2904N181

Candidate's Seat No :_____

BSc Sem.-4 Examination
CC 204
Electronics
April 2022

Time : 2-00 Hours] [Max. Marks : 50

Instructions: All questions in **Section – 1** carry equal marks.
Attempt **any Three** questions in **Section – 1.**
Question -9 in Section – 2 is COMPULSORY.

Section – 1

Q-1 (A) Explain effect of positive feedback with suitable block-diagram and examples. 7
(B) Classify RC oscillators. Explain Wien bridge oscillator in detail. 7

Q-2 (A) A rectangular pulse of voltage is applied to the base of a transistor driven in to heavy saturation. Explain different switching times in a transistor with the help of waveforms. 7
(B) Explain shortly the working of an astable multivibrator using transistor. 7

Q-3 (A) In a transformer coupled class A power amplifier, a power of 50 mW is to be delivered to the load R_L of 4 ohms, using a 2N109 germanium transistor and a DC supply of 9V. For the power amplifier design calculate the values of the components to be used. 7
(B) Explain how the active device (transistor) in a class A direct coupled resistive load amplifier dissipates less power when a signal is applied than with no signal input. 7

Q-4 (A) Write a short note on cross-over distortion. 7
(B) Prove that the optimum conversion efficiency in pure class-B push-pull amplifier circuit is 78.5%. 7

Q-5 (A) List the basic processes used in silicon planar technology. Explain in brief the steps used in Silicon wafer preparation. 7
(B) What are the advantages of Ion Implantation technique? Draw the block diagram of ion implantation system. Explain the system briefly. 7

Q-6 (A) Classify ICs on the basis of chip size and chip complexity. 7
(B) Explain briefly the photolithography process using ultraviolet light exposure method. 7

Q-7 (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 10kΩ. 7
(B) Draw ideal non-inverting op-amp circuit and prove $A_{CL}=1+(Rf/R1)$ 7

Q-8 (A) For an ideal inverting op-amp, R1=10 kΩ, Rf=100 kΩ, vi=1V. A load of 25 kΩ is connected to the output terminal. Calculate (1) i_1 (2)v_o (3)i_L (4) total current i_o in to the output pin. 7
(B) Describe the terms (1) CMRR (2) Slew-rate (3) input offset voltage (4) voltage follower. 7

Section – 2

Q-9 Answer in short (ANY EIGHT): 8

1 What is the formula for frequency of Wien bridge oscillator?
2 An astable multivibrator has component values $R_{B1}=R_{B2}=R=10k\Omega$, and $C_1=C_2=C=120pF$ and $R_{L1}=R_{L2}=R_L=1$ kΩ. Find frequency of oscillation.
3 Why two stages amplification is required in Wien bridge oscillator?
4 What is the full form of RFC?
5 How many active devices are used in a class-A push-pull amplifier?
6 Which class of power amplifier removes the crossover distortion by slightly forward biasing both transistors?
7 The maximum theoretical conversion efficiency of a class A amplifier utilizing a direct coupled resistive load is_____
8 In class A direct coupled resistive load amplifier, the heating of the active device is at a maximum when the input signal is _____.
9 Name any two types of IC packages.
10 What are the full forms of SSI and ULSI?
11 What is the meaning of the term ' epitaxy'?
12 What is the importance of the SiO_2 layer for the oxidation of the silicon wafer?

P.T.O.

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13 Draw schematic symbol of Op-Amp.

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

15 IC CA3741 is manufactured by _____ company.

16 For better op-amp, what may be the value of CMRR?