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Question Paper Code : 91395

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Third Semester

Electronics and Communication Engineering

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

(Regulation 2008/2010)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Write the working principle of self excited generators with a diagram.
2. What are the factors that control motor speed?
3. Draw the equivalent circuit of a transformer.
4. Define regulation of a transformer. With expression and parameters.
5. Define 'slip' of an induction motor.
6. Draw the torque/speed curve of an induction motor.
7. What are the uses of dampers?
8. What is the principle of operation of Alternators?
9. What is a substation?
10. List out the type of overhead line insulators.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw and discuss the no-load and load characteristics of a shunt generator. (12)
(ii) What is the significance of back emf in motor? Explain in brief with expression. (4)

Or

- (b) (i) Brief up the necessity of a starter? (4)
(ii) Distinguish between shunt and series motors. (4)
(iii) In a brake test, the effective load on the brake pulley was 38.1 kg, the effective diameter of the pulley 63.5 cm and speed 12 r.p.s. The motor took 49 A at 220 V. Calculate its efficiency. (8)

12. (a) Explain the construction and principle of operation of a transformer with neat diagrams. Also derive its emf equation. (16)

Or

- (b) (i) With neat figures, discuss the open circuit and short circuit tests on transformer, and their purpose. (12)
- (ii) Draw the vector diagram for a loaded transformer when load is non-inductive. (4)

13. (a) Explain the construction and principle of operation of three phase induction motor. (16)

Or

- (b) (i) A 4 pole, 3-phase induction motor operates from a supply whose frequency is 50 Hz. Calculate the following ;
- (1) the speed at which the field of the stator is rotating
- (2) the speed of the rotor when the slip is 0.04 .
- (3) the frequency of the rotor currents when the slip is 0.03.
- (4) the frequency of the rotor currents at standstill. (6)
- (ii) Explain why single phase induction motor is not self starting. (10)

14. (a) (i) What are the two types of rotors used in alternators? (4)
- (ii) Derive the equation of induced emf of alternator. (4)
- (iii) Find the synchronous impedance of an alternator in which a given field current produces an armature current of 200 A on short circuit and a generated emf of 50 V on open – circuit. The armature resistance is 0.1Ω . To what induced voltage must the alternator be excited if it is to deliver a load of 100 A at p.f. of 0.8 lagging, with a terminal voltage of 200 V. (8)

Or

- (b) (i) Discuss the construction and working principle of reluctance motor With appropriate diagram. (10)
- (ii) Discuss the principle of stepper motor. With relevant diagram. (6)

15. (a) (i) Compare and contrast between EHVAC and EHVDC transmission systems. (8)
- (ii) Write a detailed technical note on underground cables. (8)

Or

- (b) Draw the typical layout of a substation and discuss the function of various equipment in it. (16)