**MECHANICAL ENGINEERING DEPARTMENT**

**NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR**

**Assignment Unit I**

**Subject: Lubricant Selection & Applications Semester: M.Tech 2nd (ITMM)**

**Session: Spring-2020 Due date of Submission- 07th May, 2020**

***Note: Students must submit the assignment on or before due date on my e-mail address shaficharoo123@nitsri.net. Any doubt regarding unit I, unit II and unit III can be discussed on my Mobile No. 9797793483.***

**Q.1 A lubricant's viscosity at -20o C is 1000[cS] and the ASTM slope for this lubricant is 0.6. What is the viscosity index of this lubricant?**

**Q.2 Three viscosities of a lubricating oil were determined at three different temperatures, i.e., 1000[cS] at 0o C, 75[cS] at 40o C and 10[cS] at 100o C. Using the Vogel viscosity-temperature equation determine the oils viscosity at -20o C. What is the viscosity index of this oil? The lubricants density is 900 Kg/m3**

**Q.3 Find the quantity of oxygen that could be dissolved in 1 litre of Methyl phenyl silicone at 200oC.**

**Q.4 Find the Viscosity index of an oil that has kinematic viscosity at 40o C of ν40oC = 145[cS] and at 100o C of ν100oC = 19.35[cS]**

**Q.5 Define and discuss various temperature characteristics of lubricants.**

**Q.6 What is Neutralization Number. Discuss its significance in liquid lubricants.**

**Q.7 Determine the performance parameters (minimum film thickness, coefficient of friction, power loss, side flow, location and magnitude of the maximum fluid pressure) of a full journal bearing having following specifications:**

**Journal radius (RJ) = 25 mm, bearing length (L) = 50 mm, rotational speed of journal = 1440 rpm, load (W) = 1000 N, lubricant oil SAE40, and radial clearance (c)= 0.00005 m. The lubricant supply temperature is 70°. An initial assumption of expected temperature rise is 8 °C. The density and specific heat of the lubricant is 887 kg/m3 and 1800 J/kg/°C respectively.**

**Assignment Unit II**

**Subject: Lubricant Selection & Applications Semester: M.Tech 2nd (ITMM)**

**Session: Spring-2020 Due date of Submission- 14th May, 2020**

**Q.1 How are engine and transmission oil grades classified on the basis of viscosity?**

**Q.2 What is the base stock? What is the one of the main purposes of developing Synthetic oils**

**Q.3 Discuss a simple and effective rheological model of grease.**

**Q.4 Define grease consistency. How is it measured?**

**Q.5 What are emulsions and aqueous lubricants? Explain their applications.**

**Q.6 What is the function of lubricant additives? Discuss various types of lubricant additives**

**Q.7 Discuss the action of Zinc dialkyldithiophosphate (ZDDP) on the tribological properties of oil.**

**Assignment Unit III**

**Subject: Lubricant Selection & Applications Semester: M.Tech 2nd (ITMM)**

**Session: Spring-2020 Due date of Submission- 21st May, 2020**

**Q.1 What is the characteristic material property of solids used as solid lubricants?**

**Q.2 Name a lamellar solid which is not effective as a solid lubricant. Support your answer with a valid reason.**

**Q.3 What are the various deposition methods of solid lubricants?**

**Q.4 Explain the mechanism of friction reduction by soft films on hard substrates.**

**Q.5 Discuss solid lubricants as additives to oils and polymers.**

**Q.6 Discuss new trends in coating technology.**

**Q.7 Discuss reduction of friction by soft metallic films.**