Ex/Prod/T/424A/2018

BACHELOR OF ENGINEERING IN PRODUCTION ENGINEERING EXAMINATION, 2018

(4th Year, 2nd Semester)

TRIBOLOGY

Time : Three hours Full Marks : 100

Answer ***any five*** questions :

1. a) Discuss spectrometric oil analysis program (SOAP) used in relation to wear debris. 10

   b) Prove that the frictional moment for worn-in plates in case of collar bearing, is $\frac{3}{4}$ as much as for new surfaces. 10

2. a) Deduce Petroff's equation mentioning the assumptions made. 15

   b) What is solid lubricant ? Explain. 15

3. a) Discuss Rabinowicz's quantitative law of abraisive wear. 10

   b) Differentiate between metal cutting and wear with examples. 6

   c) What is bearing area curve ? 4

4. a) Elucidate the system concept. 10

   b) Show the application of system concepts to TRIBOLOGY. 10

5. The research laboratory at ABC Co. has narrowed the search for a perspective coating material to fom coating materials CT_1, CT_2, CT_3 and CT_4. The final selection is based on form criteria : Hardness (H), Young's modulus (E), criticalload (L_C) and Co-efficient of friction (μ). You, as an expert, are required to make an eclectic decision. 20

6. The following data is given or a 360^o hydrodynamic bearing :

   radial load = 3.2 KN

   journal speed = 1490 r.p.m.

   journal diameter = 50 mm

   bearing length = 50 mm

   radial clearance = 0.05 mm

   viscosity of lubricant = 25 cP

   Assuming that the total heat generated in the bearing is canicol by the total oil flow in the bearing, calculate

   i) Co-efficient of friction

   ii) Power lost in friction

   iii) Minimum oil film thickness

   iv) flow requirements in litres / min.

   v) maximum film pressure developed in oil film. 20

7. Write short notes on ***any two*** : 10×2=20

   a) Hertzian Contacts

   b) Friction circle

   c) Different nomenclature of bearing series

   d) Bearing life.