5655

BOARD DIPLOMA EXAMINATION, (C–16)
MARCH/APRIL—2018
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. Explain why the transformer should not be connected to DC supply.

2. Distinguish between core-type and shell-type transformers.

3. Draw the vector diagram of single-phase transformer on no-load.

4. Define all-day efficiency and commercial efficiency of a single-phase transformer.

5. State any three advantages of three-phase transformer over a bank of three single-phase transformers.

6. State the methods of cooling a transformer.

7. Briefly explain the working principle of alternator.

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8. What are the advantages of stationary armature over rotating-type armature?

9. Define *(a)* synchronous reactance and *(b)* synchronous impedance of an alternator.

10. State the conditions for parallel operation of alternator.

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PART—B
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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. With neat sketch, explain the construction and working of a single-phase transformer.

12. A 220/440 V, single-phase transformer has the following particulars :

R_1 0 5 , X_1 1 8 , R_2 0 5 and X_2 3

Calculate the total impedance of the transformer referred to primary and secondary.

13. A 10 kVA, 2500/250 V, 50 Hz, 1- transformer gave the following test results :

OC test : 250 V, 0·8 A and 50 W

SC test : 60 V, 3 A and 45 W

(a) Calculate the efficiency at $\frac{1}{4}, \frac{1}{2}$ of the full load at 0·8 p.f. lag.

(b) Calculate the load in kVA at the maximum efficiency.

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14. *(a)* Distinguish between distribution transformer and power transformer.

    (b) Derive the condition for maximum efficiency.

15. Draw the connection diagrams of *(a)* star-star, *(b)* delta-delta, *(c)* star-delta and (d) delta-star configurations of 3- transformers.

16. *(a)* Derive the e.m.f. equation of an alternator.

    (b) Obtain the relation between no-load EMF and terminal voltage in alternator.

17. A 200 kVA, 415 V, 50 Hz, 3- alternator has effective armature resistance of 0·01 and an armature leakage reactance of 0·05 . Compute the voltage induced in the armature winding when the alternator is delivering rated current at a load power factor of *(a)* 0·8 lag and *(b)* 0·8 lead.

18. Explain the procedure of synchronisation by using lamp method.

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