



UNIVERSITY OF RUHUNA

Faculty of Engineering

Mid-Semester 7 Examination in Engineering: June 2015

Module Number: ME 7320

Module Name: Maintenance Management

[Two Hours]

[Answer all questions, each question carries 5 marks]

- Q1. a) Distinguish between Plant Maintenance and Plant Maintenance Management. [2 Marks]
- b) Briefly explain **three** objectives of Plant Maintenance Management. [3 Marks]
- Q2. a) Explain the typical organisational hierarchy of a maintenance department, indicating roles and responsibilities corresponding to each hierarchical level. [2 Marks]
- b) "Maintenance department in a production plant can be identified as an entity that deals with many other departments within the plant, on various requirements". Discuss this statement. [3 Marks]
- Q3. a) Briefly explain **four** types of maintenance techniques used in the manufacturing industry. [2 Marks]
- b) "Different approaches can be used for scheduling Preventive Maintenance activities". Discuss this statement. [3 Marks]
- Q4. a) State **four** maintenance analysis techniques used in Maintenance Management. [1 Mark]
- b) A book manufacturing plant runs on 12 hour shifts. It has conducted an Overall Equipment Effectiveness (OEE) analysis on one of its critical machines, which has an average production output of ~~150~~¹⁴⁵ books per shift. The cycle time to produce a book is 4 min in this machine. Operators of this machine have 10 min and 45 min of tea and meal breaks per each shift, respectively. Also average per-shift breakdown time is estimated to be 40 min and the time for preventive maintenance activities is around 35 min. Quality control records of this machine indicate that approximately 5% of the production output is defective and is rejected. Based on this case study, answer the following questions.
- i) Calculate OEE 1 and OEE 2.
- ii) Based on OEE1, draw an OEE chart indicating each type of losses and the corresponding OEE values.
- iii) Estimate the percentage OEE loss due to unaccounted losses.
- iv) Give two useful insights based the above analysis. [4 Marks]