sharing between two single phase transformers.
13. State and briefly explain cooling method for oil immered type transformer.
14. Draw the phasor diagram of an alternator for
- i) A purely restive load
  - ii) A lagging power factor load
  - iii) A leading power factor load
15. In a 50 KVA, star connected, 440 V, three phase 50 Hz alternator effective armature resistance is 0.25 ohm per phase. The synchronous reactance is 3.2 ohm per phase and leakage reactance is 0.5 ohm per phase. At rated load and UPF determine the following.
- i) Internal EMF.
  - ii) No load EMF.
  - iii) % regulation on full load.
  - iv) reactance which replaces armature reaction.
16. Explain the procedure of Synchronization of alternators using **Dark lamp** and **Bright lamp** method.
17. A 50 KVA, 2000/200 V, 50 Hz single phase transformer has an impedance drop of 5% and resistance drop of 3%. Find the following,
- i) Regulation at full load 0.8 power factor lagging.
  - ii) Power factor at which regulation is zero.
  - iii) Power factor at which regulation is maximum.
- \* 18. Explain the working of a single phase transformer on load with neat sketches.

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