BC-102

May-2015

B.Sc., Sem.-IV

CC-204 : Electronics

Time : 3 Hours] **[Max. Marks : 70**

Instructions : (1) **All** questions carry equal marks.

(2) Symbols used here have their usual meanings.

1. (a) What is the role of feedback network in RC oscillators ? Discuss the RC phase-shift oscillator in detail. **7**

OR

Differentiate between the Colpitt's and Hartley oscillators circuit. Draw the circuit of Hartley oscillator and explain its working.

(b) List the types of multi-vibrators and explain transistorized bistable multi-vibrator in detail. **7**

OR

A rectangular pulse of voltage is applied to the base of a transistor driven into heavy saturation. Explain different switching times in a transistor with the help of waveforms.

2. (a) Prove that the optimum conversion efficiency in pure class-B push-pull amplifier circuit is 78.5%. **7**

OR

What disadvantages are there in a single ended transformer coupled power amplifier ? Explain the transformer saturation.

(b) What principal factor contributes to the doubling of the conversion efficiency in a transformer coupled load amplifier compared with an amplifier with a direct coupled resistive load ? What other advantages does the transformer provide ? **7**

OR

Explain cross-over distortion. What it is caused by, and how it is overcome ?

3. (a) List the basic processes used in silicon planar technology. Write a note on photolithography. **7**

OR

Explain the method used for fabricating diffused type IC resistor. Give the dimensions of a 4000 Ω defused resistor.

(b) Discuss the various ways for fabricating pnp transistors. **7**

OR

Explain importance of SiO_2 layer. How thick is this layer ?

4. (a) Draw the circuit diagram of inverting amplifier. Prove $A_{CL} = -R_f/R_1$ for inverting OP-AMP. Design an amplifier with a gain of –10 and input resistance equal to 10 kΩ. **7**

OR

Describe the terms (1) input bias current (2) input offset current (3) input offset voltage (4) thermal drift.

(b) For non inverting amplifier prove $A_{CL} = 1 + (R_f/R_1)$. What is voltage follower ? **7**

OR

A square wave of peak-to-peak amplitude of 500 mV has to be amplified to peak-to-peak amplitude of 3 volts, with a rise time of 4 µS. Calculate slew rate. Can a 741 be used ?

5. Answer in short : **14**
   (1) What disadvantage does a phase-shift oscillator have ?
   (2) Where resonant type oscillators are used ?
   (3) An astable multi-vibrator has component values $R_{B1} = R_{B2} = R = 10$ kΩ, and $C_1 = C_2 = C = 120$ pF and $R_{L1} = R_{L2} = R_L = 1$ kΩ. Find frequency of oscillation.
   (4) How many stable states does an astable multi-vibrator have ?
   (5) What type of bias is used in a true class B push-pull amplifier ?
   (6) What are the advantages does push-pull provide ?
   (7) The maximum theoretical conversion efficiency of a class A amplifier utilizing a direct coupled resistive load is _____.
   (8) Give any two advantages of integrated circuits over the circuits those made by interconnecting discrete components.
   (9) What is the full form of SiO_2 ?
   (10) What is VLSI ?
   (11) Why n-p-n transistors are preferred in integrated circuits compared to p-n-p transistors ?
   (12) Define slew rate ?
   (13) What is the full form of DIP ?
   (14) A 741 op amp is available in a 14-pin DIP package. What is the pin number for (1) inverting input (2) non-inverting input (3) output

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