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

Day : Thursday | Time : 10:00 AM-01:00 PM
Date : 16-06-2022 | **S-24661-2022** | 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.

Q.1 Define the following terms with reference to operational amplifier: **(10)**

i) Input Bias Current **ii)** Input Offset Current
iii) Differential Input Resistance **iv)** CMRR **v)** PSRR

OR

Q.1 Why do we need frequency compensation for OPAMP? State the three techniques of frequency compensation. **(10)**

Q.2 Design an inverting DC amplifier using OPAMP with following specifications: **(10)**
V_i = 5m V, A_v = 100, Source resistance R_s = 50 Ω, Assume R_L = 10 KΩ and IB(max) for OPAMP = 500_n A.

OR

Q.2 Derive the equations for output of an non-inverting summing amplifier assuming three input sources. **(10)**

Q.3 Draw the circuit diagram for logarithmic amplifier and derive the equation for its output voltage. **(10)**

OR

Q.3 Design a second order HPF with Butter worth response with f_L = 10 kHz using 741 OPAMP. Compute the required slew rate for the OPAMP if input voltage (peak) = 1V **(10)**

Q.4 Design an inverting Schmitt Trigger circuit to have LTP = –1V and UTP = + 1V, to produce a ± 11V output. Assume I_b(max) = 500nA for OPAMP. Clearly state the required supply voltage value for the OPAMP. **(10)**

OR

Q.4 Draw the circuit diagram for sample and hold circuit and explain its operation. **(10)**

Q.5 Design a IC555 based astable multivibrator to give a 5kHz output signal with 50% duty cycle. Use VCC = + 18 V, given : I_{th} = 0.25 μA and I_{trig} = 0.5 μA. **(10)**

OR

Q.5 Design a phase-shift oscillator using 741 OPAMP, to produce a 3kHz frequency . The OPAMP is to use a ± 12 V supply. **(10)**

Q.6 Draw the block diagram of a PLL and explain its operation. State its applications. **(10)**

OR

Q.6 Define the following terms with reference to ADC : **(10)**
i) Precision **ii)** Offset and gain errors **iii)** Integral non linearity
iv) Stability **v)** Conversion time

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