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15EE46

Fourth Semester B.E. Degree Examination, Aug./Sept. 2020
Operational Amplifiers and Linear IC's

Time: 3 hrs.   Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a. Draw the block diagram of op-amp and explain.   (08 Marks)
    b. The 741 op-amp having following paremeters is connected as a non-inverting amplifier with $R_1 = 1k\Omega$, $R_F = 10k\Omega$, $A = 200000$, $R_i = 2M\Omega$, $R_0 = 75\Omega$, $f_0 = 5KHz$, supply voltages $\pm 15V$ output voltage swing $= \pm 13V$. Calculate values of A_F, R_{iF}, R_{0F}, f_F and Vo_{0T}. Draw the circuit.
                                                                              (08 Marks)

OR

2   a. Derive the closed loop voltage gain equation for voltage series feedback amplifier. (08 Marks)
    b. Explain with neat circuit diagram :
       i) Peaking amplifier
       ii) AC non-inverting amplifier.   (08 Marks)

Module-2

3   a. Design second order low pass filter at a high cut off frequency of 1KHz. Draw the circuit.
                                                                              (08 Marks)
    b. Explain the terms with respect to voltage regulator. i) Source effect ii) Load effect. (04 Marks)
    c. An LM317 regulator is to provide a 6V output from a 15V supply. The load current is 200mA. Determine suitable resistance values of R_1 and R_2.   (04 Marks)

OR

4   a. Explain with neat circuit diagram Wide-band-pass filter.   (08 Marks)
    b. An unregulated DC power supply output changes from 20V to 19.7V, when the load is increased from zero to maximum. The voltage also increases to 20.2V. When AC supply increases by 10%. Calculate load and source effects and load and line regulations. (08 Marks)

Module-3

5   a. Design RC phase shift oscillator for $f_0 = 200Hz$ using 741. Draw neat circuit diagram and output waveforms.   (08 Marks)
    b. Explain with neat diagram SCHMITT Trigger circuit and also draw wave forms.   (08 Marks)

OR

6   a. Explain with necessary circuit and waveforms triangular wave generator using op-amp.
                                                                              (08 Marks)
    b. Explain voltage to frequency converter using single variable supply voltage with offset and gain adjust using 9400.   (08 Marks)

Module-4

7 a. Explain with neat circuit diagram and wave forms sample and hold circuit using 741. **(08 Marks)**

   b. Explain in detail successive approximation ADC analog to digital converter. **(08 Marks)**

OR

8 a. Explain with neat circuit and waveforms positive clamper and negative clamper using op-amp. **(08 Marks)**

   b. Explain in detail R to 2R D/A converter. **(08 Marks)**

Module-5

9 a. Explain with block diagram phase locked loop. **(08 Marks)**

   b. Explain Astable multivibrator circuit operation using op-amp. **(08 Marks)**

OR

10 a. Explain the following terms with respect to PLL
    i) Loop gain
    ii) Tracking range
    iii) Capture range. **(08 Marks)**

    b. Explain function of various pins of IC555 timer. **(08 Marks)**

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