C16–EE–401

6440

BOARD DIPLOMA EXAMINATION, (C–16)

OCTOBER—2020

DEEE—FOURTH SEMESTER EXAMINATION

A.C. MACHINES—I (G & P)

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 function.

2. Draw the vector diagram for a transformer on load working on lagging power factor.

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

4. Mention the conditions for parallel operation of transformers.

5. State the applications of star-delta transformers.

6. List the special transformers.

7. Define distribution factor and state the equation for it.

8. State the advantages of stationary armature.

9. Define the term regulation of a alternator and state the equation.

10. State the reasons for parallel operation 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 criteria for valuation are the content but not the length of the answer.

11. *(a)* Derive the E.M.F. equation of a transformer.

(b) The no-load current of a transformer is 5·0 A at 0·3 power factor when supplied at 230 V, 50 Hz. The number of turns on the primary winding is 200. Calculate *(i)* the maxumum value of flux in the core, *(ii)* the core loss and *(iii)* the magnetizing current.

12. Obtain the equivalent circuit of a 200/400 V, 50 Hz, 1-phase transformer from the following test data referred to primary :

O.C. test (L.V. side) : 200 V, 0·7 A, 70 W
S.C. test (H.V. side) : 15 V, 10 A, 85 W

Calculate the secondary voltage when delivering 5 kW at 0·8 p.f. lagging, the primary voltage being 200 V.

13. An 11,000/230 V, 150 kVA, 50 Hz, 1-phase transformer has a core loss of 1·4 kW and full-load copper loss of 1·6 kW. Determine the efficients at *(i)* full-load, unity p.f., *(ii)* half-load at 0·8 p.f. lagging and *(iii)* the kVA load for maximum efficiency.

14. *(a)* Derive the expression for voltage regulation of a transformer.

(b) Explain the losses occurring in a transformer.

15. Explain any two methods of cooling of a power transformer.

16. Describe the constructional details of an alternator with legible sketch.

17. A 100 kVA, 300 V, star-connected alternator has effective armature resistance of 0·2 ohm. The field current of 40 A produces short circuit current of 200 A and an open circuit voltage of 1040 V (line value). Calculate the full-load voltage regulation at *(i)* 0·8 p.f. lagging, *(ii)* 0·8 p.f. leading.

18. Explain the procedure of synchronization by suing synchroscope with neat diagram.

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