

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

Course Code: ME369

Course Name: TRIBOLOGY (ME, MC, MP, PE, AU)

Max. Marks: 100

Duration: 3 Hours

PART A

Answer any three full questions, each carries 10 marks.

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|---|--|-------|
| 1 | a) Explain the industrial significance of tribology. | (3) |
| | b) What are the physico-chemical characteristics of surface layers. | (4) |
| | c) Give one use of each bearings of following type: | (3) |
| | i) Tapered roller bearing ii) Roller thrust bearings iii) needle roller bearing | |
| 2 | a) What are the assumptions of Hertz theory? | (3) |
| | b) What are the advantages of roller bearing over sliding bearing? | (4) |
| | c) Differentiate between confirming and non-confirming contacts with example. | (3) |
| 3 | a) Explain any one of the methods of measuring friction in detail. | (4) |
| | b) What are the laws of friction with exceptions for each law? | (6) |
| 4 | a) Write short notes on: i) Friction of metals ii) Friction of ceramics. | (6) |
| | b) Write down any two situations where i) Friction is desirable ii) Friction is undesirable. | (2) |
| | c) What is stick slip phenomenon? | (2) |

PART B

Answer any three full questions, each carries 10 marks.

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|---|---|-----|
| 5 | a) What are the different types of wear? | (6) |
| | b) Give any 4 examples of occurrence of sliding wear in industry. | (4) |
| 6 | a) State the assumptions of Archard's law and derive an expression for it. | (6) |
| | b) What are the different stages of wear? Explain with wear regime maps? | (4) |
| 7 | a) What is viscosity? Explain Newton's law of viscosity. | (4) |
| | b) Differentiate between Newtonian and non-Newtonian fluid. | (3) |
| | c) Explain the role of lubricant in rolling process. | (3) |
| 8 | a) Explain different types of additives for developing a good lubricant (Any four additives). | (8) |
| | b) What is viscosity index? | (2) |

PART C

Answer any four full questions, each carries 10 marks.

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| 9 | a) What is the importance of adhesion in tribology? | (4) |
| | b) What is meant by adhesion index? | (4) |
| | c) Write short notes on adhesion produced by surface tension. | (2) |
| 10 | a) What is Stiction? | (4) |
| | b) What are the different bearing materials used in industry? | (3) |
| | c) Explain the constructional details of a roller bearing. | (3) |
| 11 | a) Write down the basic equation for fluid film lubrication and explain its significance | (4) |
| | b) What are the different types of slider bearing? | (3) |
| | c) Explain the working principle of journal bearing. | (3) |

- 12 a) Write short notes on microstructural treatments. (5)
- b) Explain thermo chemical treatments. (5)
- 13 a) What are different types of vapour deposition processes? Explain any two methods. (8)
- b) Explain transformation hardening. (2)
- 14 a) What are the different properties and parameters of coating? (4)
- b) Write short notes on i) Surface melting ii) Fusion Processes. (6)
