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Question Paper Code : 50959

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Third Semester

Electronics and Communication Engineering

EC 3353 — ELECTRONIC DEVICES AND CIRCUITS

(Common to : Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Determine the diode current at 20°C for a Silicon diode with reverse saturation current of 50 nA and an applied forward bias of 0.6 V.

2. Compare half wave and full wave rectifier.

3. What is an Operating point in BJT?

4. What is the need for biasing?

5. State the importance of coupling capacitor in an amplifier.

6. Define CMRR.

7. List the advantages of negative feedback.

8. What are the necessary conditions for oscillation?

9. Why is heat sink required in power amplifiers?

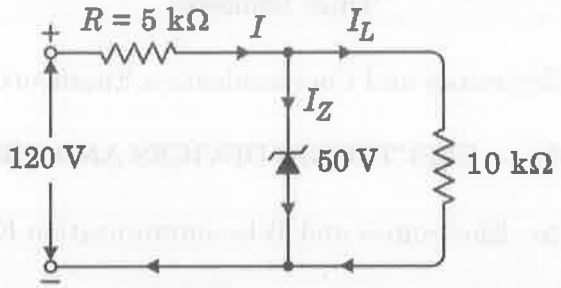
10. What is the angle of conduction of class B and Class AB power amplifiers?

PART B — (5 × 13 = 65 marks)

11. (a) Derive the average voltage and RMS voltage of a full wave rectifier output. Also compute the average voltage and RMS voltage when the peak input voltage is 20 V.

Or

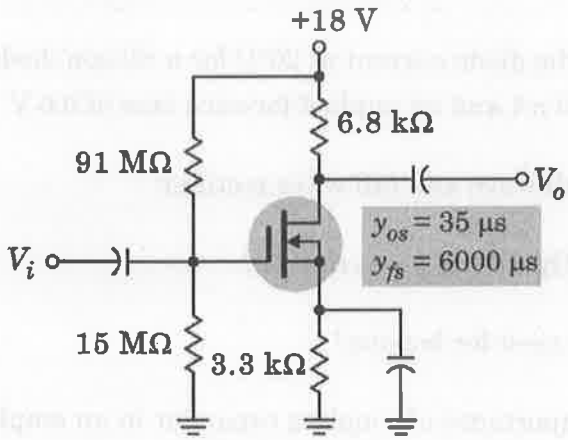
(b) For the circuit shown in Figure below find (i) the output voltage across 10 kΩ (ii) the voltage drop across series resistance 5 kΩ (iii) the current through Zener diode (iv) the current through 10 kΩ.



12. (a) For the voltage divider bias circuit for biasing BJT, derive the expression for I_{CQ} and V_{CEQ}.

Or

(b)



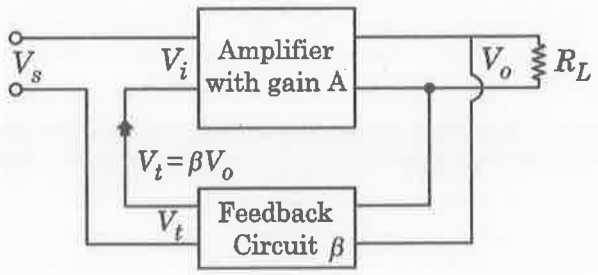
Find the output voltage V_o, for the input voltage V_{in} = 4 mV.

13. (a) Analyze and determine the gain of differential amplifier using BJT in common mode and difference mode.

Or

(b) Explain the effects on cut off frequencies and bandwidth of multistage amplifier MOSFET frequency response.

14. (a) Derive the voltage gain, input impedance and output impedance of the following voltage series feedback amplifier configuration.



Or

(b) Explain the working phase shift oscillator and determine the oscillating frequency.

15. (a) Explain the working of Buck type DC/DC convertor with relevant circuit diagrams

Or

(b) Describe the working of class A and Class B amplifier using BJT.

PART C — (1 × 15 = 15 marks)

16. (a) Design an electronic circuit which requires a constant DC voltage of 8V for its operation. The available supply is 12V ± 1V. The electronic device can be assumed to be purely resistive of resistance 2 kΩ. Design a simple shunt regulator using Zener diode. Choose appropriate resistance values for the design.

Or

(b) Calculate the oscillator frequency for an FET Hartley oscillator as in Figure for the following circuit values: C = 250 pF, L1 = 1.5 mH, L2 = 1.5 mH, and M = 0.5 mH.