AO-102

May-2016

B.Sc., Sem.-IV

CC-204 : Electronics

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

Instructions : (1) Symbols have their usual meanings.

(2) All questions carry equal marks.

1. (a) Draw the block diagram of a feedback system. What is the advantage of positive feedback ? Discuss the effect of positive feedback in detail with suitable examples. **7**

OR

Differentiate between the RC phase-shift and Wien Bridge oscillators. Draw the circuit of RC phase-shift oscillator and explain its working.

(b) Why astable multivibrator is called *"Free-running multivibrator"* ? Explain transistorized astable multivibrator in detail. **7**

OR

Which type of multivibrator is known as *"flip-flop"* ? Draw a transistorized flip-flop circuit using NPN transistors and explain it.

2. (a) What is the advantage of transformer coupled resistive load class-A power amplifier over direct coupled resistive load class-A power amplifier ? Draw the circuit of transformer - coupled resistive load class-A power amplifier and explain its working. Prove that for this circuit optimum conversion efficiency $\eta = 50\%$. **7**

OR

Prove that the optimum conversion efficiency in class-B push-pull amplifier circuit is 78.5%.

(b) Draw the simplified circuit of a class-B push-pull complementary symmetry amplifier without transformer. Explain its working in brief. **7**

OR

Explain the terms (1) Thermal runaway (2) Harmonic Distortion (3) Cross-over distortion.

AO-102 1 **P.T.O.**

3. (a) Write a note on fabrication technique of MOSFET. What are the advantages of polysilicon – gate ? **7**

OR

List four different methods available for fabricating integrated resistors. Explain shortly fabrication of Thin-Film resistor.

(b) Explain how silicon wafers are prepared. **7**

OR

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

4. (a) What is an Op-Amp ? List characteristics of an ideal Op-Amp. Design an inverting Op-Amp with a gain of –10 and input resistance = 10000 Ω. **7**

OR

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

(b) What is voltage follower ? Define CMRR. List any six parameters given in manufacturer's data sheet of an Op-Amp. **7**

OR

Write a short note on inverting amplifier.

5. Answer in short : **14**

1. What are basic requirements for oscillations ?
2. Calculate the frequency of oscillations for a Wien Bridge oscillator having R = 10 kΩ and C = 500 pF.
3. An astable multivibrator 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. Where bistable multivibrator is used ?
5. Why transformer is used in the output of the power amplifier ?
6. Define conversion efficiency for transistor power amplifiers.
7. What are the advantages does pupsh-pull provide ?
8. What is the disadvantage of class AB operation ?
9. Compare discrete component circuit and ICs.
10. What do you mean by the word *"monolithic"* ?
11. What is the unit of Slew Rate ?
12. Name any two different types of 1C packages.
13. Calculate value of R_f for a non-inverting Op-Amp with a gain of +5 using one Op-Amp. Assume $R_1 = 10$ kΩ.
14. Draw the circuit symbol of Op-Amp.

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