# 22423

*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 <u>FIVE</u> of the following:**    **10**

a)  Define Input offset voltage and Input bias current.

b)  Draw the circuit diagram of voltage follower.

c)  Draw pin diagram of IC 565.

d)  Define cutoff frequency and passband.

e)  List two applications of IC LM324.

f)  Draw circuit diagram of I to V converter.

g)  State two merits of active filters over passive filters.

**Marks**

**2.    Attempt any THREE of the following:**                    **12**

a)  Describe the operation of PLL as FM demodulator.

b)  Sketch first order Butterworth low pass filter with component value at cutoff frequency of 15 kHz with passband gain of 2.

c)  In op-amp based Schmitt trigger, $R_2 = 200\Omega$, $R_1 = 50\Omega$ Vin = 500 $mV_{PP}$ sine wave, saturation voltage = ± is v. Determine threshold Voltage $V_{UTP}$ , $V_{LTP}$ .

d)  Draw ideal and practical voltage transfer curve of op-amp.

**3.    Attempt any THREE of the following:**                    **12**

a)  Draw block diagram of OPAMP and state function of each block.

b)  Draw the circuit of basic differentiator and derive output expression.

c)  Draw a neat circuit diagram of analog divider using log-antilog amplifiers and explain its operation.

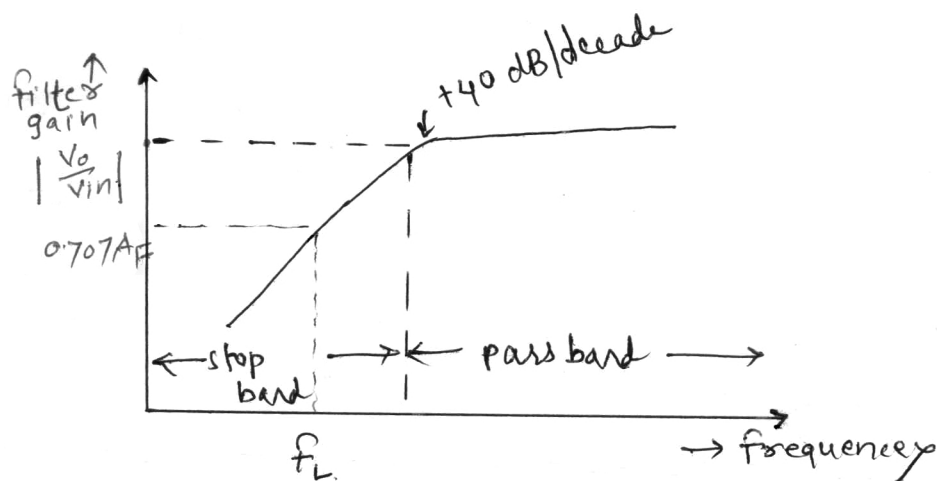d)  Draw filter circuit for the following response. (Refer Fig. 1)



**Fig. No. 1**

**4.**    **Attempt any <u>THREE</u> of the following:**                    **12**

   a)  Compare open loop and closed loop configuration.

   b)  Explain the procedure to null the offset voltage with appropriate diagrams.

   c)  Design the circuit to  get the output voltage.

   $V_0 = 3V_1 + 2V_2$ where

   $V_1$ and $V_2$ are input voltages.

   d)  Explain phase shift oscillator using IC 741 with neat diagram.

   e)  Explain the working of astable multivibrator using IC 555.


**5.**    **Attempt any <u>TWO</u> of the following:**                    **12**

   a)  Draw a circuit diagram of V-I converter of  floating load. Derive expression for its output. List any two applications.

   b)  Sketch input and output waveform for 2V peak to peak size wave for Inverting ZCD and active Integrator.

   c)  Design second order high pass Butterworth filter with higher cutoff frequency of 1.5 kHz. Draw circuit with component values.


**6.**    **Attempt any <u>TWO</u> of the following:**                    **12**

   a)  Calculate output voltage for open loop non-inverting amplifier. If Vin = 10 mv dc, also draw input and output waveform and draw circuit diagram also.

   b)  Explain operation of Instrumentation amplifier with two op-amp with neat diagram.

**Marks**

c) From the circuit diagram given in Fig. 2, identify the name of the circuit and calculate cut off frequency and pass band gain.
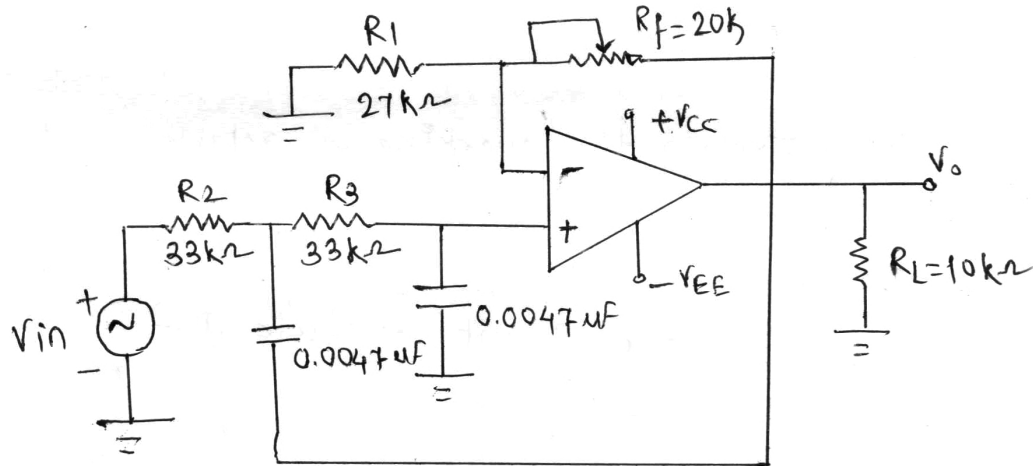


**Fig. No. 2**

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