The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Mechanical Engineering

Study Programme	:	BTech Hons in Engineering
Name of the Examination	:	Final Examination
Course Code and Title	:	**DMX 5211 Plant Maintenance**
Academic Year	:	2021/22
Date	:	01 February 2023
Time	:	13 30-16 30 hrs
Duration	:	3 hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of 07 questions. All questions carry equal marks.
3. Answer any 05 questions only.

Q1.

(a) State three factors to be considered when developing a Maintenance programme for a large plant. (4 Marks)

(b) Draw a typical Failure Curve (Bath-Tub Curve) for a mechanical component and mark the different phases. (6 Marks)

(c) Give reasons for failure in each of the phases mentioned in part (b) (6 Marks)

(d) "Preventive maintenance policy" may not give the organization optimum benefits. Explain the statement. (4 Marks)

Q2.

(a) How do Condition Based Maintenance systems save more money than traditional schedule maintenance systems? Explain. (5 Marks)

(b) List down four possible parameters to gauge the state of a piece of equipment. (5 Marks)

(c) As part of a predictive maintenance program, ultrasonic instruments are used for three primary applications. Explain these applications giving examples for each. (5 Marks)

(d) Pollution control is a task of the maintenance department in many organizations. Name and explain four air pollution controllers used in industries. (5 Marks)

Q3.

(a) Name three types of solid lubricants (3 Marks)

(b) Explain under what circumstances are lubricating solids preferred. (4 Marks)

(c) Compare Boundary lubrication and Hydrodynamic lubrication. (4 marks)

(d) What are the properties that a lubricant should possess? (5 Marks)

(e) Mention three types of lubricant application techniques frequently used and mention the usage of each application technique. (4 Marks)

Q4.

(a) Consideration should be given when designing and constructing buildings in order to prevent the spread of fire. Explain three factors that affect the spread of a fire in a building. (3 Marks)

(b) What is meant by spontaneous risk in relation to industrial hazards? (3 Marks)

(c) List down four processes in which spontaneous risks can be found. (4 Marks)

(d) What sort of firefighting equipment (portable) would you suggest, for a Nitrate Bath? Give reasons for your suggestion. (6 Marks)

(e) Mention two types of fixed firefighting systems used and explain how these systems are activated. (4 marks)

Q5.

(a) Overheating of bearings is one of the main reasons for failure of bearings. Explain at least three causes of overheating? (4 marks)

(b) Internal clearance between rolling elements and the raceway is kept at higher than normal at some instances. Explain two reasons to maintain higher clearance than designated amount. (4 Marks)

(c) List down three properties of bearing material and explain the importance of the mentioned properties in the case of sliding bearings. (6 Marks)

(d). Discuss the factors that need to be considered when deciding the re-lubrication interval of bearings. (6 Marks)

Q6.

(a) Explain the concept of Total Productive Maintenance (TPM). What are the outcomes of implementing TPM within an organization? (4 Marks)

(b) TPM is focused on eliminating causes of wastage of time and resources. List down the **"big six wastes"** which are eliminated by implementing a TPM system. (6 Marks)

(c) Give reasons why the maintenance manager "would go" or "would not go" for a computer based Maintenance Management System (CMMS) in the organization. Discuss at least three reasons (6 Marks)

(d). CMMS provides storage, manipulation, and retrieval of different types of information necessary for an effective maintenance system. Name at least three types of these information. (6 Marks)

Q7. Write short notes on **any four** of the following; (5 Marks each)

(a) Importance of "Fault tracing" .

(b) Machine condition monitoring tools.

(c) Predictive vs corrective maintenance methods.

(d) TPM adoption challenges.

(e) Maintenance cost and condition based maintenance.

(f). Usage of Vent Pipes in a drainage system.