

- (c) A certain transistor has α_{DC} of 0.98 and a collector leakage current I_{CO} of $1\mu A$. Calculate the collector and base currents when $I_E = 1mA$. (5)
6. (a) What are the different biasing arrangements used with a transistor? Explain the working of a fixed bias circuit without R_E . (7)
- (b) Give the working of a voltage divider biasing circuit used with a NPN transistor. Also find the expressions of I_E and V_{CE} for this circuit? (6)
- (c) Calculate the values of I_C and V_{CE} for a voltage divider biasing circuit used with a NPN transistor. Given $R_1 = 40K\Omega$, $R_2 = 5K\Omega$, $R_C = 5K\Omega$, $R_E = 1K\Omega$, $\beta = 60$, $V_{CC} = 12V$, $V_{BE} = 0.3V$. (5)
7. (a) Draw the block representations of four types of negative feedback circuits. What is the difference between a negative and positive feedback? (7)
- (b) Derive an expression to illustrate that the voltage gain in an amplifier circuit with negative feedback is less than the gain without feedback. (6)
- (c) Calculate the gain A_F of a negative feedback amplifier with gain $A = 100$ and feedback factor $\beta = 0.1$. (5)

(1000)

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3510

I

Unique Paper Code : 2514001003

Name of the Paper : Fundamentals of Electronics

Name of the Course : B.Sc. (H) Electronics (GE)

Semester : I

Duration : 3 Hours Maximum Marks : 90

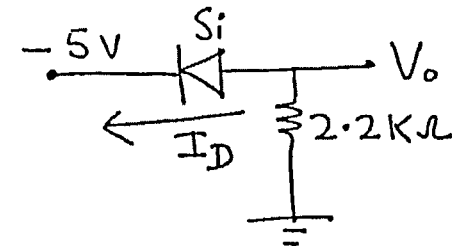
Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
 2. There are **seven** questions in all, out of which you have to attempt any **five** questions.
 3. **All** questions carry equal marks.
 4. Question No. 1 is Compulsory.
-
1. (a) State and explain Kirchoff's Current Law with the help of an example. (3)
 - (b) A voltage source of 10V is in series with a 2Ω resistance between terminals A and B. Convert above combination to a current source in parallel with a resistance between terminals A and B. (3)

P.T.O.

- (c) What do you mean by depletion region in a PN junction diode? (3)
- (d) Explain why an ordinary junction transistor is called bipolar? (3)
- (e) Define the terms stability and stability factor for a transistor. (3)
- (f) What are the requirements of a transistor biasing circuit? (3)
2. (a) State superposition theorem and explain it with the help of an example. What is the limitation of this theorem? (7)
- (b) Three resistances having values 3Ω , 6Ω and 9Ω respectively are in parallel with a current source of 9A. Using current divider rule, find current through all three resistors. (6)
- (c) A 2Ω resistance and a load resistance R_L are in series with a 6V voltage source. Which value of R_L will absorb the maximum power from the voltage source? Also calculate the maximum power absorbed by R_L . (5)
3. (a) Draw the circuit diagram of a bridge rectifier. Explain its working with the help of necessary waveforms. Give its advantage over half wave rectifier. (7)

- (b) Draw the I-V characteristics of a Zener diode and explain its working in reverse bias. Define Zener breakdown voltage. (6)
- (c) Calculate voltage V_o and current I_D in the following diode circuit : (5)



4. (a) Explain the working of a positive clamper circuit. Also draw its output waveform if a square wave is applied at the input. (7)
- (b) What is a negative clipper? Draw the circuit diagram of a negative clipper circuit and explain its working with the help of waveforms. (6)
- (c) Why LED is operated in forward bias and photodiode is operated in reverse bias? Give one application each of LED and photodiode. (5)
5. (a) Show the biasing arrangement for a PNP transistor in CB configuration so that it works in active region and explain its working. (7)
- (b) Sketch the typical input and output characteristics of a PNP transistor in CE configuration and explain its working. (6)