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C14–EE–502

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BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2016

DEEE—FIFTH SEMESTER EXAMINATION

AC MACHINES—II

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. Draw the vector diagram of overexcited and underexcited synchronous motors, and name all the component vectors and angles on it.

2. List out the applications of synchronous motor.

3. Enumerate different losses in an induction motor.

4. Draw the power flow diagram of a 3-phase induction motor.

5. State the need of starter in case of a 3-phase induction motor.

6. List different types of a 1-phase induction motor.

7. Write any three applications of capacitor start and capacitor run induction motors.

8. State the applications of a 1-phase split phase induction motor.

9. Give various methods of speed control of a universal motor.

10. Write any three applications of a brushless DC motor.

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. *(a)* Explain why the synchronous motor is not self-starting.

(b) A 2200 V, 3-phase star-connected synchronous motor draws a current of 50 A. The effective resistance and synchronous reactance are 0 2 /phase and 2 2 /phase respectively. The input is 800 kW. Determine the value of back e.m.f. and angle of retardation of the rotor at *(i)* 0·8 p.f. lag and *(ii)* 0·8 p.f. lead. 5+5=10

12. *(a)* Explain the phenomenon of hunting. How is it prevented?

(b) An industrial installation have induction motor 2000 kW from a 3-phase and 3300 V supply at 0·8 p.f. lagging. It is desired to improve the power factor to 0·9 lagging by using a synchronous condenser. Determine the rating of synchronous condenser (assume it is not to supply any active load) and the kVA rating of the installation. 4+6=10

13. *(a)* Distinguish between induction motor and transformer.

(b) Derive torque equation of a 3-phase induction motor. 5+5=10

14. Describe the no-load test and blocked rotor test on an induction motor.

15. A 4-pole, 400 V, 3-phase, 50 Hz induction motor runs at 1440 r.p.m. at 0·8 p.f. lag and develops an output of 10·8 kW. The stator loss is 1060 W, friction and windage losses are 390 W. Calculate *(a)* slip, *(b)* rotor copper loss, *(c)* rotor efficiency, *(d)* stator input and *(e)* line current.

16. *(a)* List different speed control methods of a 3-phase induction motor. Explain about any one of the speed control methods.

(b) Explain the star-delta starter of a 3-phase induction motor with a neat diagram. 5+5=10

17. Explain the working of capacitor start and capacitor run induction motors with neat diagram.

18. Explain the construction and working of a brushless DC motor with neat diagram.

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