JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2023

B.Tech-III Semester (ECE)

COURSE CODE (CREDITS): 18B11EC313 (4) MAX. MARKS: 25

COURSE NAME: ELECTRONIC DEVICES AND CIRCUITS

COURSE INSTRUCTORS: Dr. Shruti Jain MAX. TIME: 1 Hour 30 Min

***Note:*** *(a)All questions are compulsory.*

*(b)Marks are indicated against each question in square brackets.*

*(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems*



**Section A (Short Answers : 1 × 5 = 5 marks) [CO2, 3]**

1.

i. Is it possible to make a transistor by connecting two semiconductor diodes back to back? Justify

ii. Which of the transistor currents is always the largest? Which is the smallest?

iii. Which cut-off of current is greater? $I_{CEO}$ or $I_{CBO}$. How?

iv. The intersection of the dc load line with the given base current is called _____

v. For switching operation of a BJT, transistor must operate in_____region.

**Section B (Long Answers : 4 × 5 = 20 marks)**

2.

[CO2]

i. Define common emitter transistor and common base transistor current gain. Find the relationship between two gains. **[1]**

ii. A transistor has a base current 100μA, $I_{CO}$ =12 μA, and $\alpha$ = 0.95. Calculate emitter current and collector current. **[2]**

iii. For common emitter configuration, collector current of a transistor is 90mA and its current gain is 65. Calculate the value of base current and emitter current. (Note : use only current gain formulas). **[2]**

[CO2]

3.

i. Fig 1 shows the NPN transistor circuit. If the voltage across the base emitter is 0.6V, the voltage between collector emitter terminals is 0.35V, and dc current gain is 80. Find the operation mode of the transistor. **[3]**

ii. Sita wants to use common emitter configuration in her project in different regions. Explain her different regions with the help of output characteristics. **[2]**

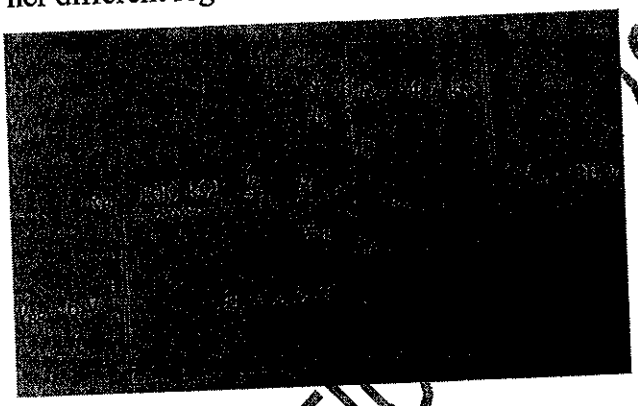

Fig 1

[CO2, 3]

4.

i. Why does the common emitter transistor provide large current amplification while the common base configuration does not? **[1]**

i. Help Rama in designing hybrid equivalent circuit of a common emitter configuration. She also wants to evaluate voltage gain and input resistance. **[2]**

ii. What do you mean by the distortion output in amplifiers? Explain how you can obtain an undistorted output of an amplifier? **[2]**

[CO2, 3]

5.

i. For voltage divider bias circuit of an NPN transistor, calculate the values of $R_1$ and $R_C$ . Assume $I_C = 1$ mA, $V_{CE} = 2.6$V, $R_2 = 10$ kΩ, $R_E = 350\Omega$, $V_{CC} = 6$V, $V_{BE} = 0.65$V, $\beta = 100$. **[3]**

ii. What is the Stability factor? Derive the expression for Stability factor. **[2]**