

B.Tech II Year I Semester (R13) Supplementary Examinations June 2017

ELECTRICAL & ELECTRONICS ENGINEERING

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

Answer all questions
All questions carry equal marks

PART – A
(Electrical Engineering)

UNIT – I

- 1 (a) With a neat sketch, explain the principle of operation of a DC Generator
- (b) A 4-pole generator having wave-wound armature winding has 48 slots each slot contains 20 conductors. What will be the voltage generated in the machine when driven at 1,500 rpm. Assuming the flux per pole to be 7.0 mWb?

OR

- 2 (a) How is back emf produced in a dc motor? Also derive an expression for this emf.
- (b) A 4-pole lap wound D.C shunt generator has a useful flux per pole 0.07 Wb. The armature winding consists of 220 turns each of 0.004 ohms resistance. Calculate the terminal voltage when running at 900 rpm if the armature current is 50 A.

UNIT – II

- 3 (a) Derive the EMF equation of a single phase transformer. Hence derive voltage ratio.
- (b) A single phase 50 Hz transformer has 100 turns on the primary and 400 turns on the secondary winding. The net cross sectional area of core is 250 cm². If the primary winding is connected to a 230 V 50 Hz supply, determine: (i) The EMF induced in the secondary winding. (ii) The maximum value of flux density in the core.

OR

- 4 (a) Discuss various losses that occur in transformer.
- (b) Obtain the approximate equivalent circuit of a given 200/2000 V single phase 30 kVA transformer having the following results.
O.C test : 200 V, 6.2 A, 360 W on low voltage side
S.C test : 75 V, 18 A, 600 W on high voltage side

UNIT – III

- 5 (a) Develop an expression for torque of an induction motor.
- (b) A 3-phase, 50 Hz induction motor is wound for 8 poles. Calculate: (i) The synchronous speed. (ii) The rotor speed when slip is 3%. (iii) Rotor frequency when rotor runs at 800 rpm.

OR

- 6 (a) How emf is induced in the armature of alternator? What are the factors that cause a change of the alternator terminal voltage?
- (b) A 3-phase, 10 pole star connected alternator runs at 700 r.p.m. It has 120 stator slots with 10 conductors per slot, if the flux per pole is 0.056 Wb, determine the phase and line induced e.m.f.

PART – B
(Electronics Engineering)

UNIT – I

- 7 Draw the circuit diagram of FWR with centre-tap transformer and explain its operation with the help of input and output waveforms and Derive the ripple factor.

OR

- 8 How zener diode can be used as voltage regulator? Explain.

UNIT – II

- 9 What is the need of transistor biasing? List various types of biasing techniques. Obtain the stability factor of self bias circuit.

OR

- 10 Explain the operation of JFET with a suitable block diagram.

UNIT – III

- 11 What is the importance of logic gates used in digital electronics? Explain with truth tables.

OR

- 12 Convert the following to Decimal and then to Octal.
(i) 4234₁₆. (ii) 10010011₂.