



C20-EE-402

7445

BOARD DIPLOMA EXAMINATION, (C-20)

OCTOBER/NOVEMBER—2023

DEEE – FOURTH SEMESTER EXAMINATION

**ELECTRICAL MACHINES—II
(TRANSFORMERS AND ALTERNATORS)**

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 construction.
2. Define transformation ratio.
3. Define all-day efficiency.
4. State the applications of delta-star connected three-phase transformer.
5. Write the advantages of auto transformer.
6. State the expression for distribution factor.
7. What is the need of exciter in an alternator?
8. List different methods of finding voltage regulation of alternator.
9. State the conditions for synchronization of alternators.
10. What is the effect of change in excitation in an alternator connected to infinite bus?

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

11. (a) List various losses occurring in transformer and explain them.

(OR)

(b) The EMF per turn of 220/550 V, 50 Hz, 1- Φ transformer is 1.1 V. Find

(i) The number of turns in primary and secondary windings.

(ii) The net cross-sectional area of the core for a maximum flux density of 1.1 tesla.

12. (a) Explain the procedure to conduct OC and SC tests on 1- Φ transformer.

(OR)

(b) A 2200/200 V, 1- Φ transformer takes 1 A on the HV side under no load and at 0.385 lag p.f. If load of 50 A at a p.f. of 0.8 lagging is taken from the secondary of the transformer, calculate the primary current and its power factor.

13. (a) Explain the off-load tap changing of power transformer with a neat sketch.

(OR)

(b) Explain the functions of (i) Buchholz relay, (ii) oil level indicator, (iii) transformer tank and (iv) explosion vent in a power transformer.

14. (a) Derive the e.m.f equation of alternator.

(OR)

(b) A 3-phase, 10 pole alternator has 90 slots, each containing 12 conductors. If the speed is 600 RPM and the flux per pole is 0.1 wb. Calculate the line e.m.f when the alternator is star connected. Assume the pitch factor as 0.96 and the flux is sinusoidally distributed. (Assume any missing data)

15. (a) A lighting load of 600 kW and a motor load of 707 kW at 0.707 p.f. are supplied by two alternators running parallel. One of the machine supplies 900 kW at 0.9 p.f. lagging. Find the load and p.f. of the other machine.

(OR)

- (b) Explain the procedure of synchronizing of 3- Φ alternators by using three bright lamp method.

PART—C

10×1=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. Draw the approximate equivalent circuit of a transformer referred to primary and explain it.

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