* 6440 *

C16–EE–401

6440

BOARD DIPLOMA EXAMINATION, (C–16)

SEPTEMBER/OCTOBER - 2020

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 transformers.

2. State the effects of leakage reactance of windings in a transformer.

3. State the reason for specifying the transformer power rating in kVA.

4. Define all-day efficiency.

5. State the conditions for parallel operation of three-phase transformers.

6. State the necessity of cooling of power transformer.

7. State the advantages of stationary armature in alternators.

8. State the reasons for voltage variation in alternators on load.

9. Define voltage regulation of an alternator.

10. State the conditions for synchronization of alternators.

PART—B 10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. Derive EMF equation of a single-phase transformer.

12. A 2200 V/440 V, 100 kVA single-phase transformer has the high-voltage side and low-voltage side resistances as 0·3 ohm and 0·01 ohm respectively and the corresponding leakage reactances are 1·1 ohm and 0·035 ohm respectively. Calculate the voltage regulation for full-load having a power factor of 0·8 leading.

13. A 200 V/400 V, 4 kVA single-phase transformer supplying a full-load with 0·8 power factor lagging has the following test results :

Open circuit test on low-voltage side : 200 V; 0·8 A; 70 W

Short circuit test on high-voltage side : 20 V; 10·0 A; 60 W

Find secondary voltage and efficiency on the above load and kVA corresponding to maximum efficiency.

14. The resistive load on a 150 kVA single-phase transformer increases from zero to 100 kVA from 7 a.m. to 10 a.m., stays there up to 6 p.m. and disconnected till 7 a.m. of next day. If the full-load copper loss is equal to core loss which is 1 kW, calculate ordinary efficiency and all-day efficiency.

15. Explain the function of each part of a power transformer with a legible sketch.

16. Explain the armature reaction of an alternator at different power factors.

17. A 1600 kVA, 13500 V three-phase star-connected alternator has an armature resistance of 1·5 ohm and synchronous reactance of 30 ohm. Calculate the voltage regulation for a load of 1280 kW with a power factor of 0·8 leading.

18. A resistive load of 500 kW, an inductive load of 1000 kW with a power factor of 0·9, an inductive load of 800 kW with a power factor of 0·8 and a capacitive load of 500 kW with a power factor of 0·9 are supplied by two alternators running in parallel. If one of the alternators is supplying 1500 kW at 0·95 power factor lagging, calculate the power factor and active power supplied by the other alternator.

★★★