



**Question (1) (40 Marks)**

- (1.1) Defined the viscosity and explain its properties and behavior. (10 Marks)
- (1.2) Explain the viscosity varies from fluid to fluid with temperature. (10 Marks)
- (1.3) Mention with illustration the physical properties of lubricant. (10 Marks)
- (1.4) Mention the lubricant classification for different kinds. (10 Marks)

**Question (2) (30 Marks)**

- (2.1) The viscosity of a fluid is to be measured by a viscometer constructed of two 40 cm long concentric cylinder as shown in figure (1). The outer diameter of the inner cylinder is 12 cm, and the gap between the two cylinders is 10 mm, the inner cylinder is rotated at 300 rpm, and the torque is measured to be 1.8 N.m, Determine the viscosity of the fluid. (10 Marks)

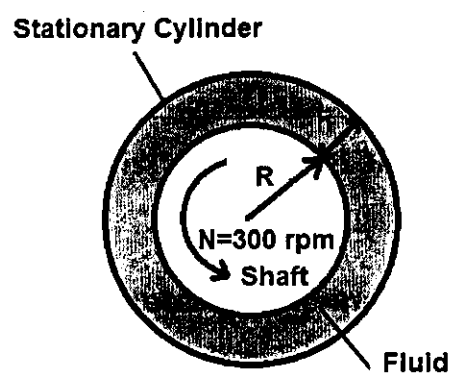


Figure (1)

- (2.2) Determine the relationship between the flow rate and the pressure drop between the inlet and exit, together with several other quantities of interest for Flow between Parallel Plates. (20 Marks)

**Question (3)**

**(30 Marks)**

- (3.1) Defined Fluid bearing and explain the difference between hydrodynamic fluid and hydrostatic fluid, and stating bearing theory. (10 Marks)
- (3.2) Explain the difference between hydrostatic and hydrostatic bearings, stating the advantages and disadvantages of each type. (10 Marks)
- (3.3) Mention the types of hydrostatic and hydrodynamic bearing and their applications. (10 Marks)

مع تمنياتى لكم بالنجاح والتوفيق

*Dr. Mohammed Said Farag*