

Dr Raj Bahadur Singh

3/5/2023

(12) (47)

Roll No.

National Institute of Technology Hamirpur
Department of Material Science and Engineering
End-Term Examination VIth Semester May 2023 (Even Semester 2022-23)

Sub: Tribology of Engineering Materials

Course Code: MS-322

Time: 3 Hrs

Max. Marks: 50

Note: Answer all questions. Draw neat sketch wherever needed.

- Q. 1. Discuss economy of tribology (write at least 500 words) (8)
- Q. 2. What are the essential properties of a material to manufacture a spur gear and why? (5)
- Q. 3. Explain friction behavior between ceramic-metal and metal-polymer (5)
- Q. 4. Discuss the mechanism of tribochemical wear, also explain the effect of different environments on tribochemical wear. (5)
- Q. 5. List the different surface hardening methods. Explain the one surface hardening methods from each category involved (i) without change in chemical composition and (ii) with change in chemical composition. (7)
- Q. 6. What are the various methods of surface characterization, explain one surface characterization technique in brief (5)
- Q. 7. What is abrasive wear? Explain the mechanism of the same. Explain and derive quantitative equation for abrasive wear (8)
- Q. 8. Explain the effect of the change of hardness, rate of oxidation, other chemical reactions and velocity on the wear properties of the materials. Give an example and explain the variation in coefficient of friction of the material with change in temperature. (7)