National Institute of Technology Hamirpur (HP)

Name of the Examination: B. Tech.

Branch : Mechanical Engineering Course Name : Industrial and Engine Tribology

Time: 3 Hours

Note: Attempt all questions; assume missing data, if any.

Q. No. 1

- i. What role does roughness play in friction and wear?
- ii. How wear can be beneficial for the surfaces in interaction? Give suitable example.
- iii. In a ball bearing what may be the impact of the presence of asperities on the bearing performance?
- iv. What are the laws of friction? How these came into existence?
- v. What is Archard's equation? How this equation is evolved?
- vi. Why oil needs to be replaced, what is the criterion for such a decision?
- vii. What do you understand by junction growth? How such a behaviour is experienced in tribo pairs?
- viii. In what type of engine parts and circumstance fatigue wear is most encountered?
- ix. In what way temperature plays its role in influencing friction coefficient?
- x. In case of oils what the following notations signify
 - a) 10W40
 - b) 22/18/12

Q. No. 2

- a. What type of friction may happen between automobile tyres and mettled as well as unmetalled road, what will be the outcome of such a friction?
- b. How can design parameters influence friction of components, which parameters may be of utmost importance?
 [2.5x2]

Q. No. 3

- a How can wear be classified? Which type of wear is more predominant in rolling element bearings?
- b How can applied load influence failure of very hard components? What are common techniques used to mitigate wear of turbine blades?

[2.5x2]

Q. No. 4

Examine the images below and give your comments from tribology point of view with appropriate justification.

[10 x 1.5]

Max Marks: 50

Do Razeon Kamas Chado 209 2/2/2022

Semester

:VII

Course Code : ME-452

210





Q. No. 5

- a What type of bearings are used to lift very heavy rotors in power plants? Write the names of all types of bearings used in a thermal power station and their location of use.
- b How contamination of lubricant can be assessed? What are different methods for oil analysis of used oil?

Q. No. 6

- a. Write the assumptions associated with Reynolds equation, which parameters were instrumental in deducing such an equation?
- b. Deduce the Reynolds equation for a journal bearing, how can this be used for an infinitely wide fluid film bearing?

[4, 6]

[2.5x4]

[2.5x2]