17445

Instructions –   (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any SIX of the following:**   12

(i) Define:

1) SVRR

2) Slew rate

(ii) Draw practical integrator using op-amp.

(iii) Give applications of Instrumental Amplifier.

(iv) State the need of signal conditioning.

(v) State the use of Schmitt trigger.

(vi) Give classification of filters.

(vii) Define:

1) Roll off rate

2) Bandwidth

(viii) Draw pin diagram of IC 555.

Marks

b) **Attempt any <u>TWO</u> of the following:**   **8**

    (i)   Draw balanced input unbalanced output amplifier. State the use of / need of this stage.

    (ii)   Compare ideal and practical op-amp values w.r.t.

         1)   PSRR

         2)   gain bandwidth product

         3)   output offset voltage.

         4)   input bias current.

    (iii)   What is the need of complementary push-pull amplifier. Draw the circuit and explain.

2.   **Attempt any <u>FOUR</u> of the following:**   **16**

    a)   Derive the equation for virtual ground concept in op-amp.

    b)   For unity again amplifier if Vin = +2V. What will be the output voltage? Draw the circuit diagram of unity gain amplifier.

    c)   Design a circuit that gives voltage gain of $\left(1 + \frac{2}{3}\right)$.

    d)   Why offset nulling is required? Explain how is it done by using pin 1 and pin 5 with proper circuit diagram.

    e)   Design a circuit that convert square wave to spikes. Draw input-output waveforms.

    f)   Design the circuit to get the output expression $V_o = - (2V_1 + V_2 + 5V_3)$

3.   **Attempt any <u>FOUR</u> of the following:**   **16**

    a)   Draw circuit and derive equation of 2 op-amp instrumentation amplifier.

    b)   Draw V-I converter with grounded load. Derive the equation for 'VO'

    c)   Draw temperature compensated log amplifier. State the equation for output voltage 'VO2'.

    d)   Draw circuit diagram of schmitt trigger using op-amp.

    e)   Explain antilog amplifier with proper circuit diagram.

    f)   Draw and explain 7V to 12V window detector.

Marks

4.   **Attempt any FOUR of the following:**   **16**

   a) Design a comparator to detect -2 volt dc.

   b) Design second order low pass filter to get pass band gain 2 and cut off frequence 1 KHz.

   c) Design a band reject filter to reject band of 10 KHz to 20 KHz.

   d) Draw high pass filter and explain with characteristics.

   e) Explain how active filter is better than passive filter.

   f) Draw notch filter. Explain with characteristics.

5.   **Attempt any FOUR of the following:**   **16**

   a) Draw circuit diagram of IC555 as water level controller. Explain its working.

   b) Design AMV for 10 KHz frequency and 60% duty cycle.

   c) Draw block diagram at IC 555. Explain the use of pin 2 and 6.

   d) Explain operation of PLL as multiplier.

   e) Explain the operation of VCO (Voltage Controlled Oscillator) block in IC 565.

   f) Draw PLL transfer curve. Explain

      (i) capture range

      (ii) lock range

6.   **Attempt any FOUR of the following:**   **16**

   a) Draw triangular wave generator. Draw its waveform of it.

   b) Give advantages and disadvantages of wien bridge oscillator.

   c) Explain working of square wave generator using op-amp, with proper circuit.

   d) Explain principle of oscillator with block diagram.

   e) Draw and explain bistable multivibrator.

   f) Explain working of monostable multivibrator using op-amp.

_____