

Code: EC3T5

**II B.Tech - I Semester–Regular/Supplementary Examinations  
November 2016**

**ELECTRICAL TECHNOLOGY  
(ELECTRONICS AND 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) List the various parts of a DC machine.
- b) A 6-pole, lap-wound DC generator has 600 conductors on its armature. The flux per pole is 0.02 Wb. Calculate the speed at which the generator must be run to generate 300V.
- c) Draw the internal and external characteristics of DC motor.
- d) Draw the phasor diagram of the 1-phase transformer on resistive load.
- e) Draw the equivalent circuit of a transformer when referred to primary side.
- f) Define slip and synchronous speed of a 3-phase induction motor.
- g) Draw the characteristic of capacitor start and capacitor run induction motor.

- h) Define distribution factor.
- i) Define voltage regulation of an alternator.
- j) Write the classification of electrical measuring instruments.
- k) List the advantages of permanent magnet moving coil instruments.

## PART – B

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

3 x 16 = 48 M

2.

a) With a neat sketch, explain the constructional details of a D.C machine. 8 M

b) Explain the significance of back EMF of a DC motor. 4 M

c) Derive the torque equation of a DC motor from fundamentals. 4 M

3.

a) Explain the principle of operation of single phase transformer. Derive the EMF equation of single phase transformer. 8 M

b) Obtain the equivalent circuit of a 200/400V, 50Hz, 1-phase transformer from the following test data: 8 M

O.C test :	200V	0.7A	70W	on L.V. side
S.C. test :	15V	10A	85W	on H.V.side.

Draw the equivalent circuit referred to primary.

4.

- a) Explain the working principle of a 3-phase induction motor. 8 M
- b) Explain the torque-slip characteristics of a 3-phase induction motor. 4 M
- c) A 3-phase induction motor is wound for 4 poles and is supplied from 50Hz supply system. Calculate: 4 M
- i) Synchronous speed
- ii) The speed of the motor when slip is 4%.

5.

- a) Derive the expression for pitch factor, distribution factor and induced EMF in an alternator. 10 M
- b) A 3-phase, 16-pole alternator has a star-connected winding with 144 slots and 10 conductors per slot. The flux per pole is 0.03 Wb, sinusoidally distributed and the speed is 375 r.p.m. find the frequency, phase and line e.m.f. Assume full-pitched coil. 6 M

6.

- a) Explain with neat sketch the principle of operation for repulsion type moving iron instruments. 10 M

b) Compare the merits and demerits of moving coil and moving iron instruments. 6 M