

**4462****BOARD DIPLOMA EXAMINATION, (C-14)****JUNE-2019****DEEE - FOURTH SEMESTER EXAMINATION****A.C. MACHINES – I**

Time: 3 Hours

Max. Marks : 80

**PART-A****10x3=30M**

- Instructions:** 1) Answer **all** questions. Each question carries **three** marks.  
2) Answer should be brief and straight to the point and shall not exceed five simple sentences.
- 1) Briefly explain the working principle of transformer.
  - 2) Draw a phasor diagram of a transformer on no load.
  - 3) List various losses in a single phase transformer.
  - 4) Write the conditions for parallel operation of single phase transformers.
  - 5) Draw the connection diagram for star- star configuration of three phase transformer.
  - 6) Write any three advantages of auto transformers.
  - 7) Compare salient pole type rotor with cylindrical rotor in any three aspects.
  - 8) Define the term synchronous reactance.
  - 9) Determine the distribution factor for a 36 slots, 4 pole single layer 3 phase winding.
  - 10) State the condition for synchronisation of an alternator.

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**PART-B**

**10x5=50M**

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

- 11) (a) Why transformer should not be connected on DC supply (3M)  
(b) A 33KVA, 2200V/220V, 50HZ single phase transformer has the following parameters:  
Primary Resistance and Reactance are  $2.4\Omega$  and  $6\Omega$  respectively  
Secondary Resistance and Reactance are  $0.03\Omega$  and  $0.07\Omega$  respectively.  
Find the equivalent resistance and leakage reactance referred to primary and secondary. (7M)
- 12) Explain open circuit test on a single phase transformer with a neat sketch and what are the parameters can be found from this test.
- 13) (a) Derive the condition for maximum efficiency of Transformer.(4m)  
(b) In a 50KVA transformer the iron loss is 2.5kW and full load copper loss is 7.5kW. Determine the maximum efficiency and the KVA load at which it occur when pf is 0.8 lag (6m)
- 14) Two single phase transformers with an equal voltage ratio are running in parallel and supplying a load of 100kW at 0.8pf lag. The equivalent impedances of the transformers referred to secondary are  $(0.5+j3)\Omega$  and  $(0.6+j10)\Omega$ . Find the load shared by each transformer.
- 15) (a) Write any six cooling methods of a transformer. (3M)  
(b) Explain off-load tap changing of transformer with a neat sketch.(7M)
- 16) (a) Derive emf equation of an alternator (6M)  
(b) Why the terminal voltage of an alternator varies when it is loaded. (4M)

17) A 200kVA, 415V, 50Hz three phase alternator has the effective armature resistance of  $0.01 \Omega$  and an armature leakage reactance of  $0.05\Omega$  . Claculate the voltage induced in the armature winding when it is delivering at rated current at a load power factor of

- a) 0.8 lag                      (b) 0.8 lead.

18) Explain the procedure of synchronisation of three phase alternators using three dark lamp method with connection diagram.

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