Code: 13A99302

R13

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

ELECTRICAL & ELECTRONICS ENGINEERING

(Mechanical 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 Engineering)

UNIT – I

1 (a) (i) Explain the operation of 3-point starter used in DC motors with net diagram.
(ii) Deduce the relation between torque and armature current of DC motor.

OR

2 (b) (i) Explain any one type of DC generators.
(ii) A short shunt compound generator supplies 200 A at 100 V. The resistance of armature, series field and shunt field are 0.04 Ω, 0.03 Ω and 60 Ω respectively. Find E.M.F generated.

UNIT – II

3 (a) (i) Define efficiency and regulation of single phase transformer.
(ii) Derive the E.M.F equation of transformer.

OR

4 (b) On what factors the induced EMF in the transformer windings depends. Justify the answer with appropriate derivation.

UNIT – III

5 (a) (i) Explain the principle of operation of induction motor.
(ii) Define the regulation of an alternator and explain how will you find the regulation by synchronous impedance method

OR

6 (b) (i) What is an alternator? Write advantages of stationary armature.
(ii) Write short notes on salient pole type alternator.

PART – B

(Electronics Engineering)

UNIT – I

7 (a) (i) Explain the formation of n type semiconductor.
(ii) Explain the V-I characteristics of a diode.

OR

8 (b) (i) Prove that the voltage regulation for a half wave rectifier is $[(R_s + R_f)/R_L] * 100$.
(ii) How does the reverse saturation current of diode varies with temperature? Explain.

UNIT – II

9 (a) (i) Explain the active region, saturation region, cutoff region in transistor characteristics.
(ii) With help of neat diagram explain the operation of an N –channel JFET

OR

10 (b) (i) If the base current in a transistor is 30 μA when the emitter current is 7.2 mA, what are the values of α and β and also calculate the collector current.
(ii) Draw and explain the drain characteristics of n- channel enhancement type MOSFET.

UNIT – III

11 (a) (i) Convert the following binary numbers into decimals:
(1) 101.01 (2) 10101.0101
(ii) Construction of AND, OR and NOT gate by using NOR gate.

OR

12 (b) (i) Simplify the logical expression (A+B).(A+ $\overline{B}$).($\overline{A}$ + B).
(ii) Convert the octal $(1745.246)_8$ number into hexadecimal number.

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