Roll No. ..... Total Pages : 3

GSE/M-21 **1480**

PHYSICS

(Semiconductor Devices)

Paper–II

Time : Three Hours] [Maximum Marks : 40

Note : Q. No. 1 is compulsory. Attempt *four* more questions selecting *one* question from each unit. All questions carry equal marks. Use of Non-programmable calculator is allowed.

Compulsory Question

1. (a) Discuss effect of temperature on the electrical conductivity of a semiconductor. 2

(b) What is a load line ? How is it obtained. 2

(c) What are positive and negative feed backs ? 2

(d) Why Emitter follower has high input impedance ? 2

UNIT–I

2. (a) Describe Zener Diode. Discuss how it is used as a constant voltage regulator ? 5

(b) Describe π-filter. 3

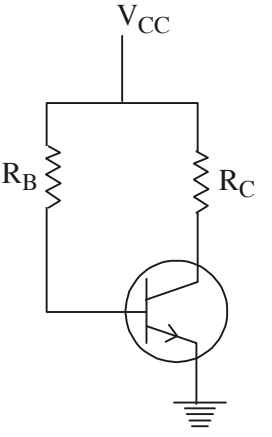
3. (a) What is a Rectifier ? Derive expressions for ripple factor of a half wave rectifier. 5

(b) What is a P-N Junction Diode ? Explain its action forward and reverse biasing. 3

UNIT–II

4. (a) Discuss the input and output characteristics of a transistor in common base configuration and draw a circuit to obtain these characteristics. 6

(b) Calculate the collector current and the collector to the emitter voltage in the following circuit. Take R_B = 300 K ohm R_C = 2 K ohm, B = 50, V_{CC} = 6 V.



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5. (a) Draw a circuit and explain working of NPN transistor. 4

(b) Explain collector to Base Bias circuit. 4

UNIT–III

6. Draw the circuit diagram of a two stage RC coupled amplifier and explain the use of different resistances and capacitances. Explain the frequency response. 8

7. (a) Draw a circuit for common emitter amplifier and explain its working. 5

(b) How the use of negative feed back in an amplifier improves its gain stability ? 3

UNIT–IV

8. (a) Draw a circuit for common emitter collector tuned oscillator and explain its working. 6

(b) The tuned collector oscillator circuit used in the local oscillator of a radio receiver make use of an LC tuned circuit with L = 0.1 mH and C = 400 pf calculate the frequency of oscillations. 2

9. Give the construction and working of CRO. Discuss its uses. 8