

1478**Code : 15EE41T**Register
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IV Semester Diploma Examination, April/May-2018**TRANSFORMERS & AC MOTORS****Time : 3 Hours]****[Max. Marks : 100**

- Note :** (i) Answer any **six** questions from Part – A (Each question carries **5** marks).
(ii) Answer any **seven** questions from Part – B (Each question carries **10** marks).

PART – A

1. Classify transformers based on construction and application. **5**
2. Explain the functions of following parts in transformer : **5**
 - (a) Transformer oil
 - (b) Buchholz relay
 - (c) Core
3. Explain the losses which occur in a transformer. **5**
4. Compare auto transformer with 2 winding transformer. **5**
5. Explain how torque is produced in the rotor of an Induction motor. **5**
6. Draw and explain torque-slip curves of induction motor. **5**
7. Explain the construction of soft starters. **5**
8. Explain the applications of synchronous motors. **5**
9. List any 5 types of 1- ϕ AC motors. **5**

PART – B

10. (a) Explain the working principle of transformer with a neat sketch. 5
- (b) A single phase transformer has 500 turns in the primary & 1200 turns in the secondary windings respectively. The cross sectional area of core is 80 sq. cm. If the primary winding is connected to a 50 Hz, 500 V supply, calculate : 5
- (i) Maximum flux density B_m .
- (ii) Voltage induced in secondary of transformer.
11. (a) Define with suitable equations : 4
- (i) Voltage regulation of transformer
- (ii) Efficiency of transformer
- (b) A 2200/250 V transformer takes 0.5 A at a power factor of 0.3 on no load. Find magnetising and working components of no load primary current. 3
- (c) Draw the equivalent circuit diagram of a transformer using suitable notations. 3
12. (a) State the conditions for parallel operation of 1- ϕ transformer. 4
- (b) A 100 kVA transformer (distribution) supplying lighting & fan load has full load copper loss of 1.5 kW & core loss of 2 kW. Calculate all day efficiency of transformer, if it is loaded as follows : 6
- 6 AM to 6 PM – half load (12 hrs.)
- 6 PM to 10 PM – full load (4 hrs.)
- 10 PM to 6 AM – Negligible load
13. (a) List the advantages of 3- ϕ transformer over single phase transformer. 5
- (b) Explain Air blast cooling & oil natural cooling methods employed in transformer. 5
14. (a) With a neat diagram, explain the construction of squirrel cage induction motor. 6

- (b) A 4-pole, 3-phase induction motor operates from a supply where frequency is 50 Hz. Calculate : 4
- (i) The speed of rotating magnetic field
 - (ii) The speed of rotor when the slip is 0.04.
 - (iii) The frequency of rotor current.
 - (iv) The frequency of the rotor current at stand still.
15. (a) State the condition for maximum starting torque in induction motor. Explain the effect of supply voltage on starting torque. 5
- (b) The input to a 3-phase induction motor is 60 kW. The stator losses are about 1 kW. Find the total mechanical power developed and rotor copper losses per phase, if the motor is running with a slip of 3%. **BETA CONSOLE!** 5
16. (a) Explain the speed control of induction motor by change of poles method. 4
- (b) Explain the necessity of starters. List various methods of starting induction motors. 6
17. (a) Explain the working principle of synchronous motor with a neat diagram. 6
- (b) Explain V-curves with sketch. 4
18. (a) Explain the effect of changing excitation on constant load on synchronous motors. 6
- (b) List any 4 applications of split phase IM. 4
19. (a) Explain the construction of shaded pole motor. 6
- (b) List the characteristics of capacitor start capacitor run 1- ϕ motor. 4