



Roll No:

BTECH

(SEM. VI) THEORY EXAMINATION 2025-26

TRIBOLOGY

TIME: 3 HRS

M.MARKS: 70

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt all questions in brief.

02 x 7 = 14

Q no.	Question	CO	Level
a.	Define <i>adhesive wear</i> and list any two conditions under which it becomes severe.	1	K1
b.	List any four important properties of lubricants and state their significance in practical applications.	2	K1
c.	What is hydrodynamic lubrication? State the basic condition required for its formation in journal bearings.	3	K2
d.	What is solid lubrication? Give two examples of solid lubricants used in engineering applications.	4	K1
e.	What is friction stability? Explain its importance in machine performance.	5	K2
f.	Differentiate between <i>rolling friction</i> and <i>sliding friction</i> based on their causes and effects.	1	K2
g.	List different lubrication methods used in bearings and mention one application for each.	3	K1

SECTION B

2. Attempt any three of the following:

07 x 3 = 21

Q no.	Question	CO	Level
a.	Classify different types of wear mechanisms and explain any four types of wear in detail with suitable examples from industrial applications.	1	K3
b.	Discuss the criteria for selecting a suitable lubricant for high-temperature and high-load conditions.	2	K1
c.	Explain the mechanism of pressure development in hydrodynamic lubrication and its significance in journal bearings.	3	K2
d.	Discuss various techniques used for producing wear-resistant coatings. Explain their advantages and limitations.	4	K2
e.	Analyze the effect of friction in screw mechanisms with square and triangular threads. Also, compare their performance.	5	K4

SECTION C

3. Attempt any one part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Explain the theories of dry friction, including: i. Adhesion theory ii. Abrasion theory iii. Junction growth theory Also discuss how these theories contribute to frictional resistance in mechanical systems.	1	K2



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b.	Evaluate different methods for measurement of wear in tribological systems. Suggest suitable strategies to minimize wear in engineering components.	1	K4
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4. Attempt any one part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Explain different types of lubricants and analyze their suitability for various engineering applications.	2	K4
b.	Describe the role of lubricant additives and explain how they improve the performance of base lubricants under different operating conditions.	2	K3

5. Attempt any one part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Compare hydrostatic lubrication and hydrodynamic lubrication with respect to working principle, advantages, and applications.	3	K4
b.	Select suitable lubrication methods for following types of bearings i. Journal bearings ii. Rolling element bearings iii. Thrust bearings Also justify your choices based on operating conditions.	3	K5

6. Attempt any one part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Evaluate different surface coating methods for reducing wear in industrial components. Justify the selection of a suitable method for a given application.	4	K5
b.	Analyze the friction and wear characteristics of lamellar solid lubricants. Explain their suitability in extreme operating conditions.	4	K4

7. Attempt any one part of the following:

07 x 1 = 07

Q no.	Question	CO	Level
a.	Evaluate the impact of friction in belt drives and cam-follower systems. Justify methods to improve their efficiency.	5	K5
b.	Explain plate and cone clutches with neat diagram. Also analyze the role of friction in torque transmission.	5	K4