MBT-003-1274002 Seat No. _____

M. Sc. (ECI) (Sem. IV) (CBCS) Examination

April / May - 2018

Op-Amp and its Applications : Paper-14

Faculty Code : 003
Subject Code : 1274002

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

1   Answer the following questions in brief : (any **Seven**)   **14**

1. Mention advantages and disadvantages instrumentation amplifier over differential amplifier.

2. Draw and explain equivalent circuit, of an operational amplifier.

3. What is an oscillator ? Draw block diagram for it.

4. Draw the circuit diagram of an integrator. Also explain its working.

5. Enlist characteristics of an ideal operational amplifier.

6. Explain input and output impedances.

7. For a voltage follower using 741 (slew rate=0.5V/μS) operating at ±10V, determine maximum frequency that can produce distortionless output.

8. Explain working of an op-amp integrator in brief.

9. Design a first order high pass filter with F_c=1 kHz.

10. Enlist types of oscillators.

2   Attempt any **two** of the following questions : (Each **7** Marks) **14**

1. With necessary diagrams explain working of summing and scaling amplifier in inverting mode.

2. Derive expressions to calculate values of closed loop gain (A_F), input impedance (R_{iF}), output impedance (R_{oF}), bandwidth (f_F) and offset voltage (V_{oor}).

3. Explain use of instrumentation amplifier in temperature indicator and controller.

3   Answer the following questions :
    1   Write a short note on floating load type current to   5
        voltage, converter.
    2. Explain AC amplifier with single power supply with   5
        help of necessary diagrams.
    3. Draw the block diagram of a typical operational amplifier   4
        and explain working of each block in detail.

                              OR

3   Answer the following questions :
    1. With neat diagram explain working of Wein-bridge   5
        oscillator.
    2. Write a detailed note on Schmitt Trigger.   5
    3. What is slew rate? What are the causes ? Explain   4
        effect of slew rate in real applications of op-amp.

4   Answer the following questions :
    1. What is the working principle of an oscillator ? Explain   5
        frequency stability.
    2. Write a short note on peaking amplifier using op-amp.   5
    3. Explain working of a voltage series feedback in op-amp.   4

5   Answer any **two** of the following questions : (Each **7** Marks)   14
    1. Write a detailed note on variation in offset voltage due to
        change in power supply and temperature.
    2. For voltage shunt feedback derive expressions for closed-
        loop voltage gain, input resistance, output resistance,
        bandwidth and total output offset voltage.
    3. Draw high frequency op-amp equivalent circuit and with
        help of necessary expressions, explain how open-loop gain
        varies with frequency.
    4. What is a filter ? Explain design and working of wide-band
        bandpass filter. Design a bandpass filter with F_L=1000Hz
        and F_H=3000Hz.

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