(Please write your Exam Roll No.) Exam Roll No. .....

END TERM EXAMINATION

SECOND SEMESTER [B.TECH] MAY- JUNE 2016

Paper Code: ETEC-106 **Subject: Electronics Devices (Batch 2014 onwards)**

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

Note: Attempt any five questions including Q.No1 which is compulsory. Select one question from each unit. Assume missing data suitably if any.

Q1 (a) Describe the properties of Intrinsic and Extrinsic semi conductors.
(b) What do you mean by thermal runaway of a transistor? Explain.
(c) Explain the working of negative clipper with its circuit diagram.
(d) Why does Fermi level shift toward conduction or valence band with doping.
(e) Define h-parameter and hence derive h-parameter model of a transistor in CE configuration. **(5x5=25)**

UNIT-I

Q2 (a) What are energy bands? How are these formed? Distinguish between a conductor, an insulator and a semiconductor on the basis of energy diagram. **(6.5)**
(b) A slice of intrinsic silicon bar is 3mm long and has a rectangular cross section 50μm *10μm. At 300K, determine the electric field intensity in the bar and the voltage across the bar when a steady current of 2μA is measured.
Take the value of resistivity=2.30* 10^5Ωcm at room temperature (300K). **(6)**

Q3 (a) Define diffusion capacitance. Derive an expression for the same. **(6)**
(b) Show that the Fermi level of an intrinsic semiconductor lies much closed to the middle of the band gap. How does the intrinsic carrier density depend upon the band gap? **(6.5)**

UNIT-II

Q4 (a) Name the important process that occurs during the formation of a p-n junction. Explain briefly with the help of suitable diagram, how a p-n junction is formed. Define the term 'barrier potential'. **(6.5)**
(b) Why is Zener diode considered as a special purpose semiconductor diode? Draw the I-V characteristics of Zener diode. Describe briefly with the help of a circuit diagram how a Zener diode works to obtain a constant DC voltage from the unregulated DC output of a rectifier. **(6)**

Q5 (a) Write short note on:- **(6)**
(i) LED
(ii) Schottky barrier diode
(b) Explain the working of a half wave rectifier. Also determine ripple factor, efficiency and peak inverse voltage. **(6.5)**

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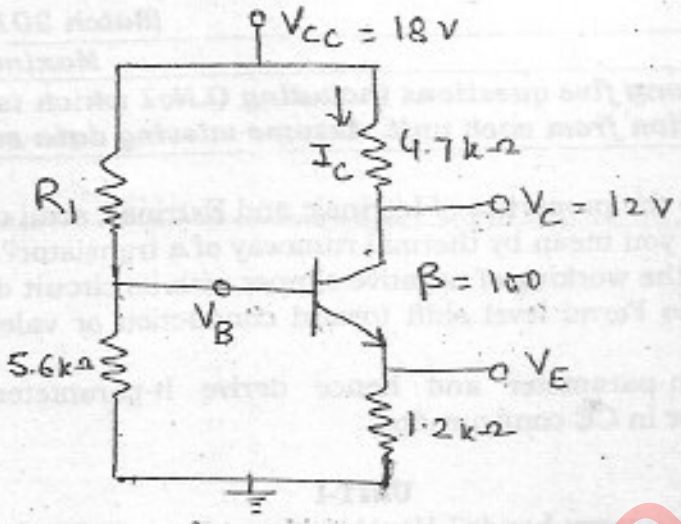
ETEC-106
P1/2

UNIT-III

Q6 (a) For the circuit shown in the figure given below, find I_C, V_B, V_E, R_1. **(6.5)**



(b) What is biasing? Discuss the factor which causes bias instability in a transistor. **(6)**

Q7 (a) Draw and explain the input and output characteristics of a transistor in CB configuration. Indicate the cut off saturation and active region. **(6.5)**

(b) Find the operating point for the voltage divide bias circuit with β=80 and V_{BE}= 0.6 V. Find the new operating point when β changes to 100 and V_{BE} changes to 0.25V. Given V_{CC}=15 V, R1=100KΩ, R_2=18 KΩ, R_C=4.7 KΩ, R_E=1KΩ. **(6)**

UNIT-IV

Q8 (a) Draw the hybrid π model of a transistor and explain the significance of each component in the model. **(6.5)**

(b) Explain the I-V characteristics of N channel enhancement mode MOSEFT and indicate the distinct regions of operation. **(6)**

Q9 (a) Explain the neat circuit diagram, the operation and characteristics of a JFET. Distinguish between n- channel and p-channel JFET. **(6.5)**

(b) Determine the minimum cost SOP expressions for the function $F(x_1,x_2,x_3,x_4) = \Sigma m(4,6,8,10,12,15) + D(3,5,7,9)$ **(6)**

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ETEC-106

P2/2