1. *What is the working principle of the Carey Foster’s Bridge?*

Ans. When the resistance in the outer gaps are interchanged, the position of the null points on the bridge wire shifts. The difference between the two resistances is equal to the resistance of the bridge wire connected between these two null points.

1. *What is effect of increasing the effective length of a Carey Foster’s Bridge?*

Ans. By doing this accuracy of the result will be increased.

1. *How is this bridge better than the ordinary Wheatstone’s Bridge?*

Ans. The sensitivity and accuracy of a meter bridge is directly proportional to the length of the bridge wire. In Carey Foster Bridge, the effective length of the bridge wire is increased and so it is more accurate and sensitive.

1. *Why is the copper strip fitted on the Carey Foster’s Bridge?*

Ans. So that it may offer negligible resistance.

1. *Why is a frictional resistance box (FRB) used?*

Ans. The resistance introduced should be such that when the resistances in outer gap are interchanged, the null point should shift on the bridge wire. Thus the maximum resistance permissible is equal to the resistance of bridge wire, which is very small. To have several readings, a decimal box has to be used.

1. *Why should jockey be not pressed too hard?*

Ans. If jockey is pressed too hard, the wire will become flat at that point and its are of cross-section will be no longer uniform and hence the resistance of the wire will not be proportional to its length.

1. *What will happen if the two resistances in the inner gaps are not equal?*

Ans. If the difference between them is large, the sensitivity of the bridge will be reduced and the null point will be pushed towards one end. He percentage of error in measurement of length will increase.

1. *What do you mean by the resistance of conductor?*

Ans. The ratio of the potential difference between the two ends of a conductor to the current flowing in it, is called the resistance of the conductor.

1. *On what factors does resistance of a conductor depends?*

Ans. Resistance of a conductor is directly proportional to its length(l), inversely proportional to the area of cross-section(A). It also depends upon the nature of material and temperature of the conductor.

1. *What is a cell?*

Ans. A cell is a device by which electric energy is generated due to chemical action taking place in it.

1. *What are essentials of a cell?*

Ans. Electrolyte, positive plate and negative plate.

1. *Why do we not get continous current in Leclance cell?*

Ans. The depolarizer MnO2 does not oxidise the hydrogen as rapidly as it is produced in the cell reaction.

1. *What do you mean by internal resistance of a cell?*

Ans. Internal Resistance of a cell means the resistance offered by the electrolyte to the flow of electric current through the cell.

1. *What is function of porous pot in a cell?*

Ans. Porous pot has a very minute holes which allow gases to pass through it.

1. *Why do we prefer a potentiometer to measure e.m.f. of a cell rather than a voltmeter?*

Ans. A potentiometer does not have any current from the cell whose e.m.f. is to be determined, whereas a voltmeter always has some current. Therefore, e.m.f. measured by voltmeter is slightly less than the actual e.m.f. of the cell.

1. *Why we use constantan and magnanin wire?*

Ans. Since both of wires possess high specific resistance and low temperature coefficient.

1. *What is the principle of potentiometer?*

Ans. The working of potentiometer is based on the fact that the fall in potential across the potentiometer wire is directly proportional to the length of the wire, if the area of cross-section of wire and current flowing through the wire are constant.

1. *Why the jockey should not to be rubbed against potentiometer wire?*

Ans. Because the rubbing of wire with jockey can be change the uniformity if the cross-section of the wire and thereby affecting the fall of potential along the wire.

1. *What is a Leclanche cell? Explain its chemical reactions.*

Ans. Leclanche cell consists of a glass vessel containing ammonium chloride(NH4Cl) solution and an amalgamated zinc rod. A porous pot containing a mixture of MnO2 and carbon powder and a carbon rod is placed in the solution. Carbon rod and zinc rod act as positive and negative electrodes respectively. The e.m.f. of this cell is about 1.5V.

1. *What is the priniciple on which Lee’s method works?*

Ans. At steady state, temperature of lower metal plate becomes constant and then the heat lost by it to the surroundings is just made up by heat gained by it through the experimental disc of poor conductor.

1. *What is the mode of transmission of heat in this experiment?*

Ans. The mode of transmission of heat in this experiment is conduction.

1. *What is purpose of taking the material in the form of a disc?*

Ans. The experimental material is taken in the form of a disc because the disc has small thickness and large area of cross-section, this increases the quantity of heat transmitted across the discs.

i.e. Heat Conducted(Q) ∝ Area of cross-section ∝ Thickness

1. *Why outer discs are taken of metal?*

Ans. Outer discs are taken of metal because while doing this, there is normal flow of heat from one disc to another disc.

1. *Why is the metal disc and cylindrical vessel nickel plated?*

Ans. The metal disc and cylindrical vessel are nickel plated so as to give them the same emissive.

1. *Why is it necessary to obtain the steady state before taking the observation?*

Ans. Before this stage the temperature depends upon the coefficient of thermal conductivity and specific heat. In steady state since there is no rise in temperature, it will be independent of above factors.

1. *Can you measure the thermal conductivity of good conductor by this method? Why?*

Ans. This method can not be used to determine the thermal conductivity of a good conductor since the temperatures Θ1 and Θ2 will be nearly equal and the measurement of their difference will be difficult.

1. *What is thermocouple?*

Ans. When two wire of different metals are joined at their free ends with galvanometer in between them, the resulting arrangement is called a thermocouple.

