



C16-EE-401

6440

BOARD DIPLOMA EXAMINATION, (C-16)
OCTOBER/NOVEMBER—2023
DEEE - FOURTH SEMESTER EXAMINATION

AC MACHINES—I

Time : 3 Hours]

[Total Marks : 80

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. Classify the transformers based on (a) number of phases and (b) construction. 3
2. Define efficiency of a transformer. 3
3. Draw the vector diagram for 1- ϕ transformer on load at leading p.f. $1\frac{1}{2}+1\frac{1}{2}$
4. State the reasons for expressing transformer rating in KVA. 3
5. What are the advantages of auto transformer? 3
6. Write any three applications of autotransformer. 3
7. Define (a) chording factor and (b) distribution factor of an alternator. 3
8. Define regulation of an alternator. 3
9. Compare the salient pole type and non-salient pole type alternators in any three aspects. 3
10. State the necessity for parallel operation of alternators. 3

/6440

1

[Contd...

PART—B

10×5=50

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

- 11.** Explain the open circuit test and short circuit test on a single-phase transformer with neat diagrams. 5+5
- 12.** A 50 KVA, 2000/200 V, 50 Hz single-phase transformer has impedance drop of 5% and resistance drop of 3%. Find (a) regulation at full load 0.8 p.f. lagging, (b) p.f. at which regulation is zero and (c) p.f. at which regulation is maximum. 10
- 13.** A 100 KVA transformer has iron loss of 1000 W and full load copper loss of 1500 W. If the power factor of the load is 0.8 lagging, calculate (a) full-load efficiency, (b) the load KVA corresponding to maximum efficiency and (c) the maximum efficiency. 10
- 14.** (a) Distinguish between distribution transformer and power transformer in any five aspects. 5
- (b) A 400/230 V, 50 Hz, single-phase transformer has 250 turns on the low voltage side. If the maximum flux density in the core is 1.4 Wb/m^2 . Calculate (i) the cross-sectional area of the core, (ii) the primary number of turns and (iii) transformation ratio. 5
- 15.** Explain the function of each part of a power transformer. 10
- 16.** (a) Derive the EMF equation of an alternator taking into account distribution factor and pitch factor. 5
- (b) A 3- Φ , 4-pole, 24 slot alternator has its armature coils short pitched by one slot. Find (i) pitch factor and (ii) distribution factor. 5

- 17.** A 200 KVA, 415 V, 50 Hz, 3- Φ alternator has effective armature resistance of 0.01Ω and an armature leakage reactance of 0.05Ω . Compute the voltage induced in the armature winding when the alternator is delivering rated current at a load p.f. of (a) 0.8 lag and (b) 0.8 lead. 10
- 18.** Explain the procedure of synchronization of alternators by using lamp method. 10

★ ★ ★