C16–EE–**401**

6440

BOARD DIPLOMA EXAMINATION, (C–16)
OCT/NOV—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. Define transformer.

2. Derive the EMF equation of a single-phase transformer.

3. Why the iron losses are neglected in a short circuit test of a single-phase transformer.

4. State the conditions for parallel operation of single-phase transformers.

5. State the advantages of auto transformers.

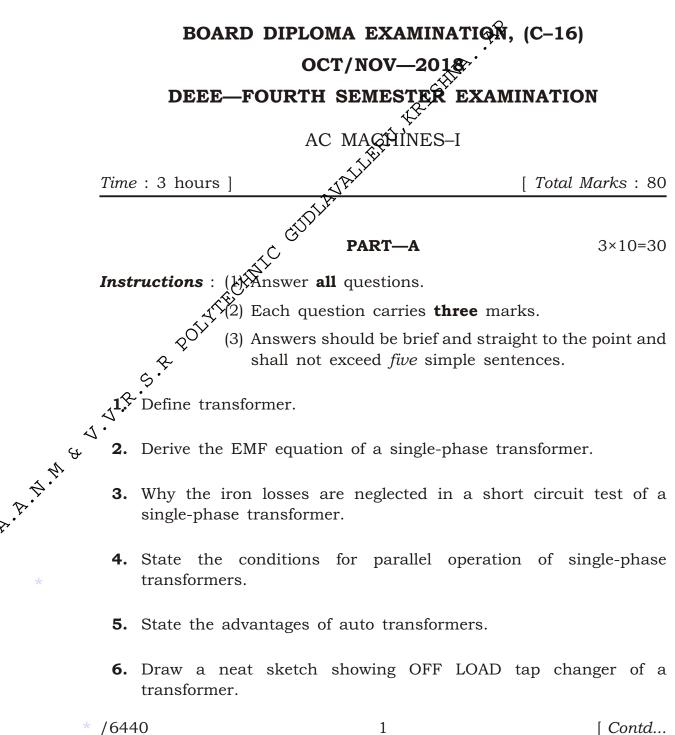**6.** Draw a neat sketch showing OFF LOAD tap changer of a transformer.

7. Define synchronous impedance of an alternator.

8. Differentiate concentrated windings and distributed windings.

9. Draw a neat vector diagram of an alternator on load at lagging power factor.

10. Draw a neat sketch of synchronization of two single-phase alternators by using bright lamp method.

<div align="center">

PART—B 10×5=50

</div>

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

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

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

11. *(a)* Distinguish between shell type and core type transformer.

(b) Derive the condition for maximum efficiency in a single-phase transformer.

12. *(a)* Draw a neat sketch of approximate equivalent circuit of a single-phase transformer as referred to primary side.

(b) The no-load current of a transformer is 15 Amp at power factor of 0.2 lag when connected to a 460 volt, 50Hz supply. Estimate the iron loss and magnetising component of current.

13. A 4 kVA, 200V/400V, 50Hz single-phase transformer gave the following test results:

O.C. test : 220 V, 0.7A, 70W (on L.V. side)

S.C. test : 15 V, 10 A, 80 W (on H.V. side)

Find the parameters of equivalent circuit as referred to L.V. side draw the circuit.

14. A 100 kVA distribution transformer is supplying the following loads:

(a) 80 kW at 0.8 p.f. 8 hours

(b) 40 kW at unity p.f. for 6 hours

(c) No-load for 10 hours

Find the all-day efficiency it iron losses are 1 kW and full load copper losses are 2 kW.

15. Explain the functions of the following parts of a power transformer:

(a) Transformer oil

(b) Conservator

(c) Breather

(d) Buchholtz relay

16. *(a)* Define voltage regulation of an alternator.

(b) Explain the procedure for determining the voltage regulation of an alternator by using synchronous impedance method with neat diagrams.

17. Calculate the line value of induced e.m.f. of pole, 3 , 50 Hz, star connected alternator with 60 slots and 4 conductors per slot. The coil span is 150° electrical, flux per pole is 0.12 Wb and it is sinusoidally distributed.

18. Two alternators running in parallel supplying a lighting load of 2000 kW and a motor load of 4000 kW at a p.f. of 0.8 lagging. One machine is loaded to 2400 kW at 0.95 p.f. lagging. What is the kW output and p.f. of the second machine?

★ ★ ★