## USN

## Third Semester B.E. Degree Examination, December 2011 **Electronic Circuits**

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, selecting atleast TWO questions from each part.

PART - A

Define the condition for stiff clipper and stiff clamper. With a neat diagram and waveform, explain the working of

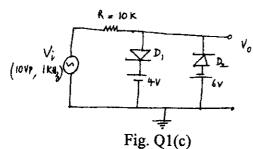
(02 Marks)

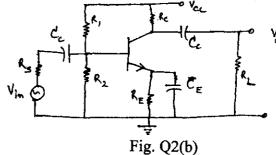
i) Positive clipper

ii) Negative clarper.

(10 Marks)

Sketch the output waveform of the circuit shown below for a sinusoidal input of 10 V peak. (Assume Si diodes). (04 Marks)





Write a note on schottkey diode.

(04 Marks)

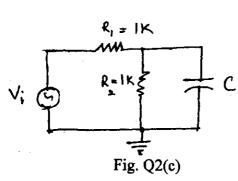
Define the following terms of a transistor amplifier circuit.

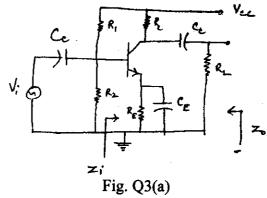
i) Q – point ii) Load line iii) AC emitter resistance (re).

(06 Marks)

b. Find the Q - point of the circuit shown below. Also find the AC emitter resistance (re).  $V_{CC} = +12 \text{ V}$ ;  $R_1 = 82 \text{ K}$ ;  $R_2 = 18 \text{ K}$ ;  $R_C = 4.7 \text{ K}$ ;  $R_E = 1.2 \text{ K}$ ;  $\beta = 90$ ;  $R_S = 500 \Omega$ ;  $R_L = 100 \text{ K. (Transistor} - \text{Si)}.$ (10 Marks)

c. Find the value of 'C' needed for effective bypass in the circuit shown below. Input signal frequency is 1.2 KHz. (04 Marks)



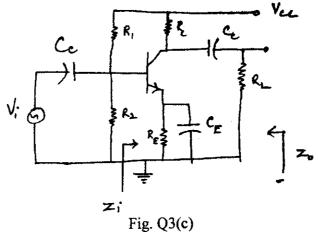


Find the voltage gain, current gain, Z<sub>i</sub>, Z<sub>o</sub> and power gain for the CE amplifier circuit shown 3 below. Derive all the formulas used.

 $R_1 = 10 \text{ K}$ ;  $R_2 = 2.2 \text{ K}$ ;  $R_E = 1 \text{ K}$ ;  $R_C = 3.6 \text{ K}$ ;  $R_L = 10 \text{ K}$ ;  $V_{CC} = +10 \text{ V}$ ;  $\beta = 95$ .

What is a swamped amplifier? What is its advantages? List the characteristics of the amplifier. (05 Marks)

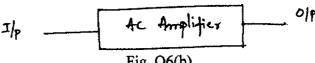
For the Darlington amplifier circuit shown below, find the base current of Q1, overall current (05 Marks) gain, and also its input resistance.



- What are power amplifiers? Give the graphical representations of the classes of power (10 Marks) amplifiers.
  - b. Explain the working of a class B pushpull amplifier. What is maximum conversion  $\eta$ ? (06 Marks)
  - c. Find the Bandwidth of class 'C' amplifier. If the tuning circuit components are 470 pF and  $2~\mu H$  and the quality factors of the circuit is 100. (04 Marks)

## PART - B

- iii) V<sub>T</sub>. a. Define the following terms of a MOSFET. i) IDSS (06 Marks) ii) V<sub>GS(off)</sub> 5
  - b. With a net diagram and characteristics, explain the working of a n channel enhancement (06 Marks) mode MOSFET.
  - c. Draw the circuit of a CMOS inverter and explain its working. Find the output voltage of the inverter. If  $V_{DD} = 20 \text{ V}$ ,  $R_{D(ON)} = 6 \Omega$ , for an input pulse varying from 0 - 10 V. sketch (08 Marks) waveforms.
- a. Define the following terms of an amplifier 6
  - iii) Band width. (06 Marks) ii) Cut off frequencies i) Frequency response
  - b. For an AC amplifier circuit shown below, if the midband voltage gain is 250,  $F_L = 25$  Hz,  $F_{\rm H}$  = 200 KHz. Draw its frequency response. Also find the gain of the amplifier at 10 Hz and (04 Marks) 900 KHz.



c. Explain the four types of negative feedback amplifiers.

(10 Marks)

- Explain the working of an inverting schemitt trigger and give the expressions for UTP and 7 (06 Marks) LTP.
  - b. Design an opamp relaxation oscillator to generate a square wave of 2 KHz and duty cycle (08 Marks) 0.5. Draw output and capacitor waveform. Take  $\beta = 0.5$ .
  - c. Explain the working of astable multivibrator using IC555, with a neat circuit diagram and (06 Marks) internal diagram.
- Define load regulation, line regulation and output resistance of a regulator. Calculate % regulation if  $V_{NL} = 9.91 \text{ V}$  and  $V_{FL} = 9.79 \text{ V}$ . (08 Marks)
  - Draw circuit diagram of zener and two transistor discrete series regulator and derive (12 Marks) equations for output voltage.