

Code: 13A99301

B.Tech II Year I Semester (R13) Supplementary Examinations June 2015
ELECTRICAL & MECHANICAL TECHNOLOGY
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

Answer all questions
 All questions carry equal marks
 (Use single answer booklet only)

PART – A
(Electrical Technology)

UNIT – I

- 1 (a) (i) Draw and explain the load characteristics of a series generator.
 (ii) Explain the principle of operation of DC generator.
- (OR)**
- 2 (b) (i) Derive the Torque equation of DC motor.
 (ii) A 500 V DC shunt motor takes 4 A on no-load, the armature resistance including that of brushes is 0.2 ohm and the field current is 1.0 A. Estimate the output and efficiency when the input current is 20 A.

UNIT – II

- 3 (a) Define efficiency and the regulation of a transformer. Explain how power factor affects both of them.
- (OR)**
- 4 (b) Derive the E.M.F equation for transformers with phasor diagrams.

UNIT – III

- 5 (a) (i) Explain the principle of operation of induction motor.
 (ii) Explain the slip-torque characteristics of induction motor.
- (OR)**
- 6 (b) Derive E.M.F equation for an alternator and explain distribution factor and pitch factor used in E.M.F equation.

PART – B
(Mechanical Technology)

UNIT – I

- 7 (a) (i) Explain with suitable sketches the working of four-stroke diesel engine.
 (ii) Explain the working of two-stroke Otto engine with P-V diagram.
- (OR)**
- 8 (b) (i) Describe construction and working of multi-stage reciprocating air compressor with a neat sketch.
 (ii) What is the purpose of inter-cooling in air compressors? Explain the inter-cooling system with a neat sketch.

UNIT – II

- 9 (a) (i) What are the advantages and disadvantages of vapour compression refrigeration system?
 (ii) Name some common refrigerants and list out the advantages.
- (OR)**
- 10 (b) (i) Explain about winter air conditioning system with a neat sketch.
 (ii) With a neat sketch explain year round air conditioning system.

UNIT – III

- 11 (a) (i) What do you mean by open belt drive? Find the length of belt in open belt drive.
 (ii) Deduce an expression for the ratio of tight and slack side tensions in case of a V-belt drive.
- (OR)**
- 12 (b) Write a short notes on:
 (i) Belt conveyors. (ii) Bucket conveyors. (iii) Bulldozers.
