

2122  
B.E. (Electrical and Electronics Engineering)  
Third Semester  
PC-EE-303: Analog Electronics

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

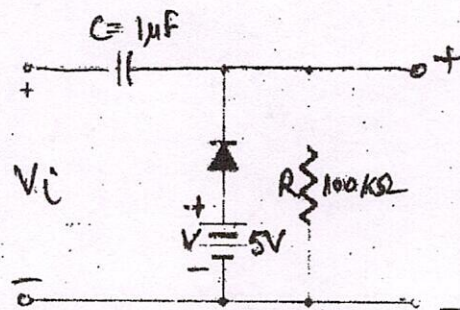
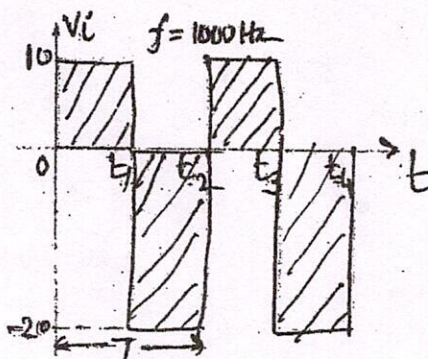
I. Attempt the following:-

- Draw I-V characteristics of a zener diode?
- Why MOSFETs are commonly called as IGFETS?
- What is the function of  $R_E$  in voltage divider bias circuits?
- State the barkhausen criteria for oscillations?
- What are the ideal characteristics of op-amp? (5x2)

**UNIT - I**

II. Consider the circuit below and answer the following:-

- Identify and name the circuit.
- Draw the output waveform at  $V_o$  of the circuit treating the diode a Silicon diode.
- Draw the output waveform at  $V_o$  of the circuit treating the diode an ideal diode.
- If the diode in the circuit burn accidentally, what will be the output waveform?
- If the capacitor of  $1\mu F$  in circuit is replaced by  $1K$  ohm resistance, then identify the circuit.



(10)

- III. a) Write about the concept of biasing in transistors? How thermal runaway affect transistor operation.
- b) Show that the Q-point in voltage divider biasing circuit is independent of the current gain.

(10)

P.T.O.



(2)

- IV. Which is the most suitable circuit to convert ac into dc? Derive the dc average current, dc output voltage and efficiency of the circuit used. (10)

**UNIT - II**

- V. Plot op amp ideal characteristics and analyse op amp as an integrator and inverting op-amp. (10)
- VI. a) If the two applied voltage signals  $V_1$  and  $V_2$  are of magnitude 2V and 5V respectively to a differential amplifier, then calculate the corresponding output signal. Also list the characteristics of differential amplifier.  
b) Explain op-amp as a zero crossing detector. (10)
- VII. Draw and explain the Wein bridge oscillators? Calculate its frequency when  $R=6k\Omega$  and  $C=2400pF$ . (10)