



# UNIVERSITY OF RUHUNA

## Faculty of Engineering

End-Semester 3 Examination in Engineering: October 2019

Module Number: ME3203

Module Name: Manufacturing Processes  
and Practice

[Three Hours]

[Answer all questions, each question carries 12 marks]

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- Q1. a) The Electro-discharge Machining (EDM) process is widely used in the tool making industry. Discuss four (04) advantages and four (04) disadvantages of the usage of EDM process in production of dies. [4.0 Marks]
- b) Explain why studying the type of chips produced is important in understanding machining operations. [2.0 Marks]
- c) Draw the Merchant's circle and derive relationships for the shear force and friction coefficient during metal cutting. State all the assumptions that you made. [6.0 Marks]
- Q2. a) Derive expressions from the basics for,  
I. cutting velocity  
II. tool life [6.0 Marks]
- b) A 5cm bar of mild steel was turned at 350rpm and tool failure occurred in 8 min. The speed was changed to 250rpm and the tool failure occurred in 1 hour. What cutting speed should be used to obtain 30 min. tool life? [2.0 Marks]
- c) In conventional metal cutting process, tool wear is inevitable.  
I. Discuss the most significant factors that cause tool wear  
II. Explain why cutting tool failure is difficult to predict [4.0 Marks]
- Q3. a) What is the difference between hazard and risk? Explain by giving three (03) examples. [2.0 Marks]
- b) List four (04) articles of personal protective equipment that should be worn by workers involve in lath (machining) operation? Explain the function of each article. [4.0 Marks]
- c) "Steamy environment can be hazardous"; give five (05) reasons why this is so? [2.0 Marks]
- d) How often should a machine be cleaned? And how do you carry out this task in your workshop? Explain the things by using any machine. [4.0 Marks]

- Q4. a) What is meant by a "Joining Process"? Classify the joining processes. [5.0 Marks]
- b) Define lap joint and butt joint with neat sketches. [3.0 Marks]
- c) What is called by "Friction Welding process"? Describe **two (02)** major advantages of friction welding. [4.0 Marks]
- Q5. a) Briefly explain the process of "Gas Cutting". [3.0 Marks]
- b) State the types of flames used in gas welding, sketch them and state their applications. [4.0 Marks]
- c) Briefly explain the working principle of the Shielded Metal Arc Welding (SMAW) with neat sketches and mention its applications. [5.0 Marks]