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T 8146

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2006.

Third Semester

Electronics and Communication Engineering

EC 1203 — ELECTRONIC CIRCUITS – I

(Common to B.E. (Part-Time) Second Semester, R 2005)

(Regulation 2004)

Time : Three hours **Maximum** : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is thermal runaway in a transistor?
2. Explain the use of JFET as a Variable Voltage Resistor.
3. Draw the hybrid model for transistor.
4. State Millers theorem.
5. What is the significance of Octaves and Decades in frequency response?
6. The midband gain of an amplifier is 100 and the lower cut off frequency is 1 KHz. Find the gain of the amplifier at a frequency of 20 Hz.
7. What is a heat sink? Give its advantages.
8. Draw the circuit diagram of transformer coupled class A amplifier.
9. Draw the half wave voltage doubler circuit.
10. Give the schematic of power control using SCR.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Give the guide lines for the analysis of transistor circuit for its small signal behaviour. Explain with an example. (8)

(ii) Define CMRR. Explain the methods used to improve CMRR. (8)

Or

(b) (i) With small signal equivalent circuit of emitter follower, derive its input impedance, Av and output impedance. (10)

(ii) Employ Bootstrapping technique in the emitter follower circuit and derive its input impedance. (6)

12. (a) What is the need for biasing BJT? Explain the different types of biasing circuits. (16)

Or

(b) (i) What is DC load line, how will you select the operation point, explain it using common emitter amplifier characteristics as an example. (8)

(ii) Explain the voltage divider bias circuit for n-channel J FET give its DC analysis. (8)

13. (a) (i) Give the relationship between rise time and upper cut off frequency. (4)

(ii) Give the relationship between bandwidth and rise time. (4)

(iii) What do you understand by frequency response of an amplifier? How is it plotted? (8)

Or

(b) Derive the expression for CE short circuit current gain of transistor at high frequency. (16)

14. (a) The loud speaker of 8 Ω is connected to the secondary of the output transformer of a class A amplifier circuit. The quiescent collector current is 140 mA. The turns ratio of the transformer is 3 :1. The collector supply voltage is 10 V. If a.c. power delivered to the loudspeaker is 0.48 W, assume ideal transformer, calculate :

(i) Power developed across primary

(ii) RMS value of load voltage

(iii) RMS value of primary voltage

(iv) RMS value of load current

(v) RMS value of primary current

(vi) The DC power input

(vii) The efficiency

(viii) The power dissipation. (16)

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Or

(b) (i) Explain the working class D amplifier. What is its efficiency and state its application. (8)

(ii) What is cross over distortion in amplifier, suggest a method to eliminate it? (8)

15. (a) (i) What is an SMPS, with a functional block diagram explain its basic working principle. (8)

(ii) Design a simple zener regulator to give a DC fixed output of 5 V up to a load current of 50 mA. (8)

Or

(b) Explain the working of bridge rectifier. Give the expression for RMS current, PIV, Ripple factor and efficiency. (16)

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