2020

B.Sc. (General) Part - III

Paper – VIII

Total Marks – 40 Time – 4 hours

Group – A

Answer any one of the following questions.

Upload the Graph, Results and Calculations.

30 x 1 = 30

1. (a) Draw a curve connecting square of the diameters of rings and ring numbers using the given data of a Newton's ring experiment.
(b) Hence find the radius of curvature of the plano-convex lens used in the experiment.

Table 1 – Determination of diameter of the rings

Least count =0.001 cm

Ring no.	Observation starts from	Reading of microscope for the			
		Left edge of ring		Right edge of ring	
		Main scale (mm)	Circular scale	Main scale (mm)	Circular scale
5	L to R	50	59	47	10
	R to L	50	23	46	78
6	L to R	50	73	46	98
	R to L	50	36	46	65
7	L to R	50	83	46	86
	R to L	50	50	46	54
8	L to R	50	97	46	71
	R to L	50	62	46	42
9	L to R	51	08	46	60
	R to L	50	73	46	29
10	L to R	51	17	46	49
	R to L	50	83	46	20
11	L to R	51	25	46	38
	R to L	50	93	46	10
12	L to R	51	47	46	29
	R to L	51	05	45	99
13	L to R	51	56	46	22
	R to L	51	15	45	89
14	L to R	51	66	46	10
	R to L	51	24	45	80

Wavelength of the light used = 589.3 nm

2. Draw the output characteristic curves of a transistor in the CE mode from the given data and calculate current gain (β).

I_B = 40 μA		I_B = 50 μA	
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 output voltage vs input voltage ($V_o - V_i$) curve of an adder using OPAMP from the given data.

R_1 = 1kΩ and R_2 = 1kΩ

Input Voltages in mV			Output Voltage (V_o) in mV
V_1	V_2	V_3	
10	20	30	59.5
20	-20	-20	-20
30	20	20	70
20	-20	30	30
20	30	30	79.9
10	-10	-30	-30
-10	-20	-20	-50
30	-40	30	-39.8

Group – B

Answer any two of the following questions in a paper and upload it.

5 x 2 = 10

1. Why is the central spot dark in case of Newton's ring ?
   (নিউটন রিং এর কেন্দ্র বিন্দু কালো হয় কেন ?)

2. What is the difference between for and while loops in C programming?
   (C programming এর ক্ষেত্রে for এবং while লুপের পার্থক্য লেখ।)

3. What is a common emitter (CE) amplifier?
   (সাধারণ নিঃসারক বিবর্ধক বলিতে কি বুঝ ?)

4. Why OPAMP is called an operational amplifier?
   (OPAMP কে অপারেসনাল বিবর্ধক বলা হয় কেন ?)