* K C - 6 1 8 5 *

KC-6185

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

November / December – 2012

Electronics Devices & Circuits

Time : **3** 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 wherever necessary.

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

(1) The cut-in voltage for Ge PN junction diode is _____ volt.
(a) 0.7 (b) 0.6
(c) 0.3

(2) The free electron is said to be in the _____ band.
(a) Conduction (b) Valence
(c) Forbidden

(3) The peak-inverse voltage is the max reverse voltage that can be applied to a diode destruction.
True / False ?

(4) The _____ diode can be used as light detector.
(a) LED (b) Photo
(3) Solar cell

(5) The relation between α and β is_____.

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

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

(6) The transition capacitance is _____ proportional to the width of depletion region.
(a) directly (b) inversely

(7) The diode _____ shows a negative resistance characteristics.
(a) Zener (b) Tunnel
(c) PN - junction

(8) In CB - configuration with emitter open the collector current is equal to _____.
(a) I_B (b) I_{CEO}
(c) I_{CBO}

(9) For a transistor if $\alpha_{dc} = 0.99$ and $I_E = 7\ mA$. Calculate I_C and I_B.

(10) The _____ impurity is known as an acceptor impurity.
(a) trivalent (b) tetravalent
(c) Pentavalent

(11) Peak inverse voltage of half wave rectifier is _____.
(a) V_m (b) $2V_m$
(c) $V_{m/2}$

(12) For the switching diodes, the forward and reverse recovery times should be as _____ as possible.
(a) Small (b) Large.

(b) (i) Explain the forward and reverse characteristics of PN junction diode. **5**

(ii) State the differences between Avanlanche breakdown and zener break down. **5**

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

(i) $I_{L,\ rms}$

(ii) $V_{L,\ rms}$

(iii) $P_{L,\ dc}$

OR

(a) Explain the half wave rectifier and derive the following parameters : **8**
(i) Ripple factor
(ii) Rectifier efficiency
(iii) TUF

(b) Explain Rectifier with different filters. **7**

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

(1) Diode switching times.

(2) Shottkey diode.

(3) Base width modulation.

(4) Input and output characteristic of CE configuration.

(5) Light emitting diode.

4 (a) Attempt following questions **10**

(1) The Q point of class A Amplifier is located _____. **1**

(2) Explain impedance reflection in transistor. **4**

(3) The current gain of darlington is β = _____. **1**

(4) Multistage amplifier are employed for having larger _____. **1**

(5) All the _____ harmonies are automatically cancelled in the push pull amplifier **1**

(6) What is the difference between voltage amplifier and power amplifier. **2**

(b) Discuss the characteristics of darlington amplifier. **5**

(c) Classify different power amplifier. **5**

5 Attempt any two **12**

(i) For the Si transistor in figure h_{fe} = 100 and $h_{re} = h_{oe}$ = 0. find h_{ie}, A_i, Z_i, Z_e. Also find Ai is the transistor amplifier is not used and load resistor of 1.5 $K\Omega$ is connected directly to input.

