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P 1171

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Fourth Semester

Electrical and Electronics Engineering

EC 254 — ELECTRONIC CIRCUITS

EC 2205

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the characteristics of a common collector amplifier ?
2. Sketch the Cascade and Darlington connections.
3. List the four differential amplifier configurations.
4. What is the purpose of a tuned voltage amplifier?
5. What is the significance of negative feedback?
6. What are the advantages of crystal oscillators over other LC oscillators?
7. Sketch a positive clipper to clip the positive cycles of a 50 Hz sinusoidal signal. Assume ideal diodes ($V_F = 0$ V)
8. Draw the circuit diagram of a Schmitt trigger.
9. What is the function of a regulator in a DC power supply?
10. What are the advantages of a Switched Mode Power Supply (SMPS)?

PART B — (5 × 10 = 80 marks)

11. (a) Explain the operation of a two stage RC coupled common emitter amplifier and discuss its frequency response.

Or

- (b) (i) With circuit diagram and necessary waveforms, explain the operation of a Class B power amplifier using complementary transistors. (12)
- (ii) Compare the power efficiencies of Class A, B and C power amplifiers. (4)

12. (a) Conduct an AC analysis on the differential amplifier and derive expressions for differential gain, common-mode gain and hence common-mode rejection ratio (CMRR).

Or

- (b) (i) Briefly discuss the chopper method of building a dc amplifier. (8)
- (ii) Briefly explain the operation of a tuned class-C amplifier and show its frequency response. (8)

13. (a) Discuss the different voltage-current - series/shunt feedback connections with expressions for gain, input resistance and output resistance.

Or

- (b) Explain the working of a Hartley oscillator and design the Hartley oscillator for a frequency of 10 kHz. Indicate the necessary conditions and assumptions made.

14. (a) With circuit diagram and relevant waveforms, explain the operation of an astable multivibrator.

Or

- (b) Discuss the working of Unijunction transistor (UJT) relaxation oscillator with associated waveforms and output frequency.

15. (a) Discuss the different types of filters used with rectifiers and compare their ripple factors.

Or

- (b) Design a Zener diode voltage regulator for the following specifications: Input voltage $V_{in} = 12 \pm 1$ V, Output voltage $V_o = V_Z = 9$ V, Load current $I_{Lmin} = 0$ mA and $I_{Lmax} = 10$ mA; Zener current $I_{Zmin} = 5$ mA; $I_{Zmax} = 40$ mA.

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