QUEST FOR EXCELLENCE	**Maharashthra Institute Of Technology,Aurangabad**	
	Practical Experiment Instruction Sheet	
	EXPERIMENT TITLE : **Determination of viscosity of oil by Redwood viscometer.**	

Class: F.Y. BTech.	DEPARTMENT: Basic Sciences & Humanity			
LABORATORY : Engg. Chemistry		Location:-	PART:	PAGE:

Aim:- To determine viscosity of lubricating oil by Redwood viscometer.

Apparatus:- Redwood viscometer no. 1 and stop watch.

Theory:- Viscosity is one of the most important properties of a lubricating oil. It is the property of the liquid by which it offers resistance to its own flow. The units of viscosity is poise or centipoise. 1 poise = 1 dyne / sec cm^2. Viscosity is the measure of the internal resistance to motion of a fluid and is mainly due to the forces of cohesion between the fluid molecules.

Absolute viscosity (η) may be defined as the force per unit area required to maintain a unit velocity gradient between two parallel layers. The units of absolute viscosity or coefficient of viscosity are poise and centipoise.

Redwood viscometer:

There are two types of redwood viscometer: Redwood viscometer No. 1 and Redwood viscometer No. 2. The two viscometers work on the same principle and have same shape and method of testing. The only difference lies in the dimensions id the discharge capillary.

Redwood viscometer No.1 is commonly used for determining the viscosities of thin lubricating oils such as kerosene, mustard oil etc.

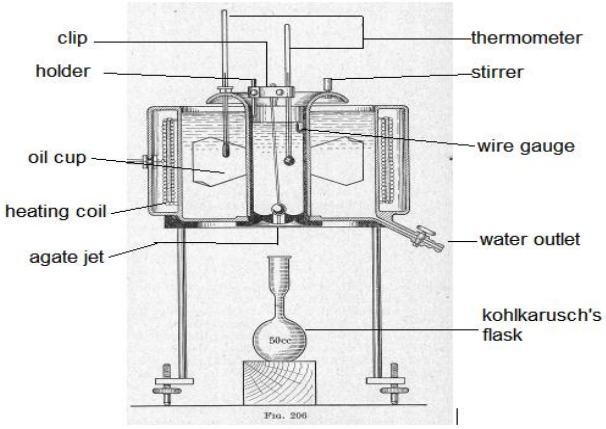
A redwood viscometer consist of the following parts:

Oil cup: oil cup is a silver plated brass cylinder having height of 90mm and diameter 46.5mm. The bottom of the cup is provided with a central hole in which an agate jet with bore diameter 1.62 mm and length 10mm is fitted. To indicate the level of cylinder a pointer is fixed on the inner side. A Thermometer is inserted in the cup through the lid of the cup.

Heating bath: a cylindrical copper bath containing water surrounds the oil cup. It is provided with a tap. A thermometer is also inserted in the copper bath to know the temperature. Heating bath is also provided with a stirrer.

Spirit level: A spirit level used for levelling the apparatus vertically is also provided in the lid of the cup.

Kohlrausch's flask: A specially shaped flash is provided to receive the oil form the outlet. Capacity of this flask is 50ml.



Procedure:-

1. Level the instrument with the help of the levelling screws on the tripod. Fill the water bath with water to the height
2. Keep the brass ball in position so as to seal the orifice.
3. Then pour the oil under test carefully into the oil cup up to the tip of the indicator. Keep the 50ml flask in position below the jet.
4. Keep the oil and water well stirred and note their temperatures. When the temperature of the oil and water are steady, raise the ball valve and suspend it from the thermometer bracket. Simultaneously start a stop watch.
5. When the level of oil dropping into the flask reaches 50ml mark, stop the stop watch, and note the time in seconds. Replace the ball valve in position to seal the cup to prevent overflow of the oil.
6. Refill the oil up to the indicator tip of the oil cup. Repeat these steps once again. Redwood viscosity No 1 at T ^{0}C = t seconds. This is the viscosity at room temperature.
7. Repeat this experiment at five elevated temperature, say 45^{0}C, 55 ^{0}C, 67 ^{0}C, 75 ^{0}C and 85 ^{0}C, and note the respective time of efflux as described above.
8. Similarly, determine the efflux time for other lower temperatures.
9. Construct graphs correlating (a) viscosity and temperature and (b) log viscosity and temperature.

Calculations:- Viscosity (v) = c x t,

where: c = viscosity constant = 0.063.

t = time of flow in redwood viscometer.

Observation table:-

Sr. No	Temperature	Efflux time(sec)	Viscosity (centipoise)
1			
2			
3			
4			

Conclusion:- Viscosity of the lubricating oil decreases with increase in temperature.