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KD-6169

B. E. II (Sem. III) (Computer) Examination

December – 2012

Linear Electronics - I

Time : Hours] [Total Marks :

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. 2 (Sem. 3) (Computer)**

Name of the Subject :

☛ **Linear Electronics - 1**

☛ Subject Code No. : **6 1 6 9** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Assume suitable data wherever required.
(3) Figures on right indicate marks.
(4) Use of scientific calculator CASIO f*x*-82/83 or f*x*-100 or equivalent of other companies is allowed.
(5) Attempt all the questions.

1 (a) Answer the following : **10**

(1) Define Ripple factor

(2) What is donor type semiconductor material ?

(3) I_{CBO} is _____ current in _____ configuration.

(4) Draw the symbol of zener diode and state where it is used.

(5) For Si diode V_D = _____

(6) The output is taken from _____ terminal is case of an emitter follower circuit.

(7) The voltage gain of common collector amplifier is _____.

(8) The diode characteristic equation is _____ .

(9) Define extrinsic semiconductor.

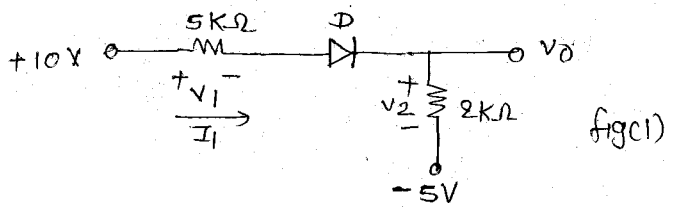
(10) If both the junction of transistor are in forward biased, then transistor is in _____ region.

(b) (1) Draw and explain the V-I characteristics of Diode. **5**

(2) Explain the concept of diffusion capacitance. **5**

2 (a) Draw the circuit of Half wave rectifier with capacitor fiter and explain it in detail. 8

(b) Find I_1, V_1, V_2 and X_0 for the given Ckt. 4



fig(1)

(c) Define efficiency and ripple factor of a rectifier. 3

OR

2 (a) Draw the Ckt of centre tap full wave rectifier and derive all the necessary equations. 10

(b) Explain the current flow mechanism of a transistor using CB configuration. 5

3 (a) Explain how current amplification takes place in the transistor. 7

(b) Calculate the value of R_2 and R_C to place Q point at I_E = 2 mA and V_{CE} = 6V in the given Ckt. V_{BE} = 0.2 V and α = 0.985 and I_{CBO} = 4 μA. 8

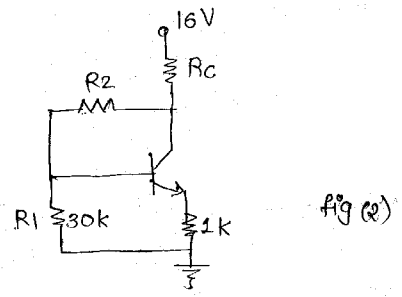
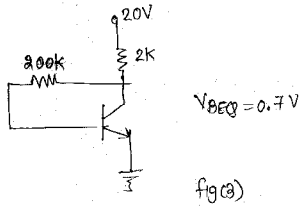


fig (2)

OR

3 (a) Calculate the minimum and maximum collector current in fig. (3). If β varies from 50 to 200. Also find variation in V_{CE} and show it on load line. Neglect I_{CBO}. 8



fig(3)

(b) Why do we need transistor biasing methods ? List all of them. Explain DC bias with voltage feedback. 7

4 (a) Attempt the following : **10**

(1) Ic is generally made up of _____

(2) Define : Compensation techniques for stabilization.

(3) Define : Thermal resistance.

(4) Define : Thermal runaway.

(5) Classified Amplifier based on Q point.

(6) Darlington amplifier is sometimes also called _____

(7) Which semiconductors are used in fabrication of ICs ?

(8) What are the applications of CB, CC and CE configuration ?

(9) How many components are fabricated on VLSI model ?

(10) What happen with the gain if the number of transistor cascading transistors are increases ?

(b) Attempt any two : **10**

(1) What do you mean by stabilization ? Define stability factor. Derive the expression factors S_I, S_V, S_β, S_{VCE} and S_{RE} for transistor amplifier circuit.

(2) Explain Monolithic IC fabrication process.

(3) Explain Photolithography process for IC fabrication.

5 Write short notes : (any three) **15**

(1) Explain Phase splitter circuit.

(2) Explain the effect of β on Q point.

(3) Explain Boot Strapped emitter follower.

(4) Explain direct coupled amplifier circuit.

6 Attempt any two : **15**

(1) The idealized push pull class-B circuit has V_{cc} = 20V. N = 1/2, R_1 =20 Ω, h_{fe} = 20. Determine the output signal power and collector dissipation in each transistor the circuit is designed for maximum swing.

(2) Darlington Amplifier

(3) Cascode Amplifier.