

Roll No. ....

Total Pages : 3

Exam. Code
6032

8072

BT-2/M-11  
ELEMENTS OF ELECTRONICS ENGINEERING  
(2008 ONWARDS)  
Paper : EL-101(E)

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT-I

1. (a) For a p-n junction, sketch the curves for space charge, electric field and potential as a function of distance across the junction. Explain what happens to the junction potential under reverse and forward bias. 8
- (b) Obtain the expression for the volt-ampere characteristics of a p-n diode and plot it. How does the reverse saturation current of a p-n diode vary with temperature ? 7
2. (a) Draw the circuit of a full wave rectifier and compute (i) the d.c. current, (ii) the d.c. load voltage, (iii) the d.c. diode voltage, and (iv) the rms current. 8
- (b) With the help of a diagram, explain the operation of a clamping circuit. How does the choice of capacitance affect the performance of this circuit ? 7

UNIT-II

3. (a) Sketch the family of common emitter (CE) output characteristics for a transistor. Indicate the active, cut-off and saturation regions; and explain the shape of the curves qualitatively. 8



- (b) A transistor circuit has resistors  $R_b$ ,  $R_c$  and  $R_e$  in the base, collector and emitter legs, respectively. The biasing voltages are  $V_{BB}$  and  $V_{CC}$  in the base and collector circuits, respectively. Explain the method for finding the quiescent current, assuming that the transistor operates in the active region. How do you test to see if your assumption is correct? 7
4. (a) Draw the circuit of a two-stage RC-coupled CE transistor amplifier. Explain the role of coupling and bypass capacitors present in the circuit. How is the frequency response of this amplifier affected by the coupling capacitance? 7
- (b) What are the four possible topologies of a feedback amplifier? Identify the output signal and the feedback signal either as a current or voltage, for each topology. Also, comment on the changes in the input and the output resistances for each topology. 8

### UNIT-III

5. (a) What is an ideal differential amplifier? Draw the transfer characteristics of a differential amplifier. Over what differential voltage range does this amplifier act as a good limiter? 7
- (b) For an OP-AMP define (i) common mode signal, (ii) difference mode signal, (iii) common mode rejection ratio, and (iv) slew rate. 8
6. (a) Give reasons why an open loop op-amp is unsuitable for linear applications. Explain briefly why negative feedback is desirable in amplifier applications. Which two configurations of negative feedback are most commonly used? 8
- (b) Draw the circuit diagram for an integrator using op-amp and compute its output for a given input signal.

UNIT-IV

7. (a) For an  $n$ -channel dual-mode MOSFET, draw and discuss (i) the drain characteristics, and (ii) the transfer characteristics. 9
- (b) What are the advantages and disadvantages of JFET relative to BJT? 6
8. (a) Draw and explain the volt-ampere characteristics of an SCR. What is meant by the following : 8
- (i) Turn-on time, and
- (ii) Turn-off time of an SCR.
- (b) Explain the working of UJT by giving its basic structure. Define the term Interbase stand-off ratio. 7