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UH-6185

B. E. II (Sem. III) (EC/ECC/IC) Examination

May / June – 2012

Electronics Devices & Circuits

Time : Hours] [Total Marks : **100**

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) (EC/ECC/IC)**

Name of the Subject :

☛ **Electronics Devices & Circuits**

☛ Subject Code No. : **6 1 8 5** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Attempt all questions.

(3) Figures to the right indicate full marks.

(4) Programmable calculators are not allowed.

(5) Assume suitable data whenever necessary.

1 (a) Answer the following questions : (any ten) **10**

(i) The electronics in the _____ band are responsible for the flow of current

(a) forbidden

(b) valence

(c) conduction

(ii) For a certain transistor $\alpha_{dc} = 0.97$ and I_E = 5mA. Calculate I_C and I_B.

(iii) In a transistor _____ region is very lightly doped and very thin.

(a) Collector

(b) Emitter

(c) Base

(iv) The peak inverse voltage of each diode in a full wave rectifier with centertap transformer is _____.

(a) V_m

(b) 2_{Vm}

(c) $U_{m/2}$

(v) The _____ impurity is called as a donor impurity.

(a) trivalent

(b) tetravalent

(c) pentavalent

(vi) Name the three operating region of the transistor.

(vii) The photo diode operates on_____ effect.

(a) photoconductive

(b) Photovoltaic

(c) Photo emissive

(viii) The process of adding impurities to intrinsic semiconductor is known as_____

(ix) The relation between α and β _____.

(a) $\beta = \frac{\alpha}{1+\alpha}$

(b) $\beta = \frac{1+\alpha}{\alpha}$

(c) $\beta = \frac{\alpha}{1-\alpha}$

(x) The transition capacitance is _____ proportional to the width of depletion region.

(a) directly

(b) inversely

(xi) The depletion region penetrates more into _____ doped region.

(a) heavily

(b) lightly

(c) equally

(xii) The DC resistance of the diode is also known as _____ resistance.

(a) dynamic

(b) static

(c) forward

(b) (i) Explain the input and output characteristic of CB configuration of transmitor. **5**

(ii) Explain the forward and reverse characteristic of PN junction diode. **5**

2 (a) Explain the full wave Centertap Rectifier and derive the following parameters : 8

(i) $I_{L,rms}$

(ii) $V_{L,rms}$

(iii) $P_{L,de}$

OR

(a) Explain the full wave Bridge Rectifier and derive the following parameters. 8

(i) TUF

(ii) Rectifier efficiency

(iii) Ripple factor

(b) Explain the base width modulation. 7

3 Write short notes : (any three) 15

(i) Light emitting diode

(ii) Rectifier with different filters.

(iii) Zoner diode as a voltage Regulator.

(iv) Diode capacitances.

(v) Emitter follower

4 (a) Answer the following in brief : 10

(i) Why silicon type transistors are more often used the germanium type ?

(ii) What is quiescent point ?

(iii) What is the difference between voltage amplifier and power amplifier ?

(iv) Define the following h-parameters :

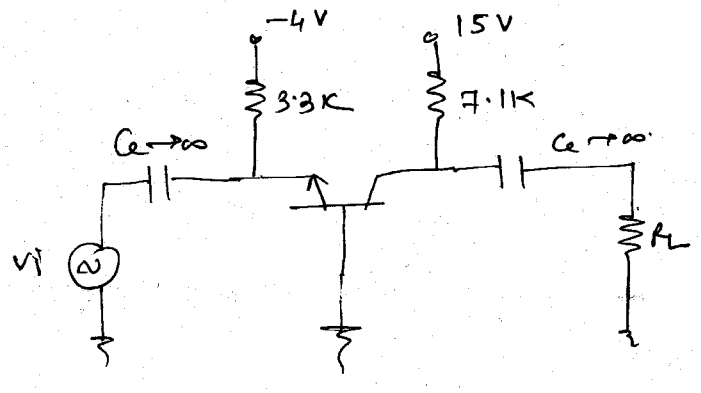
(a) hie

(b) hoe

(v) What are the main characteristics of darlington amplifier ?

(b) Explain current amplification in the transistor. 5

(c) For Si transistor of fig. given below β=100, I_{CBO} = 0 find I_{BQ} and V_{CEQ}. 5



5 (a) Draw and explain direct coupled push-pull amplifier. Write its advantages and disadvantages. 7

(b) In the figure given below the BJT has h_{fe}=50. All bypass and coupling capacitors are assumed to have zero reactance at signal frequency. 8

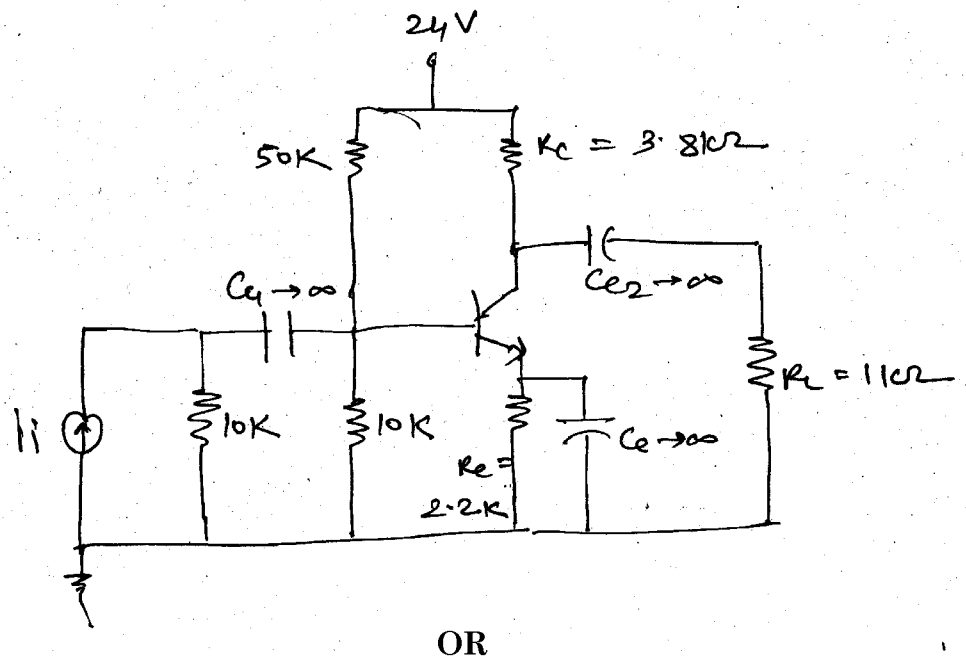
Find

(i) quiescent conditions

(ii) small signal equivalent circuit neglecting h_{oe}, h_{re}

(iii) The current gain Ai = iL/ii

(iv) i/p and o/p impedances.



OR

5 Answer the following :

(a) Obtain CB h-parameters in terms CE h-parameters. 8

(b) A single transistor is operating as an ideal class-B. amplifier with 1 KΩ load. A dc meter in the collector circuit reads 10 mA. How much signal power is delivered to the load ? 7

6 Write shortnotes on : (any three) 15

(i) Cascade amplifier

(ii) Impedance reflection in the transistor

(iii) Class C-amplifier

(iv) Difference amplifier with constant current source.