

## B. Tech Degree II Semester Examination in Instrumentation May 2010

### IN 202 ANALOG ELECTRONICS

Time : 3 Hours

Maximum Marks : 100

#### PART - A

(Answer ANY FIVE questions)

(5 x 5 = 25)

- I. (a) What are the importance of filters in rectifier? Explain the operation of any 3 filter circuits.
- (b) What is a 'Bode Plot'? Explain a typical bode plot with a neat diagram.
- (c) What are the different types of power amplifiers?
- (d) Explain the techniques for reducing interference.
- (e) What is the need of epitaxial growth?
- (f) How inductors are fabricated in IG?
- (g) Draw and explain the block diagram of a regulated power supply.

#### PART - B

(5 x 15 = 75)

- II. A half wave rectifier uses a diode with a forward resistance of  $100 \Omega$ . If the input ac voltage is 220V(rms) and the load resistance of  $2 \text{ k}\Omega$  determine

- (i)  $I_{max}$ ,  $I_{dc}$  and  $I_{ms}$
  - (ii) PIV when diode is ideal
  - (iii) Load output voltage
  - (iv) dc output power and ac input power
  - (v) Ripple factor
  - (vi) Transformer utilization factor
  - (vii) Rectification efficiency
- (15)

#### OR

- III. (a) Determine the peak output voltage for a negative series clipper circuit connected to an input ac sinusoidal signal of peak value 12V. The barrier potential for silicon diode is 0.7V. Draw the circuit diagram and output waveform. (7)
- (b) Determine the peak output voltage for a positive shunt clipper circuit connected to an input a.c sinusoidal signal of peak value 10V. The barrier potential of germanium diode is 0.3V, series resistor of  $400 \Omega$  and load resistor is of  $2 \text{ k}\Omega$ . (8)

- IV. (a) Given the following parameters for a given transistor at  $I_c = 10 \text{ mA}$ ,  $V_{ce} = 10 \text{ V}$ ,  $h_{fe} = 100$ ,  $L_{ic} = 500 \Omega$ ,  $|A_i| = 10$  at  $10 \text{ MHz}$  and  $C_c = 3 \text{ pF}$ . Find  $F_B$ ,  $F_T$ ,  $C_e$ ,  $r_{b'e}$  and  $r_{bb'}$ . (8)
- (b) Draw the frequency response of an RC coupled amplifier and show that gain band width product is constant. (7)

#### OR

- V. (a) Three identical cascaded amplifier stages has an overall upper 3dB cut off frequency of  $200 \text{ kHz}$ . What is the upper 3dB cut off-frequency of each stage. (8)
- (b) Name the different types of distortions in amplifier and their causes. (7)

(Turn Over)

- VI. (a) Why a step down transformer is used at the output of a power amplifier? (7)  
(b) A class B push-pull amplifier is supplied with  $V_{cc} = 40V$ . The signal swings the collector voltage down to  $V_{min} = 8V$ . The dissipation in both transistors is  $38W$ . Determine -

- (i) Total power input  
(ii) Total power developed across the load  
(iii) Power rating of each transistor  
(iv) Overall efficiency. (8)

**OR**

- VII. (a) Why a class A power amplifier is cooler in the presence of signal than in the absence of signal? (8)  
(b) A power amplifier supplies  $64W$  to an output device of  $16\Omega$ . Determine ac output current and voltage. (7)

- VIII. (a) What are the different methods of coupling noise? (7)  
(b) What is drift in dc amplifier? Why DC amplifier are not suitable for amplification of high frequency signal? (8)

**OR**

- IX. (a) Draw and explain the circuit of boot strapped darlington circuit. (8)  
(b) Explain the technique of zener diode biasing for DC amplifier. (7)

- X. (a) What is a Schottky transistor? Why is storage time eliminated in such a transistor? (8)  
(b) Describe a thin film resistor. What is shunt resistance? (7)

**OR**

- XI. (a) Sketch the cross section of a junction capacitor. Draw the equivalent circuit showing all parasitic elements. (8)  
(b) Define buried layer. Why it is used? (7)