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ITL-703 Fundamentals of Tribology
Minor Test II (9-10-2015)

Time 1 hr

Total Marks 40

Answers should be brief. Answers to Q2 must be tried on the question paper.

Q1

(35)

- a) Explain systematically (with Fig) all the 8 wear regimes in the adhesive wear map (Tabular form) only. Define X and Y coordinates. Explain the significance of wear maps (8+1+2)
- b) Derive Archard eqn for adhesive wear mode. What is k & its significance? (at least 6 points). (6+5+3)
- c) Write Archard equation for abrasive wear mode and what are its four major shortcomings? (4) $\times 5$
- d) What are major mechanisms operative during abrasion of ductile and brittle materials? (4)
- e) What is concept of critical load during abrasion of brittle solids and on what factors it depends? (2)

Q2 - Fill in the blanks or tick right answer

(5)

i) Brittleness index (BI) is defined as $\frac{H}{k_c}$ ^{ratio of} hardness to toughness. (1)

ii) Higher the BI, **higher/lower** is wear. higher.

iii) Precipitation hardening by relatively soft particles leads to substantial increase in abr wear

resistance (Y/N) yes.

iv) The major mechanism in adhesive wear is Film transfer and adhesion. ^{mutual solubility}

v) Smaller the grain size, **higher/lower** is the wear resistance in adhesive wear. higher.

vi) FCC structure is less ductile and hence adhesion will be **less/more** less.

vii) Higher the roughness factor (θ), **more/less** is the acuteness of abrading particle & **more/less** is wear.

viii) The common wear mechanism between adhesive and abrasive wear is plastic deformation.