

Gurudas College (CU)
Internal Examination 2020
B.Sc Semester –II
Physics Hons (PHSA) Practical
Paper – CC3

Full Marks: 15

Time: 1 Hours

Answer *any one* question

1. (a) Write down the theory along with the circuit diagram for the determination of the resistance per unit length of the wire of the Carry Foster Bridge and then to determine the value of a low resistance with the help of that Carry Foster Bridge.
- (b) State Ohm's law.
- (c) What is the effect of temperature on resistance? Name a material in which the resistance decreases with increase in temperature?
- (d) What is specific resistance? Name the factors on which specific resistance depends.
- (e) When is the Carey Foster Bridge most sensitive?
- (f) What is the minimum difference in resistances that can be measured by Carey Foster Bridge?

(3+3)+2+(1+1)+(1+1)+2+1

2. (a) Write down the theory along with the circuit diagram for the determination of the resonance curve in a series LCR circuit.
- (b) What do you mean by resonance in a LCR circuit? What happens to the voltage and current in case of series and parallel resonance?
- (c) What is sharpness of resonance? What does this signify?
- (d) Since there is no effect of resistance on the resonance frequency, will the resonance curve be of same nature as obtained in a series LCR circuit with and without resistance. Explain.
- (e) What kind of curve is obtained if V_C is plotted against frequency compared to that of V_R against frequency. Explain.
- (f) Why series LCR circuit is called acceptor circuit?

(2+1)+(2+1+1)+(1+1)+2+2+2

3. (a) Write down the theory along with the circuit diagram for the determination of the response curve in a series CR circuit.
- (b) Draw the nature of curve when V_c is plotted against frequency and that of V_r against frequency. Explain the nature of the curves.
- (c) What are filter circuits? Define different types of filter circuits.
- (d) How can we use a series CR circuit as low pass filter and as a high pass filter circuit? Explain with diagrams.
- (e) What is the cutoff frequency of a series CR circuit? What is the significance of cutoff frequency? Determine the cutoff frequency for a series CR circuit when $R = 240k$ and $C = 82$ pF.

(1+1)+(1+1)+(2+3)+3+(1+1+1)

4. (a) Write down the theory along with a neat diagram for the determination of the value of horizontal component of the earth's magnetic field.
- (b) What precautions are to be taken while recording the readings of the deflection magnetometer? When the deflection magnetometer does give the most accurate reading?
- (c) Draw the $\frac{1}{d^3}$ vs $\tan\theta$ curve, where 'd' is the mean distance of the bar magnet from the centre of the magnetometer and ' θ ' is the corresponding deflection.
- (d) What is moment of a magnet? What is its unit?
- (e) Derive the expression for the time period of oscillation of a magnet in the earth's field.

(3+1)+(2+1)+3+(1+1)+3