

Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH (ME/PE)/SEM-8/ME-805/2012

2012

TRIBOLOGY AND TEROTECHNOLOGY

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) Acquisition cost concerning life cycle to include
 - a) R & D, Management and Engineering, Design and prototyping, Testing and evaluation, Plant facilities, Overhead, Marketing and Distribution.
 - b) Manpower, operation, facilities, Raw material and consumable, Training and Repair and Maintenance
 - c) Salvage / disposal value, Production, Repair resources, Cost due to time loss concerning repair/ maintenance.
 - d) None of these.

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- ii) Tribology includes interaction between
 - a) Friction, maintenance management and reliability
 - b) Friction, Wear and Lubrication
 - c) Wear, Preventive maintenance and Maintainability
 - d) All of these.

- iii) Causes of friction depend on
 - a) Adhesion theory, sliding velocity, tangential force and surface interaction behaviour
 - b) Adhesion theory, asperity inter-locking theory, molecular attraction theory and stick-slip theory
 - c) Sliding friction, rotary friction and sticking friction
 - d) Surface interaction behaviour due to temperature rise vibration, wear and lubrication.

- iv) Wear is classified as
 - a) Adhesive, erosive and friction
 - b) Adhesive, friction, lubrication and slippage
 - c) Adhesive, erosive, abrasive, corrosive, fatigue, fretting, impact and other
 - d) None of these.

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- v) In hydrodynamic bearing
- a) the oil film presence is generated by external pump
 - b) the oil film presence is generated by dead weight of shaft
 - c) the oil film presence is generated only when the shaft rotates
 - d) the oil film is sufficient thick.
- vi) In a boundary lubricated bearing there is of lubrication between the two surfaces of sliding contact bearing.
- a) thick film
 - b) very thin film
 - c) no film.
- vii) The purpose of seal and packing is
- a) to optimize surface properties
 - b) to monitor the condition of equipment
 - c) to prevent leakage of fluids, ingress of dirt, fumes and abrasive matters and escape of gases
 - d) none of these.

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viii) Equipment record consists of

a)

- w) name of the equipment
- x) maintenance procedure
- y) break-down attended
- z) optional procedure

b)

- w) instruction manual
- x) drawing
- y) inspection register
- z) equipment history

c)

- w) name of the equipment
- x) supplier name and order no.
- y) data of commissioning and cost
- z) drawing no. if any

d)

- w) log book
- x) name of the equipment
- y) cost
- z) spare parts list.

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- ix) Which of the following devices transmits power by friction ?
- a) Spur gear
 - b) Bevel gear
 - c) Chain drive
 - d) Belt drive.
- x) Profilometer is instrument used to measure
- a) Gear involutes
 - b) Taper of a plane
 - c) Thread profile
 - d) Surface roughness.
- xi) Break-down maintenance means
- a) Corrective action
 - b) Repair undertaken whenever the equipment fails
 - c) Lost production time
 - d) all of these.
- xii) When the MTBF is increased, the system reliability will
- a) be uncertain
 - b) remain constant
 - c) increase
 - d) decrease.

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GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. a) Discuss on the role of tribology in life cycle involvement/terotechnology.
b) Discuss on the coefficient of rolling resistances. $2 + 3$
3. a) List and explain the types of defects formed on surface.
b) Describe an optical profilometer and its advantages over surface profilometer. $2 + 3$
4. a) List the sources and types of wear generally observed in engineering practice and how these can be removed.
b) What are the wear plates ? Indicate some equipment / places where these plates are used. $2 + 3$
5. a) Explain on the purposes of lubrication, viscosimetry, pour point and flash point.
b) What is condition monitoring and equipment health monitoring ? $2 + 3$

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6. a) What are the objectives of maintenance organization ?
b) Explain briefly the pillars of TPM on which it works.

2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. Describe flow analysis on Reynolds equation for one-dimensional flow of lubricants concerning journal bearing.
8. a) Explain reliability. Explain how reliability data helps in the performance of maintenance.
b) Elucidate the importance of opportunity maintenance.
c) Discuss the maintenance policies adopted on major home appliances. $5 + 5 + 5$
9. a) Explain the significance of STRIBECK curve.
b) What is Somerfeld number ?
c) Discuss Petroff s equation. $5 + 5 + 5$
10. a) Outline th importance of bathtub curve.
b) Discuss on condition based maintenance, proactive maintenance and risk based maintenance with suitable examples. $5 + 10$
11. a) Explain the significance of solid lubricants.
b) Discuss the principles of life-cycle analysis through an example known to you. $5 + 10$

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