

PHYSICS (Honours)

Paper - XI (Practical - Electronics) - 2020

Full Marks: 65

Time: Six Hours

**Group - A**

***Answer any one question (Marks- 40)***

***Upload the graph with results and calculations.***

1. Draw the I-V Characteristic of a P-N junction diode from the given data,  
draw the load line for the resistance  $R_L = 50 \Omega$  and hence find the Q-point.

Voltage in Volt	Current in mA
0.1	0
0.2	0.2
0.3	1
0.4	2
0.5	2.8
0.6	4.5
0.7	6.8
0.8	9
0.9	11.4
1	13
1.1	15.8
1.2	18
1.3	20.6
1.4	22.5
1.5	25.6
1.6	27.9
1.7	31.4
1.8	35
1.9	38.7
2	42.1
2.1	45.6
2.2	50
2.3	54.5
2.4	59.4
2.5	65.5

2. Draw the output characteristic curves of a transistor in the CE mode from the given data and determine the value of Current gain ( $\beta$ ).

$I_B = 40 \mu A$		$I_B = 50 \mu A$	
$V_{CE}$ in Volt	$I_C$ in mA	$V_{CE}$ in Volt	$I_C$ in mA
0	0	0	0
0.1	1.7	0.07	1.3
0.15	2.1	0.1	2.1
0.2	2.2	0.15	2.8
0.25	2.3	0.2	2.9
0.35	2.4	0.25	3
0.45	2.4	0.35	3
0.55	2.4	0.45	3
0.65	2.4	0.6	3
0.75	2.4	0.7	3
0.9	2.4	0.8	3
1	2.4	0.9	3
1.15	2.4	1.05	3
1.2	2.4	1.1	3
1.3	2.4	1.2	3
1.4	2.4	1.35	3
1.45	2.4	1.4	3
1.5	2.4	1.5	3

3. Draw the frequency response curve [Gain in dB vs  $\log(f)$ ] of a CE amplifier from the given data and hence calculate Band - Width of the amplifier.

Input Voltage ( $V_i$ ) = 30mV

Frequency(f) in Hz	Output Voltage( $V_o$ ) in Volt
10	0.74
20	1.38
30	1.8
40	2.15
50	2.32
60	2.52
70	2.6
80	2.66
90	2.7
100	2.76
200	2.9
300	2.93
400	2.96
500	3
600	3
700	3.01
800	3
900	3
1000	3
2000	3
3000	3
4000	3
5000	3
6000	3
7000	2.98
8000	2.96
9000	2.95
10000	2.9
20000	2.55
30000	2.3
40000	2.1
50000	1.9

**Group - B**

***Answer any five questions***

***5x5=25***

1. Can you identify the material of the diode (Ge or Si) by just looking at the V-I characteristic curve, explain.
2. What are the different configurations (mode) of a transistor? Which configuration will you prefer to construct a buffer amplifier?
3. What is DC current gain of a transistor in CB mode?
4. What is Common Mode Rejection Ratio of an OPAMP?
5. What is an ideal voltage source?
6. How does a transistor act as a switch?
7. Find the expression of output (Y).

