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**L 1245**

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

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. Draw the hybrid model of the BJT in CB configuration and mention its  $h$  parameters.
2. What is meant by early effect?
3. Define static and dynamic resistance of a PN diode.
4. What is the advantage of negative feedback?
5. Define dc and ac load line.
6. What is a BIFET-op amp?
7. Why does the feedback network in a RC phase shift oscillator contain 3 RC sections?
8. Why does a A/D converter require a sample and hold system?
9. Determine regulated voltage and circuit current for voltage shunt regulator. Given  $V_i = 22\text{ V}$ ,  $R_S = 120\ \Omega$ ,  $V_r = 8.2\text{ V}$ ,  $R_L = 100\ \Omega$ .
10. What is an analog multiplier?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Describe the current relations in CE configurations with its input and output characteristics. (10)
- (ii) Calculate the Q point and draw dc load line for a transistor operated in collector to base bias with  $R_C = 10 K \Omega$ ,  $R_B = 100 K \Omega$ ,  $V_{CC} = 12 V$  and  $\beta = 100$ . (6)

Or

- (b) (i) Discuss on the current components and derive expression for total current in a  $pn$ -junction diode. (10)
- (ii) What are the steps involved in the fabrication of a bipolar junction transistor. (6)
12. (a) (i) Derive an expression for the lower cut-off frequency ( $f_p$ ) of a RC coupled single stage amplifier. (10)
- (ii) Consider the CB amplifier for small signal analysis with  $R_g = 600 \Omega$ ,  $R_L = 1.5 k \Omega$  and  $h$  parameters  $h_{ib} = 20 \Omega$ ,  $h_{rb} = 3 \times 10^{-4}$ ,  $h_{fb} = -0.98$  and  $h_{ob} = 0.5 \times 10^6$  mho. Find  $R_i$ ,  $R_o$ ,  $A_I$  and  $A_V$ . (6)

Or

- (b) (i) Describe the current series feedback amplifier with an example and derive for its gain, output and input resistance with feedback. (8)
- (ii) What is the effect of negative feedback on (1) stability of gain (2) frequency response and bandwidth (3) distortion. (8)
13. (a) (i) Explain the operation of a differential amplifier and derive its CMRR equation. (10)
- (ii) Draw the circuit diagram of MOSFET–Op amp and explain its operation. (6)

Or

- (b) (i) Draw the pin configuration of IC–741 and mention its ideal features. (6)
- (ii) Discuss on :
- (1) Summing Amplifier. (3)
- (2) Subtractor/Adder. (3)
- (3) Rectifier. (4)

14. (a) (i) Explain the operation of monostable multivibrator with neat diagrams. (8)
- (ii) Define Barkhausen Criterion. Derive the condition of oscillation in crystal oscillator. (8)

Or

- (b) (i) How does a level detector work? Explain it with neat diagram. (6)
- (ii) Draw the hysteresis graph to discuss about the operation of Schmitt Trigger. (10)
15. (a) (i) Draw the functional block diagram of IC 723 voltage regulator and explain its working. (10)
- (ii) Draw the circuit of integrator and obtain its output when a square wave i/p is given with necessary equations. (6)

Or

- (b) (i) Explain the single slope ADC with neat diagrams. (8)
- (ii) Design a Butterworth low pass filter with a cutoff frequency 15.9 kHz with a pass band gain of 2. (8)