



C20-EE-402

7445

BOARD DIPLOMA EXAMINATION, (C-20)

JUNE/JULY—2022

DEEE – FOURTH SEMESTER EXAMINATION

ELECTRICAL MACHINES-II (T &A)

Time : 3 hours ]

[ Total Marks : 80

**PART—A**

3×10=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. Classify transformers based on function.
2. Distinguish between core type and shell type transformers in any three aspects.
3. Draw a neat vector diagram of transformer working on no-load.
4. State any three advantages of three-phase transformer over single phase transformer.
5. State the conditions for parallel-operation of three-phase transformers.
6. State the advantages of stationary armature over rotating armature.
7. Define pitch factor and distribution factor of an alternator.
8. Define voltage regulation of an alternator.
9. Define synchronisation in alternators.
10. State the necessity for parallel operations of alternators.

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## PART—B

8×5=40

- Instructions :** (1) Answer either (a) **or** (b) from *each* questions from part-B.  
(2) Each question carries **eight** marks.  
(3) Answers 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.

(OR)

(b) Explain the working of a single-phase transformer with a neat sketch.

12. (a) A 230/460 V, 1- $\phi$  transformer has a primary resistance of  $0.2\Omega$  and reactance of  $0.5\Omega$ . The corresponding values for the secondary are  $0.75\Omega$  and  $1.8\Omega$  respectively. Find the secondary terminal voltage when supplying 10A at 0.8 p.f lag.

(OR)

(b) A 5 KVA, 1- $\phi$  transformer has a core loss of 40 W and full-load copper loss of 100 W. The daily variation of load of transformer is as follows.

7 AM to 1 PM - 3kW at p.f 0.6 lag

1 PM to 6 PM - 2kW at p.f 0.8 lag

6 PM to 1 AM - 6kW at p.f 0.9 lag

1 AM to 7 AM - No-load

Determine the all-day efficiency of the transformer.

13. (a) Explain (i) Oil natural air forced cooling and (ii) Oil forced air forced cooling of power transformers.

(OR)

(b) Explain the procedure of on-load tap changer with a neat diagram.

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14. (a) Explain the armature reaction of alternator at different power factors.

( OR )

- (b) A 3- $\phi$  16 pole alternator has a star connected winding with 144 slots and 10 conductors per slot. The flux per pole is 30 mWb sinusoidally distributed. Find the phase and line voltages if the speed is 375 r.p.m.

15. (a) Explain the procedure of synchronization of alternators using two Bright and one dark lamp method.

( OR )

- (b) Explain the effect of change in excitation of alternator on infinite Busbars.

**PART—C**

10 $\times$ 1=10

- Instructions :** (1) Answer the following question.  
(2) The question carries **ten** marks.  
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. Is it possible to operate the transformer with a DC supply? If yes elaborate and if not explain.

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