1059
B.E. (Information Technology)
Second Semester
EC-202: Basic Electronics (Old)

Time allowed: 3 Hours

Max. Marks: 50

NOTE: *Attempt five questions in all, selecting atleast two questions from each Section.*

x-x-x

Section –A

I a) Describe bridge rectifier with filter circuit and derive an expression for rectification efficiency.
  b) Draw the equivalent circuit of a UJT and discuss its input characteristics curve. Also determine frequency of oscillations for a saw-tooth wave. (5, 5)

II   a) Draw and explain the full wave bridge rectifier circuit. Also derive expressions for the following(05, 05)
  parameters. -a) I_{RMS} b) I_{avg} c) Conversion Efficiency (η)   d) PIV
  b) Give the constructional detail of a LED. Explain its working principle and draw the output characteristics.

III   a) Differentiate between extrinsic and intrinsic semiconductors.Discuss the effect of temperature   (05, 05)
on conductivity, mobility and minority charge carriers lifetime in both types of semiconductors .
  b) Why are indirect semiconductors used as absorbers in solar cells despite their inferior absorption coefficient compared to direct semiconductors?State principle of solar thermo-electric converters.

IV   a) Design a Zener voltage regulator for the following specifications:
  Input Voltage=10V±20%, Output Voltage=5V, I_L=20mA,Iz_{min}=5mA and Iz_{max}=80mA.(05, 05)
  b) For the single stage amplifier circuit shown in Fig. 1, calculate Voltage gain, Input impedance and Q- Point. Given β_{ac}=150 & r_{in}=2kΩ
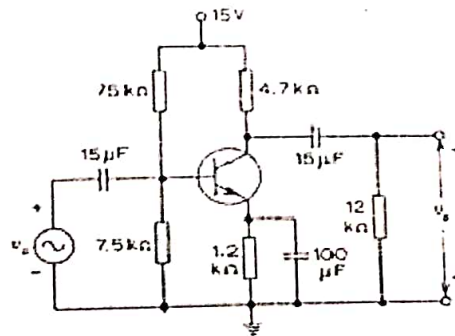

Fig. 1

Section- B

V a) Discuss the importance of Thermal run away and Thermal stability while designing a Bipolar (05, 05)
  transistors amplifiers.
  b) The class-A amplifier circuit shown in Fig. 2 is driven with a base current of 8.5 mA peak.
   Calculate the input DC power, the power dissipated in the transistor, the signalpower delivered to the load and the overall efficiency of the amplifier, givenβ=30 andV_{BE}=0.7V.
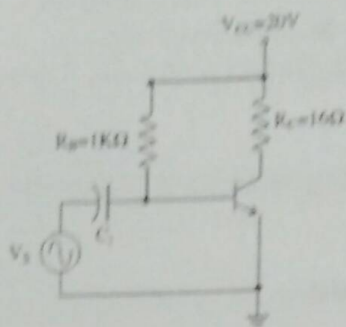
P.T.O.

(2)

Fig. 2

VI a) What do you understand by pinch off voltage in a JFET? Derive an expression for I_{DS} and explain output characteristics I-V curves of a typical JFET.   (05, 05)

   b) What is thermal runaway? Discuss the technique used to avoid it.

VII a)   Draw a small signal h-parameter equivalent circuit for the CE amplifier shown in fig.3.   (10)
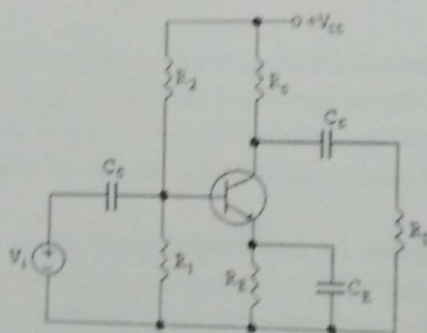

Fig. 3

Find an expression for voltage gain of the amplifier. Compute the value of voltage gain, if $R_C = R_L = 800\Omega, R_1 = 1.5k\ \Omega, R_2 = 3k\ \Omega, h_{re} \approx 0, h_{oe} = 100\mu S, h_{fe} = 90$ and $h_{ie} = 150\ \Omega$.

VIII a) Discuss the operation of JK flip-flop. Derive the JK flip-flop from it.

    b) Compare the CE,CB and CE amplifier configurations along with their advantages and   (5, 5)
    disadvantages over each other.

X-X-X