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15EE46

Fourth Semester B.E. Degree Examination, July/August 2022
Operational Amplifier and Linear IC's

Time: 3 hrs.   Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
*   2. Issue of data sheet is required.*

Module-1

1   a.   With neat block diagram, explain operational amplifier.   (08 Marks)
    b.   Draw the circuit of differential input and differential output amplifier and derive the expression for its output voltage.   (08 Marks)

OR

2   a.   What is Instrument amplifier? For instrument amplifier using transducer bridge obtain an expression for output interms of change in resistance ΔR of the transducer. Draw the circuit diagram.   (10 Marks)
    b.   With neat circuit diagram, explain peaking amplifier.   (06 Marks)

Module-2

3   a.   For the first order low pass filter derive an expression for the voltage gain and also highest cut off frequency f_H. Draw the circuit diagram.   (10 Marks)
    b.   Explain the working and design of three terminal adjustable voltage LH317 regulator.
                                                                                      (06 Marks)

OR

4   a.   Define:
         i)   Load regulation
         ii)   Line regulation
         iii) Voltage stability factor
         iv)   Temperature stability factor.   (08 Marks)
    b.   Design a high pass filter with a cut off frequency of 10kHz with a passband gain of 1.5. Also plot the frequency response for the designed filter.   (06 Marks)
    c.   Distinguish between shunt and series regulator.   (02 Marks)

Module-3

5   a.   Explain with neat diagram triangular/rectangular generator using Schmitt trigger circuit and integrator circuit. Draw the necessary waveform.   (08 Marks)
    b.   Using a bipolar Op-Amp with a ±18V, design an inverting Schmitt trigger circuit to have UTP = 1.5V and LTP = -3V. Draw the necessary circuit diagram.   (08 Marks)

OR

6   a.   With neat circuit diagram, explain non inverting Schmitt trigger circuit, draw the transfer chars and derive an expression for hysteries, draw the input and output waveforms.
                                                                                      (10 Marks)
    b.   Using a 741 Op-Amp with a supply of ±12V, design a RC phase shift oscillator to have an output frequency of 3.5kHz.   (06 Marks)

Module-4

7 a. Explain precision full wave rectifier using Half wave rectifier and summing circuit. Derive an expression for output voltage and draw the necessary waveforms. **(10 Marks)**

   b. Explain the binary weighted technique of D/A conversion. **(06 Marks)**

OR

8 a. Explain successive approximation ADC with the help of block diagram. **(08 Marks)**

   b. With a neat circuit diagram and relevant waveform explain the working of voltage follower type peak detector. **(08 Marks)**

Module-5

9 a. What is PLL? Explain block diagram of PLL. **(08 Marks)**

   b. Explain pin and functions of each pin in 555 timer. **(08 Marks)**

OR

10 a. Define lock range, capture range and pull in time. **(06 Marks)**

    b. Explain Monostable multivibrator using IC555 timer and derive an expression for pulse width. **(10 Marks)**

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