Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 20461

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Fifth Semester

Electrical and Electronics Engineering

EE 6504 — ELECTRICAL MACHINES II

(Regulations 2013)

(Common to PTEE 6504 – Electrical Machines II for B.E. (Part-Time) – Fourth Semester – Electrical and Electronics Engineering – Regulations 2014)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the equation for frequency of emf induced in an alternator.
2. Identify the type of synchronous generators that are used in hydroelectric plant.
3. Why a 3-phase synchronous motor will always run at synchronous speed?
4. Define synchronous condenser.
5. Classify the two types of 3-phase induction motor.
6. Define pullout torque.
7. Name the two windings of a single-phase induction motor.
8. Specify the use of single-phase induction motor.
9. Predict the type of motor that is used for ceiling fan.
10. What are the applications of linear induction motor?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the operating principle of three-phase alternator.

Or

(b) Derive the equation of induced emf for an alternator.

12. (a) Explain V-curves and inverted V-curves.

Or

(b) Explain briefly the features and principle of operation of three-phase synchronous motor.

13. (a) Generate the slip-torque characteristics for a three-phase induction motor and explain.

Or

(b) A 3-Phase, 400 V induction motor gave the following test reading :

No-load: 400 V, 1250 W, 9 A, Short circuit: 150 V, 4 kW, 38 A

Draw the circle diagram. If the normal rating is 14.9 kW, find from the circle diagram, the full-load value of current, power factor and slip.

14. (a) Explain the concept of crawling and cogging of induction motor in detail.

Or

(b) Describe the constructional features and operating characteristics of single-phase shaded pole motor.

15. (a) Discriminate the construction and principle of working of stepper motor.

Or

(b) Explain the operation, characteristics and application of DC and AC servo motor.

PART C — (1 × 15 = 15 marks)

16. (a) (i) Why voltage regulation value obtained using the MMF method is considered to be optimistic? (6)

(ii) A 400 V induction motor runs at a speed of 1440 rpm when supplied from a 50 Hz source. Find its speed at 30 Hz when the load torque is constant. The frequency is varied while maintaining the ratio (V/f) constant. (9)

Or

(b) A three-phase, 12-pole, 500 rpm, star connected alternator has 144 slots with 8 conductors per slots. The coils are full pitched and the flux per pole is 0.08 wb. Determine the phase and line EMF's. What will be the phase voltage if the coils are connected to form a balanced two-phase winding? (15)

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