

B.Tech II Year I Semester (R13) Regular &amp; Supplementary Examinations December 2015

**ELECTRICAL & MECHANICAL TECHNOLOGY**

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer all questions

All questions carry equal marks

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**PART – A**

(Electrical Technology)

**UNIT – I**

- 1 (a) Derive the E.M.F equation of a generator.  
 (b) A four-pole generator, having wave-wound armature winding has 51 slots, each slot containing 20 conductors. What will be the voltage generated in the machine when driven at 1500 rpm assuming the flux per pole to be 7.0 mWb?

**OR**

- 2 What is the necessity of starter? Explain 3 point starters with neat diagram.

**UNIT – II**

- 3 (a) A 25 kVA, single-phase transformer has 250 turns on the primary and 40 turns on the secondary winding. The primary is connected to 1500 volt, 50 Hz mains. Calculate: (i) Primary and secondary currents on full-load. (ii) Secondary e.m.f. (iii) Maximum flux in the core.  
 (b) Draw and explain the phasor diagram of a single phase transformer on load.

**OR**

- 4 Draw the circuit diagrams for conducting OC and SC tests on a single phase transformer. Also explain how the efficiency and voltage regulation can be estimated by these tests.

**UNIT – III**

- 5 Explain slip-torque characteristics of three phase induction motor in detail.

**OR**

- 6 Explain with neat sketches the principle of a three phase induction motor.

**PART – B**

(Mechanical Technology)

**UNIT – I**

- 7 (a) Explain with the aid of neat sketch the principle working of a four stroke cycle petrol engine.  
 (b) Describe the effect of inter cooler in a two stage reciprocating air compressor.

**OR**

- 8 (a) Describe the working of a single stage reciprocating air compressor.  
 (b) Differentiate between petrol engine and diesel engine.

**UNIT – II**

- 9 (a) Why ducts are used in a air conditioning system?  
 (b) What are the advantages and disadvantages of vapour compression refrigeration system?

**OR**

- 10 (a) Name the properties of good refrigerant.  
 (b) With a neat sketch explain year round air conditioning system.

**UNIT – III**

- 11 (a) Write short notes on: (i) Bulldozer. (ii) Concrete mixer.  
 (b) Briefly explain the construction and working of a road roller.

**OR**

- 12 (a) Briefly explain about chain drive.  
 (b) Briefly explain about open belt drive.