

22433

23124

3 Hours / 70 Marks

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. **Attempt any FIVE of the following:** **10**
 - a) Draw circuit diagram of dual input balanced output differential amplifier.
 - b) Describe virtual ground concept with reference to op-amp.

P.T.O.

- c) Suggest and draw op-amp based circuit using Butterworth filter to fulfill following frequency response. (Refer Fig. No. 1)

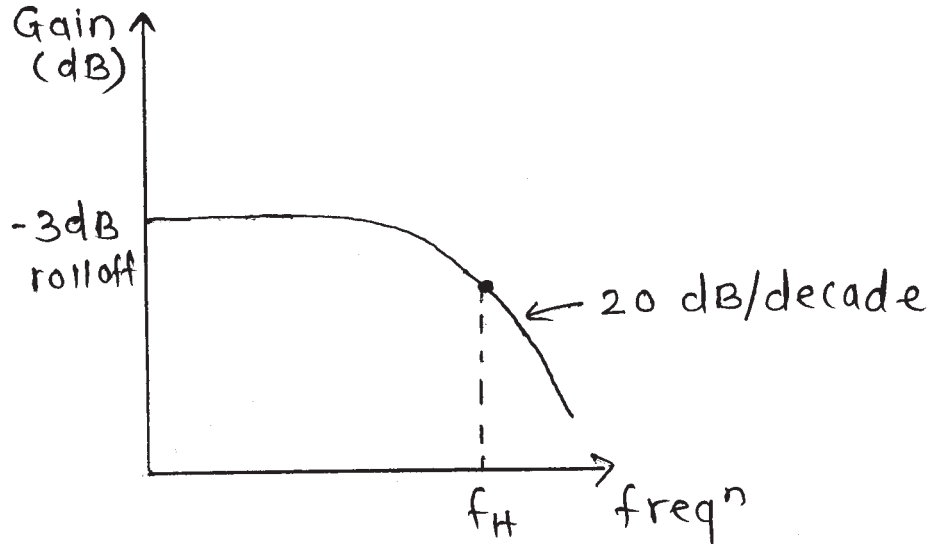


Fig. No. 1

- d) Draw monostable multivibrator circuit using IC 555.
 e) Define cut-off frequency and Q-factor with respect to filter.
 f) Draw circuit diagram of schmitt trigger using op-amp.
 g) Draw circuit diagram of I to V convertor using op-amp.

2. Attempt any THREE of the following:

12

- a) Draw circuit diagram of precision rectifier using op-amp and describe its working.
 b) With neat sketch derive the expression for inverting adder circuit.
 c) Design first order low pass filter with 1 KHz cut-off frequency and pas band gain of 5.
 d) Draw and describe V to I converter using op-amp with grounded load.

- 3. Attempt any THREE of the following:** **12**
- Draw block diagram of op-amp state the function of each block.
 - Using op-amp draw the circuit to show the output $V_0 = 3(V_1 - 3V_2)$ where V_1 & V_2 are input voltages.
 - Design and draw op-amp based phase shift oscillator for frequency 500 Hz.
 - Design a second order butterworth active HPF with cut-off frequency 1 KHz and $C = 0.01 \mu\text{f}$.
- 4. Attempt any THREE of the following:** **12**
- Draw the circuit diagram of schmitt trigger using op-Amp. Describe its working with input and output waveforms.
 - If $R_1 = 2\text{k}\Omega$, $R_F = 100\text{k}\Omega$, $V_{cc} = \pm 15\text{V}$ and RMS input voltage $V_i = 50 \text{ MV}$. Calculate output voltage in inverting and non inverting mode.
 - Describe the operation of Instrumentation amplifier using three op-amp.
 - Draw the Ideal frequency response for LPF, HPF, BPF and BRFF.
 - Draw and describe the circuit diagram of Wein Bridge oscillator.
- 5. Attempt any TWO of the following:** **12**
- Define differential amplifier. Draw single input balanced output differential amplifier. Describe its operation.
 - Draw circuit diagram of bistable multivibrator using IC555. Explain its working with neat wave forms.
 - Draw comparator circuit using op-amp to detect +5v dc signal.
- 6. Attempt any TWO of the following:** **12**
- Draw the circuit diagram and output waveform for sine and square wave input for output voltage.

$$V_0 = \frac{-1}{R_c} \int_0^t V_{in} dt + C$$
 - List ideal and practical parameters of op-amp. (any six)
 - Compare Active and passive filters (any six points)
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