Code: 9D15106a

M.Tech I Semester Supplementary Examinations August/September 2018

TRIBOLOGY

(Machine Design)

(For students admitted in 2013, 2014, 2015 & 2016 only)

Time: 3 hours Max. Marks: 60

Answer any FIVE questions

All questions carry equal marks

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1 (a) What are skewness and kurtosis of rough surfaces? Explain with schematic sketches.
(b) What are auto covariance and autocorrelation functions?

2 (a) Outline the considerations that govern the following aspects of the performance of rolling-element bearings: (i) Load capacity. (ii) Rotational speed. (iii) Life. (iv) Lubrication requirements.
(b) A shaft rotating at constant speed is subjected to variable load. The bearings supporting the shaft are subjected to stationary equivalent radial load of 3 kN for 10 per cent of time, 2 kN for 20 percent of time, 1 kN for 30 per cent of time and no load for remaining time of cycle. If the total life expected for the bearing is 20×10^6 revolutions at 95 percent reliability, calculate dynamic load rating of the ball bearing.

3 (a) Derive the one dimensional Reynolds equation for long bearing approximation.
(b) Derive the bearing parameters from the general Reynolds equation.

4 (a) Derive the relation for lubricant flow of flat circular hydrostatic pad bearing.
(b) What are aerostatic bearings? List its advantages.

5 (a) What do you understand by sintered bearings? What are its applications?
(b) What are the advantages of PTFE bearings? What do you understand by self-lubricated bearings?

6 (a) Differentiate between lubricant and lubrication. Explain how MoS_2 act as good solid lubricant.
(b) What are additives? How it contributes in lubrication?

7 (a) List the different types of seals and its applications.
(b) Discuss the importance of Seal face materials and their significant properties.

8 (a) Tabulate service failures and its causes of bearings.
(b) List the common contaminants and its possible sources.

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