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C16-EE-402

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**BOARD DIPLOMA EXAMINATION, (C-16)  
OCTOBER/NOVEMBER-2018  
DEEE - FOURTH SEMESTER EXAMINATION**

**A.C. MACHINES - I**

*Time* : 3 Hours ]

[ Total Marks: 80

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**PART-A**

3X10=30

**Instructions** :

1. Answer **All** questions.
2. Each question carries **Three** marks.
3. Answer should be brief and straight to the point and shall not exceed five simple sentences.

1. Differentiate between core type and shell type transformer.
2. What are the various losses in a Transformer?
3. Draw the vector diagram of transformer on load for lagging p.f.
4. Define All-day efficiency and commercial efficiency.
5. Write down the voltage and current relation for Star-Delta Transformer connection.
6. What are the applications of Auto-Transformer?
7. Compare salient and Non-salient type rotor of alternators.
8. Define pitch factor and distribution factor.
9. Draw the vector diagram of a loaded alternator for leading load.
10. What are the conditions for synchronization of alternators?

## PART-B

10X5=50

- Instructions* :
1. Answer any **Five** questions.
  2. Each question carries **ten** marks.
  3. Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer

11. (a) Derive the e.m.f. equation of a single phase transformer  
(b) Derive the condition for maximum efficiency of a single phase transformer.
12. A 5 KVA, 220/110 V transformer has the efficiency of 96.97% at 0.8 p.f. lagging. Its core loss is 50 W and full load regulation at 0.8 p.f. lag is 5%. Find the efficiency and regulation at  $\frac{3}{4}$  full load 0.9 p.f. lagging.
13. A 20 KVA, 250/2500 V, 50 Hz single-phase transformer gave the following test results:  
O.C. test (L V side): 250 V, 1.4 A, 105 W  
S.C. test (H V side): 104V, 8 A, 320 W  
Compute and draw the approximate equivalent circuit parameters referred to HV side. Also find the secondary terminal voltage when delivering 40 A at 0.8 p.f.
14. Two single phase transformers of equal voltage ratio are running in parallel and supply a load of 1000 A at 0.8 p.f. lag. The total impedances of the two transformers in terms of secondary are  $2+j3$  and  $2.5+j5$  ohms respectively. Calculate the current supplied by the each transformer.
15. Explain the procedure for tap-changing of a transformer for on-load and no-load.
16. Define armature reaction and explain the effect of armature reaction for various loads in alternator.
17. A 3-phase 50Hz, star connected 2000 kVA, 2300 V alternator gives as short circuit current of 600A for a certain fixed excitation. With the same excitation, the open circuit voltage was 900 V. The resistance between pair of terminals is 0.12  $\Omega$ . Find the full load regulation at UPF and 0.8 p.f. lagging.
18. Explain synchronization of alternator by using 2-bright 1-dark lamp method

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