Code: 13A99301

R13

B.Tech II Year I Semester (R13) Regular Examinations December 2014

ELECTRICAL & MECHANICAL TECHNOLOGY

(Civil Engineering)

Time: 3 hours Max. Marks: 70

Answer all questions

All questions carry equal marks

Use separate booklets for part A and part B

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PART – A

(Electrical Technology)

UNIT - I

1 (a) How do we classify the characteristics of a DC motors. Draw and explain the various characteristic curves of a DC series motor.

OR

2 (b) (i) Explain the working of three point starter with neat diagram.
(ii) Explain the action of commutator in DC generators.

UNIT – II

3 (a) (i) Explain the losses that occurs in transformers.
(ii) Explain the principle of operation of single phase transformers.

OR

4 (b) (i) Derive the condition for maximum efficiency of a transformer.
(ii) Draw the equivalent circuit of a transformer and show how the constants of primary and secondary windings may be combined to give a simplified equivalent circuit with the values of constants given in terms of secondary winding.

UNIT – III

5 (a) (i) What is an alternator? What is its operating principle?
(ii) How are alternators classified? Explain.

OR

6 (b) (i) Define and explain slip of 3-phase induction motor.
(ii) Calculate the synchronous speed, slip and rotor frequency of a 3-phase 50 Hz, 4-pole induction motor running at 1440 rpm.

PART – B

(Mechanical Technology)

UNIT – I

7 (a) Explain the following terms as applied to I.C. Engines**:** Bore, Stroke, T.D.C, B.D.C and Compression ratio.
(b) Explain with suitable sketches the working of four-stroke Otto engine.

OR

8 (a) Describe with a neat sketch the construction and working of single- stage reciprocating air compressor.
(b) Classify different types of compressors.

UNIT – II

9 (a) What are the properties of an ideal refrigerant and absorbent pair? Explain.
(b) With a neat sketch explain the vapour compression refrigeration system.

OR

10 (a) With a neat sketch explain about summer air conditioning system.
(b) What is the purpose of ducting in air conditioning systems?

UNIT – III

11 (a) What do you mean by crossed belt drive? Find the length of belt in crossed belt drive.
(b) Two parallel shafts, connected by a crossed belt are provided with pulleys 480 mm and 640 mm in diameters. The distance between the centre line of the shaft is 3 m. Find how much the length of the belt should be changed if it is desired to alter the direction of rotation of the driven shaft.

OR

12 Write a short notes on:
(a) Excavators.
(b) Concrete mixers.
(c) Power showels

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