Exam Date & Time: 05-Jan-2024 (02:30 PM - 05:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING VII SEMESTER B.TECH MAKEUP EXAMINATION, JAN 2024

Tribology [MME 4044]

Marks: 50 **Duration: 180 mins.** Descriptive Answer all the questions. Section Duration: 180 mins Discuss the role and importance of following lubricant additives. (a) Friction modifier 1A) (b) Viscosity improvers (c) Oxidation Inhibitors (5) Classify the different lubrication regimes occurring between two surfaces and using 1B) practical examples explain the lubrication mechanism under boundary lubrication (3)condition 1C) Discuss the function and advantages offered by solid lubricants in different application areas (2)Explain the working concept of optical interferometry technique for EHL film thickness 2A) measurement by analysing the different functional regions in captured interferometric (3)images 2B) Derive an expression for pressure distribution and load carrying capacity of hydrostatic circular step bearing. State the assumptions (4) Derive the continuity equation in three dimensions 2C) (3)Discuss the drawbacks of Bowden and Tabor's Simple adhesion theory of friction and 3A) explain the modifications included in modified adhesion theory of friction (4)With sketches explain the different abrasive mechanisms of wear in gear wheels 3B) (3)3C) Explain the adhesive wear mechanism based on a specific application experiencing such wear during operation (3)Discuss the role of thermal techniques utilized to manufacture surface layers and explain 4A) any of the four thermal techniques in detail (4) 4B) With detailed representation, explain the four-zone model to analyse the concept of

4C) Briefly discuss the methods used for wear and corrosion control in surface engineering (2)

superficial layer

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5A)	With illustrations, explain the working concept of following tribometers used for dry or partially lubricated sliding contacts. (i) Four-ball tester (ii) Falex Tester (iii) Pin-on-disc apparatus (iv) Pin-on-slab apparatus	(4)
5B)	With neat sketches explain the working principle of Transmission Electron Microscope (TEM)	(4)
5C)	Discuss the function of different types of shaft misalignment measurement methods available at present	(2)

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