

# First Year of Four Year B Tech Course

## 2nd Semester Examination, 2021

SUBJECT : PHYSICS LAB- II PAPER CODE: PH -206

Duration: Two and half hours

Uploading Time : Half Hours

Total Marks: 45

(Answer any Five questions from the following) 5@9 =45

1. i) In the experiments to find out the focal length of a concave Mirror, if any mirror having approximate focal length 16 cm is placed at 20 cm of the optical bench keeping back side towards zero end of the bench. Now find out the range of the image distance for which image distance will be greater than the object distance.

ii) How will you check that the circuit is working perfectly in case of the experiment Determination of Unknown Resistance with help of Post Office Box?

iii) In the experiments to find out the focal length of a convex lens, if any lens having approximate focal length 15 cm is placed at 70 cm of the 150 cm long optical bench and light source is towards “0” end of the bench. Then estimate the minimum object distance for which you will get the image on the screen placed on the bench.

iv) How will you check that the circuit is in ok and in balance condition in determination of Resistance per Unit Length,  $\rho$ , of the Carey Foster’s bridge?

v) Can you use 1000: 10 ratio to get more accurate results in the experiment Determination of Unknown Resistance with help of Post Office Box.?

vi) In case of Carey Foster’s bridge experiment what will the nature of the  $(l_2 - l_1)$  vs  $X$  graph ( Symbols have their usual meaning). Schematically draw that graph?

(6 X 1.5 = 9)

2. i) Draw the schematic diagram of the Image formation by a concave mirror along with the proper indication of the measurable parameters for the experiments to find out the focal length of the concave Mirror.

ii) If the mirror is placed at one end of the optical bench then can we place the light source at any position of the optical bench so that we get image on the screen? Briefly explain.

iii) Find out the focal length of the concave mirror from the following set of data.

No of observations	Position of the light source P cm	Position of the screen Q cm				
1.	$u < v$ $f < u < 2f$	22	52.5			
2.		25	40.7			
3.		28	34.8			
4.	$u > v$ $2f < u$	35	29.5			
5.		40	26.5			
6.		45	23.5			

2+2+5 = 9

3. i) In the “R” arm of the PO Box in which ratio the resistance are found?

ii) In PO Box experiment if the unknown resistance(S) is 35.7 Ohm then for which values of resistances having unit interval in R arm you will get opposite deflection in the galvanometer in 10: 10 ratio in Ratio arm. When there will be 100:10 ratio then for which value of resistance in R arm you will get no deflection in the galvanometer?

iii) Draw the schematic diagram of the Post Office Box circuit with external unknown resistance and biasing.

$$2+(2+2)+3 = 9$$

4. i) Draw the schematic circuit diagram for series resistance combination and parallel resistance combination with indication of all measurable parameters.

ii) Fill the cells in the following table having question mark with proper values .

$R_1$ $\Omega$	$R_2$ $\Omega$	$I$ A	$V_1$ V	$V_2$ V	$V$ V	$R_{1exp} =$ $V_1 / I$ $\Omega$	$R_{2exp} =$ $V_2 / I$ $\Omega$	$R_{Th} =$ $R_1 + R_2 \Omega$	$R_{exp} =$ $R_{1exp} + R_{2exp}$ $\Omega$	$R_{ac} = V/I \Omega$
100	20	?	?	2.85	3.5	105.5	?	?	?	128.4

iii) How will you check without calculation of results that the reading which you have taken are correct in both the series connection and parallel connection?

$$(2+2)+3+2 = 9$$

5. i) Draw the schematic diagram of the Image formation by a convex lens along with the proper indication of the measurable parameters for the experiments to find out the focal length of the convex lens.

ii) How you will find out the approximate focal length of a convex lens? Why it is called approximate?

iii) Find out the focal length of the convex lens from the following set of data.

No of Observations	Position of the image	Position of the Lens P on optical bench (cm)	Position of the Light source Q (cm)	Position of the image screen R (cm)						
1.	f<u < 2f	80	100	9.1						
2.			102	23.5						
3.			105	35.5						
4.	u > 2f		115	50.5						
5.			120	54.7						
6.			125	57.1						

$$2+3+4 = 9$$

6. : i) Draw the schematic circuit diagram for Cary Foster's bridge circuit with biasing and proper labelling. .

ii) Find out the working formula for determination of Resistance per Unit Length,  $\rho$ , of the Carey Foster's bridge.

iii) Determine the Resistance per Unit Length,  $\rho$ , of the Carey Foster's bridge from the following data.

Sr. no. of Obs	Resistance in resistance box X in $\Omega$	When X is at left Position of null point from left in scale $l_1$ cm	When X is at right Position of null point from left in scale $l_2$ cm
1.	0.5	42.2	50.5
2.	1.0	38.5	54.2
3.	1.5	34.6	59.6
4.	2	30.4	63.5

$$3+3+3 = 9$$