## **GURUDAS COLLEGE (University of Calcutta)**

M.Sc. Semester – 2, Internal Examination, 2020

Subject – Physics

Paper: PHY 424 (General Practical - 2)

Time : 1 Hr

Full Marks : 15

## Answer any one question from the following :

- 1. (a) Draw the circuit diagram of a self-biased common source JFET amplifier. (b) Given  $V_{GS} = -1$  Volt,  $V_{DS} = 6$  Volt,  $I_D = 2$  mA and  $V_{DD} = 12$  Volt, determine the other circuit parameters.
  - (c) Draw the frequency response curve from the following data

No. of	Frequency	Gain	
Obs			
1.	50 Hz	2.125	
2	100 Hz	2.375	
3	200 Hz	2.5	
4	1KHz	2.5	
5	10 KHz	2.5	
6	50 KHz	2.5	
7	100 KHz	2.5	
8	170 KHz	2.5	
9	250 KHz	2.375	
10	300 KHz	2.25	
11	350 KHz	2.0	

(d) Find the corresponding bandwidth.

(e) Compare BJT and JFET characteristics regarding following aspects:

BJT	JFET
Bipolar device	
Current controlled device	
Temperature dependent Performance	
Low input impedance	
High output impedance	
Emitter, Base, Collector regions	

## 3 + 4 + 4 + 1 + 3 = 15

- 2. (a) Define Hall voltage.
  - (b) Write down requisite equations to find Hall coefficient in the laboratory.
  - (c) Plot the following data and determine the Hall coefficient from each curve.

No. of	Magnetic Field	Hall	Hall	Thickness
Obs.	(Gauss)	Current	Voltage	of the
		(mA)	(mV)	specimen
				(cm)
1.		2	10	
	750	3	16	
		4	20	
		5	28	
		6	34	
				0.05
2.		2	16	
	1100	3	24	
		4	32	
		5	42	
		6	50	

(d) What does Hall coefficient signify?

2 + 2 + (5 + 5) + 2 = 15

- 3. (a) Draw the diagram of a transistor driven multivibrator circuit.
  - (b) Design circuit parameters for
    - output frequency (f) = 1 KHz.

Assume  $h_{fe}$  of both transistors = 200

- and collector current  $I_C = 5 \text{ mA}$
- (c) draw the qualitative nature of the output waveform.
- (d) Mention two major drawbacks of this circuit.

3+3+3+4+2=15

- 4. (a) What do you mean by LOW PASS and HIGH PASS filter?
  - (b) Explain the difference between Band Pass and Band Stop filters.
  - (c) Draw the diagram of a Twin T Passive Notch Filter circuit.
  - (d) What is the nature of a practical frequency response curve of Notch filter corresponding to a very narrow stop band?
  - (e) Design RC Notch filter circuit of frequency 1 KHz.

$$(2+2) + 2 + 4 + 2 + 3 = 15$$