

B.Tech II Year I Semester (R13) Supplementary Examinations June 2015
ELECTRICAL & ELECTRONICS ENGINEERING
 (Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

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

PART – A
(Electrical Engineering)

UNIT – I

- 1 (a) (i) Derive the EMF equation of DC generator.
 (ii) With neat sketches, explain the construction and functions of the various parts of a D.C machine.
(OR)
- 2 (b) (i) Derive the Torque equation of DC motor.
 (ii) Explain the classification of DC motors with neat diagrams and corresponding voltage equations for each.

UNIT – II

- 3 (a) Explain the constructional details of transformers.
(OR)
- 4 (b) (i) Explain the principle of operation of single phase transformers.
 (ii) Explain the losses that occur in transformers.

UNIT – III

- 5 (a) (i) Explain the principle of operation of 3-phase induction motor in detail.
(OR)
- 6 (b) (i) Briefly explain slip-torque characteristics of induction motors.
 (ii) Explain the principle of operation of alternators.

PART – B
(Electronics Engineering)

UNIT – I

- 7 (a) (i) Briefly discuss about avalanche breakdown and zener breakdown.
 (ii) Draw the circuit diagram of halfwave rectifier and explain its operation with the help of waveforms..
(OR)
- 8 (b) (i) Draw the characteristics of SCR and briefly explain.
 (ii) A single stage full wave rectifier makes use of π –section filter two $10 \mu f$ capacitors and a choke of 10 H. The secondary voltage is $280 V_{rms}$ with respect to centre tap. If the load current is 100 mA, determine the DC output voltage and percentage ripple in the output, assume supply frequency at 50 Hz.

UNIT – II

- 9 (a) (i) Sketch typical drain characteristics for an N-channel JFET explain the characteristics and identify the regions.
 (ii) Draw a fixed bias circuit and explain it.
(OR)
- 10 (b) (i) What are the factors responsible for the instability of operating point?
 (ii) Write comparisons of CC, CE and CB configuration.

UNIT – III

- 11 (a) (i) Convert the following hexa decimal numbers into decimals.
 (1) A13B (2) 7CA3
 (ii) Construct AND, OR and NOT gate by using NAND gate.
(OR)
- 12 (b) (i) Prove that the expression $Y = (A + B)(\overline{AC} + C)(\overline{B + AC})$ can be simplified to $Y = \overline{A}B$.
 (ii) Add and subtract following two numbers without converting to decimal numbers $(4F3A)_{16}$ and $(23C1)_{16}$
