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Question Paper Code : 73440

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Third Semester

Electronics and Communication Engineering

EC 2201/EC 32/EE 1204/10144 EC 302/080290008 – ELECTRICAL ENGINEERING

(Regulations 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. An 8-pole, wave-connected armature has 600 conductors and is driven at 625 rev/min. If the flux per pole is 20 mWb, determine the generated e.m.f.

2. A D.C motor operates from a 240 V supply. The armature resistance is 0.2 Ω. Determine the back e.m.f. when the armature current is 50 A.

3. Why transformer rating in kVA?

4. Write the expression for transformation ratio in a transformer.

5. Define 'slip' of an induction motor.

6. Draw the torque/speed curve of an induction motor.

7. Why synchronous motor is called so?

8. Define voltage regulation in synchronous generators.

9. Name the various conventional and non-conventional energy sources in India for power generation.

10. List the advantages of EHVDC transmission systems.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Discuss in detail the most important characteristics of d.c. shunt, series and compound generators. (8)

(ii) What is the necessity of starters? Explain any one DC starter. (8)

Or

(b) (i) Discuss in detail the methods of speed control of DC Shunt motor and DC series motor. (10)

(ii) A 250 volt, d.c. shunt motor has armature resistance of 0.25 ohm, on load it takes an armature current of 50 A and runs at 750 rpm. If the flux of motor is reduced by 10% without changing the load torque, find the new speed of the motor. (6)

12. (a) A 400 kVA transformer has a primary winding resistance of 0.5 Ω and a secondary winding resistance of 0.001 Ω. The iron loss is 2.5 kW and the primary and secondary voltages are 5 kV and 320 V respectively. If the power factor of the load is 0.85, determine the efficiency of the transformer (i) on full load, and (ii) on half load. (16)

Or

(b) (i) Derive the E.M.F Equation of the Transformer. (8)

(ii) Step by step, develop an equivalent circuit of single phase transformer. (8)

13. (a) With a neat diagram describe the construction of a three phase induction motor and explain the principle of operation.

Or

(b) (i) Describe the various speed control methods of a three-phase Induction motor. (8)

(ii) Explain the principle of operation of a single phase Induction motor. (8)

14. (a) (i) The excitation of a 415 V, three phase, mesh connected synchronous motor is such that the induced emf is 520V. The impedance per phase is 0.5 + j4Ω. If the friction and iron losses are 1000W. Calculate power output, line current, power factor and efficiency for maximum power output. (8)

(ii) Elucidate the construction and working principle, of synchronous motor. (8)

Or

(b) (i) Explain briefly about hysteresis motor and reluctance motor. (8)

(ii) Discuss about the types of stepper motor. (8)

15. (a) (i) Discuss about any one type of insulators used for overhead lines. (8)

(ii) Write a note on cables and list out the main requirements of the insulating materials used for cables. (8)

Or

(b) Draw the layout of a typical substation and discuss the role of various equipments in it. (16)