

313324

24225

3 Hours / 70 Marks

Seat No. 

--	--	--	--	--	--	--	--

- 
- 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) List the types of power amplifier.
  - b) Sketch the circuit diagram of Op-Amp based differential amplifier in open loop mode.
  - c) Define the parameters of Op Amp
    - i) Input bias current
    - ii) Slew rate
  - d) State ideal and practical value of given parameters of Op Amp IC 741
    - i) Input offset current
    - ii) Input Resistance

P.T.O.

- e) Compare amplifier and oscillator. (any two pts.)
- f) State two merits of active filters over passive filters.
- g) Define following terms of phase lock loop (PLL)
  - i) Lock range
  - ii) Capture range

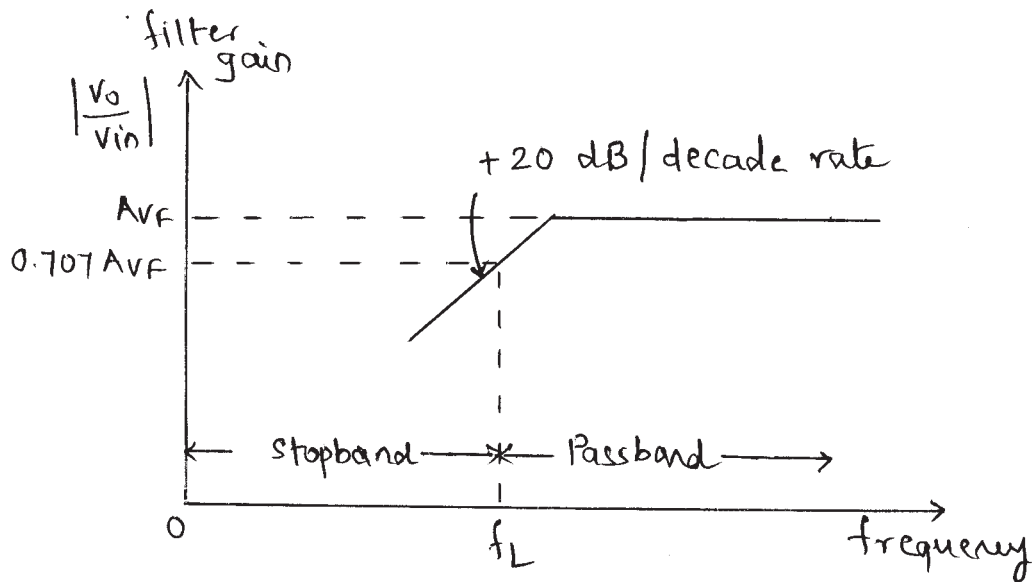
**2. Attempt any THREE of the following :** **12**

- a) Compare class A, class B, class AB and class C on basis of
  - i) conduction angle
  - ii) efficiency
  - iii) Q point location
  - iv) Application
- b) Draw and explain the circuit required for given equation with neat waveforms
$$V_o = -R_F C_1$$
- c) Explain phase shift oscillator using IC 741 with neat diagram.
- d) For IC 555 configured as Astable Multivibrator,  $R_1 = 5.8\text{k}\Omega$ ,  $R_2 = 2.8\text{k}\Omega$ , and  $c = 0.1\mu\text{f}$ . Find frequency of oscillation and duty cycle. Draw output waveform.

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

- a) Explain class C power amplifier with neat diagram.
- b) In schmitt trigger using Op-Amp,  $R_1 = 100\text{k}\Omega$ ,  $R_2 = 150\Omega$ ,  $V_{in} = 500\text{mVpp}$ ,  $V_{sat} = \pm 15\text{V}$ 
  - i) Determine threshold voltage  $V_{UTP}$  and  $V_{LTP}$
  - ii) Find out hysteresis voltage  $V_H$ .
- c) Explain any one type of crystal oscillator in detail.

d) Draw the filter circuit for the following response (refer fig. 1)



**Fig. No. 1**

4. Attempt any THREE of the following : 12

- Draw the block diagram of PLL and state function of each block.
- Draw and explain the circuit of band pass filter. Draw its characteristics.
- Define oscillator and state the Barkhausen criteria for generation of sustained oscillations.
- Differentiate between active and passive filters.
- Compare positive and negative feedback.

5. Attempt any TWO of the following : 12

- Design second order low pass filter to get pass band gain 2 and cut off frequency 2kHz.
- Explain working of monostable multivibrator using IC 555.
- Draw and explain sample and hold circuit using Op-Amp with neat waveforms.

**6. Attempt any TWO of the following :****12**

- a) Describe operation of class A push pull amplifier with neat circuit diagram.
  - b) If  $R_1 = 2\text{k}\Omega$ ,  $R_f = 100\text{k}\Omega$ ,  $V_{CC} = 15\text{V}$  and rms input voltage.  $V_i = 2\text{V}$ . Calculate the output voltage in inverting and noninverting mode. Draw circuit diagram.
  - c) Sketch the Op-Amp based wein bridge oscillator for frequency  $f = 1.5\text{kHz}$ .
-