

Basavarajeswari Group of Institutions

BALLARI INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institute under Visvesvaraya Technological University, Belagavi)

2022 SCHEME

USN

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Course Code

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Eighth Semester B.E. Degree Examinations, May 2026

TRIBOLOGY

Duration: 3 hrs

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Missing data, if any, may be suitably assumed

<u>Q. No</u>	<u>Question</u>	<u>Marks</u>	<u>(RBTL:CO: PI)</u>
<u>Module-1</u>			
1. a.	Define Tribology. Illustrate its historical background and explain its practical importance in modern industrial applications.	10	(2 : 1 : 1.2.1)
b.	Explain the effect of variation in temperature and pressure on the viscosity of a lubricant.	10	(2 : 1 : 1.2.1)
(OR)			
2. a.	Explain with neat sketch Hagen-Poiseuille law and co-efficient of viscosity.	10	(2 : 1 : 1.2.1)
b.	Distinguish between (i) Dynamic and Kinematic viscosity (ii) Fluidity and viscosity.	10	(2 : 1 : 1.2.1)
<u>Module-2</u>			
3. a.	Define and state the laws for friction.	06	(1 : 2 : 1.2.1)
b.	Distinguish between static and kinetic friction.	06	(2 : 2 : 1.2.1)
c.	Brief note on (i) Delamination theory (ii) Wear debris analysis	08	(2 : 2 : 1.2.1)
(OR)			
4. a.	List out wear mechanisms and explain any one wear mechanism.	10	(2 : 2 : 1.2.1)
b.	Write short notes on friction of metals and non-metals and debris analysis.	10	(2 : 2 : 1.2.1)
<u>Module-3</u>			
5. a.	Derive Reynold's equation in two dimensions. Also state the assumptions.	20	(2 : 3 : 2.2.1)
(OR)			
6. a.	Explain an overview of idealized journal bearing.	06	(2 : 3 : 1.2.1)
b.	Lightly loaded full journal bearing has the following specifications bearing diameter = 80 mm, bearing length = 60 mm, diametral clearance = 0.012 mm, journal speed = 24000 rpm, viscosity of lubricating oil = 2 cP, radial load = 900 N. Determine (i) Torque (ii) co-efficient of friction (iii) frictional force (iv) Power loss.	14	(2 : 3 : 2.2.1)

Note: (RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI- Performance Indicator)

Module-4

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| 7. | a. | Derive a relation for coefficient of friction in an idealized plane slider bearing with fixed shoe. | 10 | (2 : 4 : 2.2.1) |
| | b. | What are the advantages and disadvantages of hydrostatic lubrication? | 10 | (2 : 4 : 1.2.1) |

(OR)

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| 8. | a. | Derive the expression for load carrying capacity for an idealized plane slider bearing of a pivoted shoe bearing. | 10 | (2 : 4 : 2.2.1) |
| | b. | Write short notes on (i) Fixed shoe bearings (ii) Pivoted shoe bearings | 10 | (2 : 4 : 1.2.1) |

Module-5

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| 9. | a. | Discuss any 5 desirable properties of bearing materials. | 10 | (2 : 5 : 1.2.1) |
| | b. | Describe self-lubricating bearings and its advantages. | 10 | (2 : 5 : 1.2.1) |

(OR)

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| 10. | a. | Write short note on (i) surface hardening (ii) surface melting. | 10 | (2 : 5 : 1.2.1) |
| | b. | Explain in details about the major aspects to be considered for selection of coating for wear and corrosion resistance. | 10 | (2 : 5 : 3.1.1) |

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