UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 3 Examination in Engineering: March 2021

Module Number: ME3203

Module Name: Manufacturing Processes and Practices

[Three Hours]

[Answer **all questions**, each question carries **eight** marks]

(State the assumptions where necessary and do the calculations stating the units)

Q1. a) Give two (02) most important duties of a safety officer and explain them.

[2.0 Marks]

b) Discuss the safety factors to be considered while designing a workshop layout.

[2.0 Marks]

c) Give two (02) types of injuries that can be caused by incorrect method of manual lifting.

[1.0 Mark]

d) What is procedure of selecting the correct way of (manual/machine) lifting? Explain.

[3.0 Marks]

Q2. a) What is meant by a "Joining Process"? And classify them.

[2.0 Marks]

b) Give two (02) factors considered for a welding design and explain them.

[2.0 Marks]

c) How Shielded Metal Arc Welding (SMAW) and Oxy-acetylene Welding processes are differentiated from each other on the basis of;

- process,
- equipment,
- uses,
- applications.

(Use neat sketches whenever wanted)

[4.0 Marks]

Q3. a) Define lap joint and butt joint with neat sketches.

[2.0 Marks]

b) List out and briefly explain external and internal welding defects (two by each).

[2.0 Marks]

c) Differentiate the meanings of Accident and Incident by giving examples.

[2.0 Marks]

d) How often should a machine be cleaned? And how do you carry out this task in your workshop?

[2.0 Marks]

Q4. a) What is tool life?

[2.0 Marks]

b) Explain ~~tree~~ three (03) different types of tool failures.

[3.0 Marks]

c) During a cutting experiment a chip sample has been obtained while turning AISI 304 steel with a HSS tool, a rake angle of five degrees and a cutting speed of 20 ms^{-1}. If the thickness of the uncut chip is 0.15 mm and chip thickness is 0.3 mm, Calculate;

i) the cutting ratio,

ii) the shear angle,

iii) velocity of chip along tool face.

[3.0 Marks]

Q5. a) Explain the need for unconventional machining processes.

[2.0 Marks]

b) Explain the Wire EDM process, advantages and its applications.

[2.0 Marks]

c) Derive expressions for;

i) cutting velocity

ii) tool life for minimum cost per piece for straight turning operation.

[4.0 Marks]