$\eta = 0.7$, $I_p = 0.5$ mA, $V_p = 15.0$ V, $V_u = 0.8$V, $I_u = 2$ mA, $R_{BB} = 6$ kΩ.

Normal leakage current with emitter open = 3 mA. The firing frequency is 1.5 kHz for C = 0.05 μF. Compute the values of charging resistor and the external resistors connected in the base circuits. Take forward-voltage drop of E-B, Junction as zero and if the frequency of firing of SCR in above problem is changed by varying charging resistor R, obtain the maximum and minimum values of R and corresponding frequencies. **15**

8. (a) Differentiate natural and forced commutation. **7½**

(b) With the help of suitable diagrams, explain Class D and Class E commutation. **7½**

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B. Tech. EXAMINATION, Dec. 2018

(Third Semester)

(B. Scheme) (Main & Re-appear)

(EE, EEE)

EE207B

POWER ELECTRONICS DEVICES

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Describe the construction and working of LED. **7½**

(b) A single-phase half wave uncontrolled rectifier is connected to RL load. Derive an expression for the load current in terms of v_m, z, w. **7½**

2. (a) Explain saturation and cut-off mode of operation of BJT. **7½**

(b) Describe Eber-moll's model in detail. **7½**

Unit II

3. (a) Explain following terms in detail for Biasing : **7½**

(i) Collector to base Bias

(ii) Self-bias

(iii) Emitter Bias.

(b) Describe construction and characteristics of power transistors. **7½**

4. (a) Discuss applications of FET as a VVR. **7½**

(b) Explain construction and working of Power MOSFET. **7½**

Unit III

5. (a) Explain the role and applications of power electronics in recent time. **7½**

(b) Describe BENISTOR in detail. **7½**

6. Explain the following in detail : **15**

(a) GTO

(b) DIAC

(c) TRIAC

(d) Metal oxide controlled thyristor.

Unit IV

7. A Relaxation oscillator, using an UJT, is to be desgined for Triggering an SCR the UJT has the following data :