BACHELOR OF TECHNOLOGY (C.B.C.S.) (2020 COURSE)
B.Tech.Sem - IV E&C :SUMMER- 2022
SUBJECT : INTEGRATED CIRCUITS & AMPLIFIER DESIGN

Day : Wednesday
Date : 22-06-2022

S-24604-2022

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.:

1) All questions are **COMPUSLORY.**
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable **CALCULATOR** is allowed.

Q.1 What is the need of level shifter block in op-amp? Describe any three circuits used for level shifting. **(10)**

OR

Q.1 Define input offset voltage for an op-amp. Also discuss internal and external offset voltage compensation techniques in detail. **(10)**

Q.2 Draw the circuit diagram for inverting and non-inverting amplifier using op-amp. Also derive the expression of gain for both circuits. **(10)**

OR

Q.2 Design a practical integrator circuit with a dc gain of 10 to integrate a square wave of 10KHz. **(10)**

Q.3 Draw circuit diagram for full wave precision rectifier and describe how it rectifies the positive and negative half cycles of sine wave in detail. Also state the advantages of precision rectifier. **(10)**

OR

Q.3 Draw the neat circuit diagram of sample and hold circuit and Describe the following performance parameters. **(10)**

i) Aperture time
ii) Settling time
iii) Acquisition time
iv) Feed through rejection ratio

Q.4 Assuming ±15V supply, design an ICL 8038 sawtooth generator with f_o = 1KHz and % duty cycle = 99%. The circuit must have provision for frequency adjustment over ± 20% range. **(10)**

OR

a) With labelled circuit diagram and waveforms, derive the expression of oscillations for Astable multivibrator using op-amp. **(06)**
b) Write a short note on frequency scaling. **(04)**

Q.5 Design an astable multivibrator using IC555 for an output frequency of 1KHz but variable duty cycle of 30% to 70%. **(10)**

OR

Q.5 Write a short note on: **(10)**
a) Frequency multiplier using PLL
b) FM demodulator using PLL

Q.6 With the help of circuit diagram, discuss the operation of successive approximation type ADC. **(10)**

OR

Q.6 **a)** Which are the different techniques used to convert analog signal into the digital signal. Write the merits and demerits of each technique. **(06)**
b) Write a short note on current to voltage converter using op-amp. **(04)**

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