

## B. Sc. Semester – V Examination, 2020

Subject: Physics (General)

Paper: PHS-G-DSE-A-P: Analog Electronics (Practical)

Answer scripts (pdf format) to be submitted at: sarsunacollegephsg@gmail.com

F.M. : 30

Time: 1hour 30 minutes

Answer any **one** question:

1.i) Draw the circuit diagram and write working formula for an inverting OP-AMP. (5+4)

ii) For the given set of data plot a graph (output voltage Vs input voltage) and calculate the practical gain of the amplifier from the graph. (10+2)

No. of Obs.	Input Voltage ( $V_i$ ) [in volts]	Output Voltage ( $V_o$ ) [in volts]
1.	0.05	-0.55
2.	0.1	-1.10
3.	0.22	-2.33
4.	0.33	-3.57
5.	0.42	-4.81
6.	0.54	-6.07
7.	-0.05	0.54
8.	-0.1	1.08
9.	-0.22	2.32
10.	-0.33	3.56
11.	-0.42	4.80
12.	-0.54	6.08

iii) Compare the above calculated gain with theoretical gain. Given input resistance ( $R_i$ )=0.97 K $\Omega$  and output resistance ( $R_o$ )=9.75 K $\Omega$ . (3)

iv) What is offset-null? (3)

v) What is virtual ground? (3)

2.i). Draw the circuit diagram and write working formula for a non- inverting OP-AMP. (5+4)

ii) For the given set of data plot a graph (output voltage Vs input voltage) and calculate the practical gain of the amplifier from graph. (10+2)

No. of Obs.	Input Voltage ( $V_i$ ) [in volts]	Output Voltage ( $V_o$ ) [in volts]
1.	0.05	0.55
2.	0.1	1.10
3.	0.22	2.36
4.	0.33	3.57
5.	0.42	4.81
6.	0.54	6.07
7.	-0.05	-0.54
8.	-0.1	-1.10
9.	-0.22	-2.36
10.	-0.33	-3.56
11.	-0.42	-4.87
12.	-0.54	-6.08

iii) Compare the above calculated gain with theoretical gain. Given input resistance ( $R_i$ )=1.05 K $\Omega$  and output resistance ( $R_o$ )=10.2 K $\Omega$ . (3)

iv) What do you mean by open-loop gain? (3)

v) What is a unity gain buffer? (3)

3. i) Draw the circuit diagram for obtaining the CE characteristics of an n-p-n transistor. (5)

ii) Draw the static output characteristic curve and transfer characteristic curve for the transistor. (5+5)

iii) Write the working formula for ac current gain and output admittance. (3+3)

iv) What do you mean by active, saturation and cut-off regions of operation? (6)

v) Can a transistor be used as a switch? (3)