[Total No. of Questions - 9] [Total No. of Printed Pages - 3] (2125)

15010

B. Tech 1st Semester Examination

Fundamentals of Electronics Engineering (CBS)

EC-101

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question each from section A, B, C & D. Section E is compulsory.

SECTION - A

1. (a) Describe the principle of working of LED. What are the merits of LED? (6)

   (b) Draw and explain the working of full wave centre tap rectifier. Derive the equation for ripple factor and its rectification efficiency. (6)

2. (a) What is an avalanche photo-diode? Describe its working. Draw and discuss its V-I characteristics. (6)

   (b) Differentiate between Zener diode and P-N junction ordinary diode. Also, explain how Zener diode breakdown differs from avalanche breakdown. (6)

SECTION - B

3. (a) Draw and explain voltage and current gain of CB configuration with input and output characteristics. (6)

   (b) Explain the detailed operation of N-channel JFET and draw its characteristics. (6)

[P.T.O.]

4. (a) In the circuit of given Figure 1, V_{CE}sat = 0.2 V, V_{BE} = 0.7 V, I_{CBO} = 0, β = 50. Find the value of R_b that just result in saturation; if:

   (i) Capacitor is present.

   (ii) Capacitor is short circuited. (6)

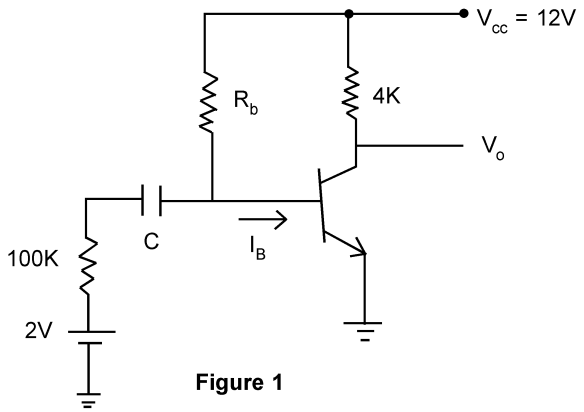

Figure 1

   (b) What are the different biasing schemes used for JFET? Explain the fixed-bias with necessary equations. (6)

SECTION - C

5. (a) Draw the block diagram of Operational Amplifier (OP-AMP). Also explain detailed working of every block. (6)

   (b) Describe Hartley Oscillator circuit and explain its action. (6)

6. (a) Draw the circuit diagram of op-amp in inverting and non-inverting configuration. Derive an expression of voltage gain in each case. (6)

   (b) Draw the circuit diagram of Colpitt oscillator and explain its action. (6)

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SECTION - D

7. (a) What is half adder? How it is realized using logic gates? Design a full adder circuit using NAND gate. (6)

   (b) Sketch the Cathode Ray Tube (CRT) with electric focusing and deflection system. How can you measure unknown voltage and unknown current with the help of CRO? (6)

8. (a) Convert the following:

   (i) $1111_2 =$_____^{10}

   (ii) $23_{10} =$ _____^{2}

   (iii) $5.5_{10} =$ _____^{2} (6)

   (b) Explain the unknown frequency and phase measure methods using Lissajous Pattern in CRO. (6)

SECTION - E

9. Attempts all parts:

   (a) Define volt equivalent of temperature. What is its magnitude at room temperature? (3)

   (b) What is meant by reverse recovery time t_{rr}? Why its value is higher for silicon than that of germanium? (3)

   (c) Sketch the CB output characteristics for the transistor. Explain the shape of curves qualitatively. (2)

   (d) Show that the maximum efficiency of a half wave rectifier is 40.6%. (2)

   (e) Discuss the effect of Re on the performance of common-emitter amplifier. (2)

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