

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

**ELECTRICAL & MECHANICAL TECHNOLOGY**

(Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer all questions  
All questions carry equal marks

\*\*\*\*\*

**PART – A**  
**(Electrical Technology)****UNIT – I**

- 1 Explain the working of DC motor and derive the torque equation.

**OR**

- 2 (a) A d.c shunt motor runs at a speed of 1000 r.p.m. on no load taking a current of 6 A from the supply, when connected to 220 V d.c source, its full load current is 50 A. Calculate its speed on full load. Assume  $R_a = 0.3 \Omega$  and  $R_{sh} = 110 \Omega$ .  
(b) Explain various types of DC generator.

**UNIT – II**

- 3 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.

**OR**

- 4 A 6 kVA, 250/500 V, transformer gave the following test results:  
Short-circuit test : 20 V, 12 A, 100 W  
Open-circuit test : 250 V, 1 A, 80 W  
(i) Determine the transformer equivalent circuit.  
(ii) Calculate applied voltage, voltage regulation and efficiency when the output is 10 A at 500 volt and 0.8 power factor lagging.

**UNIT – III**

- 5 Explain the principle of operation of 3-phase induction motor and explain how the rotating magnetic field is produced by three-phase currents.

**OR**

- 6 With neat sketch, describe the construction and principle of operation of salient pole alternator.

**PART – B**  
**(Mechanical Technology)****UNIT – I**

- 7 (a) Compare two stroke and four stroke engine.  
(b) Derive the expression for the work done by a single stage reciprocating air compressor when compression is polytropic.

**OR**

- 8 (a) Describe the working of a single stage reciprocating air compressor.  
(b) Discuss the working of a two stroke engine with a neat sketch.

**UNIT – II**

- 9 (a) Name the properties of good refrigerants.  
(b) Briefly explain with a neat sketch the working of summer air conditioning system.

**OR**

- 10 (a) Briefly explain with a neat sketch the working of vapour compression refrigeration system.  
(b) Name some of the commonly used refrigerants in refrigeration system.

**UNIT – III**

- 11 (a) Write short notes on concrete mixer.  
(b) Briefly explain with a neat sketch the working of power shovels.

**OR**

- 12 (a) Write short notes on excavators.  
(b) Briefly explain with a neat sketch the working of bulldozer.

\*\*\*\*\*