53 (EC 301) ELDC

2015

ELECTRON DEVICES AND CIRCUITS

Paper : EC 301

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ***any five*** *out of seven questions.*

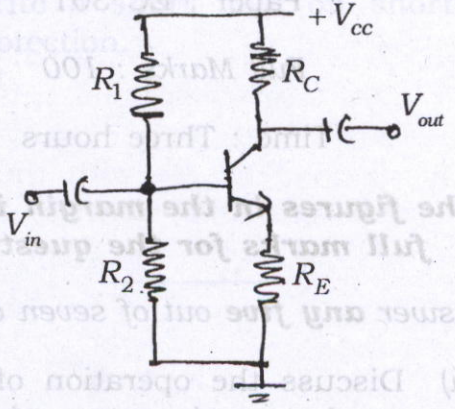
1. *(a)* Discuss the operation of Buck-Boost regulators using proper circuit diagram. 10

   (b) Mention the different types of multi-stage Amplifiers and draw the circuit diagram. Discuss the advantages of each type. 10

2. *(a)* Draw the high frequency model of an n-p-n transistor and derive the unity gain frequency and cut off frequency (-3*dB* frequency). 10

(b) Explain the operation of series regulator and discuss the short circuit protection technique for the same. 10

3. (a) Calculate the voltage gain, and input resistance and output resistance for the circuit below : 12



(b) Describe the operation of line-interactive UPS with proper block diagram. 8

4. (a) Describe the Class-B operation of power Amplifier and compare the performance with Class-A power Amplifier. 10

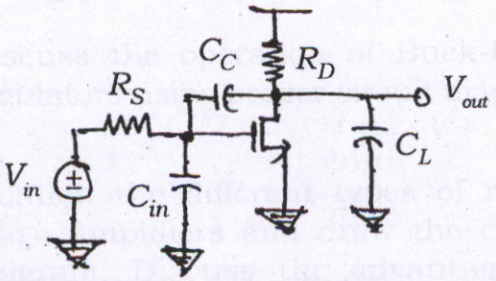
(b) Compare the analysis of a transistor Amplifier using Hybrid parameters for Common-Emitter and Common-Collector configurations. 10

5. *(a)* Explain Class-A push-pull Amplifier and point out the difference of two collector currents. 10

(b) Draw the circuit diagram of single tuned and Double tuned Amplifier. Explain the frequency response of these two circuits. 10

6. *(a)* Draw the model of two-voltage amplifiers cascaded between a source and load, hence show the various loading effects with the help of O/P voltage expression. 10

(b)



Use the Miller's theorem and hence calculate the expressions for Input Impedance and Output Impedance of the circuit shown. 10

7. *(a)* Discuss the operation of online UPS and clearly draw the comparison with the offline UPS. 10

(b) Describe the Early effect in a BJT and draw a small signal model showing the dependence of Early effect. 5

(c) Write a short note on short-circuit protection. 5