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

Day : Tuesday | Time : 02:30 PM-05:30 PM

Date : 29-11-2022 | **W-24604-2022** | Max. Marks : 60

N.B.

1) All questions are **COMPULSORY.**
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Use of non-programmable calculator is **allowed.**
4) Assume suitable data **WHEREVER** necessary.
5) Draw neat diagram **WHEREVER** necessary.

Q.1 **a)** What is the need of level shifter block in op-amp? Draw any three circuits of level shifter and derive the expression for it. **(07)**

b) What are the three operating temperature ranges of the IC? **(03)**

OR

Q.1 **a)** Define input offset voltage for an op-amp. Also discuss internal and external offset voltage compensation techniques in detail. **(07)**

b) Compare digital and linear IC's. **(03)**

Q.2 **a)** Design a differentiator using op-amp to differentiate an input signal that varies in frequency from 10Hz to about 10KHz. **(07)**

b) Describe with the help of circuit diagram I to V converter. **(03)**

OR

Q.2 Describe in detail with the help of circuit diagrams and waveforms the positive clipper and negative clipper. **(10)**

Q.3 **a)** Discuss the operation of full wave precision rectifier with neat circuit diagram and waveforms. **(07)**

b) What is the difference between a basic comparator and the Schmitt trigger? **(03)**

OR

Q.3 **a)** Describe any three performance parameters of sample and hold circuit. **(06)**

b) Draw the circuit diagram of log amplifier using op-amp and derive its output equation. **(04)**

Q.4 **a)** Draw the circuit diagram for band pass filter and discuss its operation with the help of frequency response. **(07)**

b) What are the advantages of active filters over passive filters? **(03)**

OR

Q.4 Design a sawtooth waveform generator using op-amp IC741 for f_o=1KHz and Vo=4Vp-p **(10)**

Q.5 With the help of neat block diagram discuss the principle of operation of phase locked loop. Describe any one application of PLL in detail. **(10)**

OR

Q.5 Design an IC555 based square wave generator to produce a symmetrical square wave of 2KHz, if Vcc = 12V. Draw the voltage waveform across timing capacitor and the output. **(10)**

Q.6 Derive the output voltage expression for a 3 bit R-2R ladder type D to A converter using op-amp. **(10)**

OR

Q.6 **a)** Which are the different techniques used to convert analog signal into the digital signal. Discuss merits and demerits of each technique. **(07)**

b) Differentiate between A to D converter and D to A converter. **(03)**

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