1. *What is the cause of thermo e.m.f.?*

Ans. As electrons concentration is different in different metals so at the junctions the electrons are transferred from metal having higher concentration of electrons to a metal having lower concentration of electrons due to which contact potential is developed, which is same when both junctions area are at same temperature. When one of the junction is heated, rate of transfer of electrons and hence its contact potential changes. Due to difference in contact potential, an e.m.f. is generated.

1. *On what factors the direction of the electric current depend?*

Ans. It depends upon nature of materials forming thermocouple.

1. *What is nuetral temperature? Is it same for all materials?*

Ans. That temperature corresponding to which thermo e.m.f. is maximum. No, it is different for different materials.

1. *What is inversion temperature?*

Ans. That temperature at which thermo e.m.f. reverses its direction.

1. *What is Peltier’s effect?*

Ans. When current is passed through a junction of two different metals, the heat is either evolved or absorbed at the junction, known as Peltier’s effect.

1. *What is Thomson’s effect?*

Ans. When two parts of a single conductor are maintained at different temperature an e.m.f. is developed between them, known as Thomson’s effect.

1. *What are Lissajous figures?*

Ans. When a particle is acted upon simultaneously by two simple harmonic oscillations at right angle to each other the resultant path traced by the particle is called Lissajous figure.

1. *How these figures are obtained here?*

Ans. Two sinusoidal voltages obtained from two function generators are simultaneously fed the horizontal and vertical plates of cathode ray oscilloscope. The cathode rays in the cathode ray oscilloscope are thus acted upon by two sinusoidal voltages that are at right angle to each other and thus the trace they leave on the screen will be Lissajous figure.

1. *What is the condition that the figure is a circle?*

Ans. The frequency ratio of the sinusoidal voltages should be 1:1 and amplitude should be equal.

1. *How the frequency ratio of two voltages can be found using Lissajous figures?*

Ans. Simple method to find the frequency ratio from Lissajous figures is to enclose the figure in a rectangle whose sides are parallel to the formation axes of figure and note the tangency points along the vertical and horizontal axes. The ratio of number of tangency points will be inverse ratio of the two frequencies.

1. *What is the phase difference between two sinusoidal oscillations which produce a circle on the screen?*

Ans. π/2

1. *For the frequency ratio 1:1 the two sinusoidal voltages of equal magnitude, how the shape of Lissajous figure varies as the phase changes from 0 to 2π?*

Ans. For phase 0: straight line, for phase π/2: circular, for phase π: straight line, for phase 3π/2: circular and in between the shape is elliptical.

1. *Why we are using Callender and Griffith’s Bridge?*

Ans. Callender and Griffith’s bridge is the modified Wheat stone’s bridge for the accurate measurement of resistance of the thermometer.

1. *How do you define the resistance variation with temperature in metals?*

Ans. Rt = R0 ( 1 + αt + βt2)

Where Rt and R0  be the resistance at t° and 0° respectively and α and β are the constant characteristic of metal.

1. *What is a platinum resistance thermometer?*

Ans. Platinum Resistance Thermometers are temperature sensors that exploit the predictable change in electrical resistance of platinum with changing temperature. These are being used in place of thermocouples in industrial applications at temperatures below 600 °C. At temperatures higher than that it becomes difficult to prevent the platinum from being contaminated by impurities from the metal sheath of the thermometer. PRT requires a small current to pass through it to determine its resistance at different temperatures.

1. *What are ultrasonic waves?*

Ans. The longitudinal mechanical waves having frequency greater than the highest audible frequency 20kHz are called ultrasonic waves.

1. *When the ultrasonic generator delivers maximum power in piezoelectric method of production of ultrasonics?*

Ans. The ultrasonic generator delivers maximum power when in is operated at fundamental frequency of crystal. In order to generate higher ultrasonic waves, the L-C circuit is made to oscillate at a frequency equeal to one of the harmonics of the crystals.

1. *What happens when ultrasonic waves pass through a substance?*

Ans. Intense heat is produced.

1. *What is piezoelectric effect?*

Ans. ‘Piezo’ is a Greek word having meaning pressure. It has been observed in a class of crystal like quartz, that if mechanical pressure is applied along a characteristic axis called mechanical axis then e.m.f. is automatically generated along a perpendicular axis called electric axis. The phenomenon is called piezoelectric effect. Similarly, if e.m.f. is applied along electric axis the mechanical pressure (compression or extension) is generated along mechanical axis. It is called inverse piezoelectric effect.

1. *What is the shortes wavelength of the ultrasonic waves in air at room temperature?*

Ans. The ultrasonic waves in air travel with the speed of sound which is about 331m/s at room temperature. Thus the shortes wavelength is

331/2000 m.

1. *What is acoustic grating?*

Ans. When the ultrasonic waves are created in a container. Stationary waves are created as a result of superposition of the direct and the waves that are reflected from the walls of the container, due to which at the points of rarefaction the density is more. Thus the liquid acts as diffraction grating. This type of grating is called acoustic grating.

1. *Why is it necessary to use R.F. oscillator in the experiment?*

Ans. As the natural frequency of the quartz crystal is of the order of 106 Hz. R.F. oscillator is necessary as it gives a.c. voltages of this range of frequency which is requisite for resonance.

1. *Whether you are using piezoelectric or inverse piezoelectric effect in the experiment?*

Ans. Inverse piezoelectric effect.

1. *What is magnetostriction effect?*

Ans. When a magnetic field is applied, a bar of ferromagnetic or ferrimagnetic material undergoes a change in length. Conversely, a mechanical stress is applied to the bar will cause a change in intensity of magnetisation.