

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2003.

Fourth Semester

Computer Science and Engineering

EC 250 — ELECTRONIC CIRCUITS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Why current is very small in the reversed biased condition of a diode?
2. FET is a unipolar device — Justify.
3. List the four types of negative feedback.
4. Define frequency response of an amplifier.
5. List the non linear applications of op amp.
6. Define CMRR.
7. What is meant by Schmitt trigger?
8. Draw the functional block diagram of the series type voltage regulator.
9. Mention the characteristics of Butterworth poles.
10. Draw the logic circuit diagram of a 2 to 1 MUX.

PART B — (5 × 16 = 80 marks)

11. Discuss the following configurations of operational amplifier :
  - (i) Non-inverting amplifier
  - (ii) Differentiator
  - (iii) Zero crossing detector
  - (iv) Logarithmic amplifier.

(4 × 4 = 16)

12. (a) (i) Draw the energy band diagram of a semiconductor. (4)  
(ii) Explain the working of a PN junction diode and also explain its VI characteristics. (12)

Or

- (b) Draw and explain the input and output characteristics of a CE transistor configuration. Indicate cut off, saturation and active regions. (16)
13. (a) (i) Distinguish between series feedback and shunt feedback. (4)  
(ii) Enumerate the effects of negative feedback on the various characteristics of the amplifier. (12)

Or

- (b) (i) What are the basic methods of coupling in multistage amplifiers? (4)  
(ii) With a neat sketch describe the principle of operation of RC coupled amplifier and derive the expression for voltage gain and current gain at mid frequencies. Mention its advantages and disadvantages. (12)
14. (a) (i) Find the operating frequency of a transistor Colpitts oscillator if  $C_1 = 0.001 \mu\text{F}$ ,  $C_2 = 0.01 \mu\text{F}$  and  $L = 15 \mu\text{H}$ . (4)  
(ii) State Barkhausen criterion. With a neat sketch explain the Hartley oscillator and derive the expression for frequency of oscillation. (12)

Or

- (b) What is a monostable multivibrator? Explain the operation of a collector coupled monostable multi with waveforms. Derive the expression for the gatewidth of the output pulse. (16)
15. (a) Discuss the following :  
(i) Sample and Hold circuit. (8)  
(ii) Analog multiplier. (8)

Or

- (b) (i) Draw the first order low pass filter (active filter). Derive the expression for the transfer function. Draw the frequency response. (8)  
(ii) Discuss the operation of R – 2R ladder type D/A converter. (8)