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**L 1374**

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

Second Semester

Information Technology

IF 141 — ELECTRONIC DEVICES AND CIRCUITS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is Avalanche Breakdown?
2. Define Base width modulation.
3. How cross over distortion is avoided using complementary symmetry power amplifiers?
4. Define ac and dc load line.
5. Give the Barkhausen criteria for oscillation.
6. Calculate the pulse width period and frequency of output of a astable multivibrator generating a square wave using  $C_1 = C_2 = 100$  PF and  $R_1 = R_2 = 10$  k $\Omega$ .
7. Draw the circuit of a colpitts oscillator and derive its frequency with  $C_1 = 1.5$  PF ;  $L = 50$  mH and  $C_2 = 150$  PF.
8. Give the application of a bistable multivibrator.
9. List the ideal characteristics of an operational amplifier.
10. Why does an Op-amp require its CMRR value to be very high?

PART B — (5 × 16 = 80 marks)

15.

11. (a) Explain the characteristics of FET with its regions of operation. (16)

Or

- (b) Draw the circuit symbol of a SCR. Explain its operation and V-I characteristics with neat diagrams. (16)

12. (a) (i) Discuss on Class A power amplifier and derive its efficiency. (10)

- (ii) Consider a single stage CE amplifier with  $R_s = 1\text{ k}\Omega$ ,  $R_L = 1.2\text{ k}\Omega$ . Calculate  $A_v$ ,  $R_i$ ,  $A_i$ ,  $A_{is}$ ,  $A_{vs}$ ,  $A_p$  and  $R_o$  if  $h_{ie} = 1.1\text{ k}\Omega$ ,  $h_{re} = 2.5 \times 10^{-4}$ ,  $h_{fe} = 50$  and  $h_{oe} = 25\ \mu\text{ A/V}$ . (6)

Or

- (b) (i) Draw the voltage divider bias circuit and derive its stability factor. (8)

- (ii) Explain the working principle of a single tuned amplifier. With neat diagrams. (8)

13. (a) (i) Explain the voltage series feed back amplifier with an example. (10)

- (ii) Derive for the condition of Oscillation of a LC Oscillator. (6)

Or

- (b) (i) With neat diagrams, derive the frequency of Oscillation of a RC phase shift Oscillator. (8)

- (ii) An amplifier has mid-band voltage gain ( $A_v$  mid) of 1000 with  $f_L = 50\text{ Hz}$  and  $f_H = 50\text{ kHz}$ , if 5% feedback is applied then calculate gain,  $f_L$ , and  $f_H$  with feedback. (8)

14. (a) (i) Explain the operation of a Bistable multivibrator with neat diagrams. (10)

- (ii) Design a monostable for a pulse width of 50 ms using IC 555. (6)

Or

- (b) (i) Draw the pin configuration of 555 and explain its internal Block diagram. (10)

- (ii) Discuss on any two applications of IC 555. (6)

15. (a) (i) Explain the operation of current to voltage and voltage to current converter. (8)
- (ii) Design a multiplier unit using Op-amp and derive its equation. (8)

Or

- (b) (i) Discuss on :
- (1) Differentiator (8)
- (2) Integrator.
- (ii) Design a first order High pass Butter worth filter for a cut-off frequency of 20 kHz and gain is 1.5. (8)
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