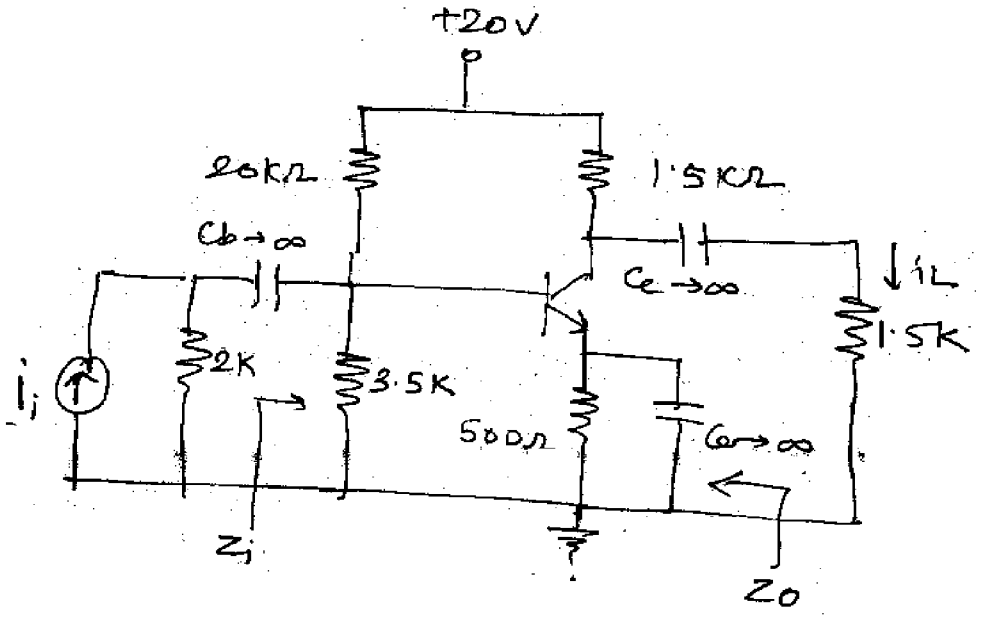

Fig.

(ii) For the given circuit find A_i, Z_i, Z_o H_{fe} = 100, h_{re} = h_{oe} = 0.

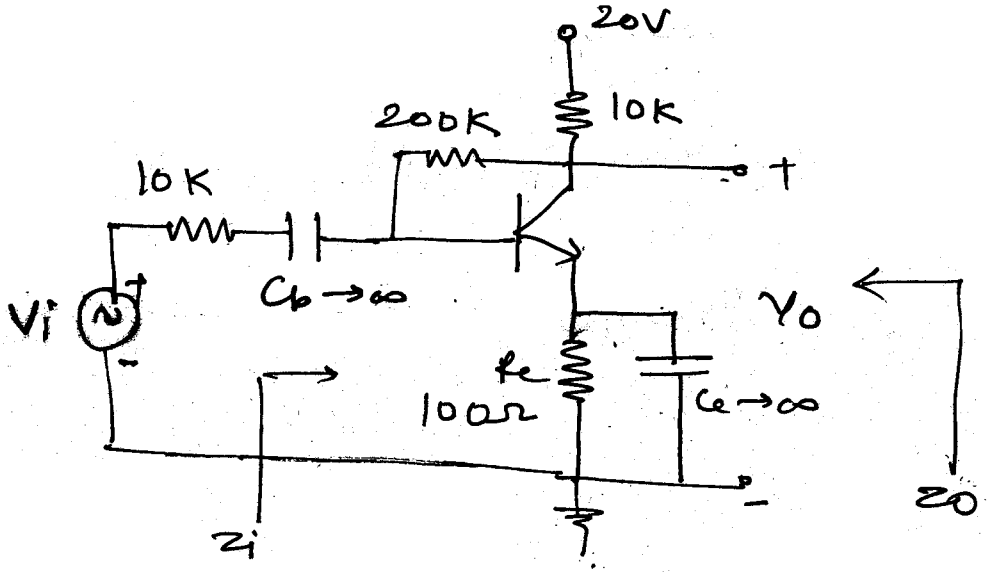

Fig.

(iii) For transistor coupled class A power amplifier maximum power of 5 watt is to deliver to the load with $PL = 4\Omega$. The Q point is adjusted for maximum symmetrical swing and V_{CC} = 20 V. Find the turns ratio N, peak collector I_{cm} and efficiency.

6 Attempt any three : **18**

(1) Cascade amplifier its advantages and significance. Discuss in detail.

(2) Write a short note on power calculations in CE amplifier

(3) For common emitter amplifier draw circuit of an amplifier, its small signal equivalent circuit and derive expression for h parameters.

(4) Discuss different types of power amplifier circuit in brief. Also discuss the location of Q point for various power amplifiers.
