

Code: EC3T5

**II B.Tech - I Semester–Regular/Supplementary Examinations
November 2017**

**ELECTRICAL TECHNOLOGY
(ELECTRONICS & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

- a) What is the principle used in a dc generator?
- b) Explain the concept of back Emf in a dc motor.
- c) Draw the magnetization characteristics of dc generator.
- d) What is purpose of laminating the core of 1-phase transformer?
- e) Draw the phasor diagram of 1-phase transformer on no-load.
- f) What are the differences between slip ring and squirrel cage induction motor?
- g) Draw the torque-slip characteristics of 3-phase induction motor.
- h) Define Distribution factor and give its expression.
- i) What is regulation in a 3-phase alternator?
- j) What is the principle operation of electrical instruments?
- k) What are the types of control torques in an instrument?

PART – B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) With neat diagram explain the Swinburne's test conducted on DC shunt motors. What are the advantages and limitations of this test? Enumerate all calculations. 10 M
- b) A 440V DC shunt generator has an armature resistance of 0.25 ohms and the resistance of the shunt field is 220 ohms while delivering a load current of 50A. If has a terminal voltage of 440V, determine the generated e.m.f and power developed. 6 M
3. a) Explain the constructional features of a single phase transformer and further classify the Transformers based on design. 10 M
- b) A 7.5 kVA, 2400V/120V transformer was tested by short circuiting the low voltage side and applying 100V to the high voltage side. The measured power input was 145W. Determine the regulation when the load has 0.8 lagging power factor. 6 M
4. a) Compare the operating characteristics of split phase, capacitor start, and shaded pole motors. 8 M

b) The power input to a rotor of 400V, 50Hz, 3-phase, 12-pole Induction motor is 100w. The rotor Emf has a frequency of 2Hz. Calculate: 8 M

i) slip

ii) Rotor speed

iii) rotor Cu losses

iv) Mechanical power developed.

5. a) Derive the emf equation of a 3-phase alternator. 8 M

b) A star connected 3-phase, 6-pole alternator has 120 slots and 8 conductors per plot. The speed is 1000 rpm. The flux per pole is 0.06wb. Calculate the emf generated if all the conductors in each phase are in series. Assume sinusoidal flux distribution and a coil span of 120° electrical. 8 M

6. a) Explain the principle and operation of PMMC with a neat diagram. 10 M

b) Explain how the range of Voltmeter can be increased and derive the expression for the resistance to be connected?

6 M