



UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 4 Examination in Engineering: January 2022

Module Number: ME4303

Module Name: Manufacturing Engineering (N/C)

[Three Hours]

[Answer all questions, each question carries twelve marks]

- Q1. a) What are the applications of casting? Briefly explain them. [2.0 Marks]
- b) Write four (04) requirements of good pattern in casting process and briefly explain them. [2.0 Marks]
- c) Explain the process "Lost Waxing Method" with neat sketches? [3.0 Marks]
- d) Explain the two (02) different methods for inspection of casting (with neat sketches). [3.0 Marks]
- e) State two (02) advantages and two (02) limitations of die casting. [2.0 Marks]
- Q2. a) Differentiate the processes of "Hot Working" and "Cold Working" giving five (05) facts for each. [3.0 Marks]
- b) You are provided 300 mm × 1500 mm (W × L) size rectangular steel plate with 10 mm thickness (Figure Q2. b)). Explain the step-by-step process of making a steel drum using above plate. [3.0 Marks]
- c) Explain why parts produced by forging is preferred when compared to other machining and welding process. Refer Figure Q2. c. [3.0 Marks]
- d) What is the difference between punching and blanking? Explain using sketches where applicable. [3.0 Marks]
- Q3. a) Explain the process of "Resistance Welding" with neat sketches. [3.0 Marks]
- b) For the above Q2. b, you have to use only resistance welding for joining two edges after making cylindrical shape. Explain the joining operation step-by-step with neat sketches (Figure Q2. b).

[3.0 Marks]

c) What are the special features of friction welding?

[2.0 Marks]

d) Explain the process of Gas Tungsten Arc Welding (GTAW) with neat sketches.

[2.0 Marks]

e) State two (02) advantages and two (02) disadvantages of GTAW process.

[2.0 Marks]

Q4. a) What are the advantages (three) and limitations (three) of Powder Metallurgy (PM) compared to other manufacturing processes?

[3.0 Marks]

b) Explain briefly three (03) methods of preparing metallic powders prior to powder metallurgy process. Use neat sketches where applicable.

[3.0 Marks]

c) How do you overcome the problems encountered during powder compaction?

[3.0 Marks]

d) "Solid State Sintering" and "liquid state sintering" are two aspects finally applied to the compacted powder body (part). Explain this statement by using mechanisms, applications, and final properties of the parts.

[3.0 Marks]

Q5. Explain three (03) of the following manufacturing process with advantages and disadvantages. Use neat sketches where applicable.

- a) Shape Rolling
- b) Extrusion (Metal)
- c) Ultrasonic Welding
- d) Flanging

[12.0 Marks]

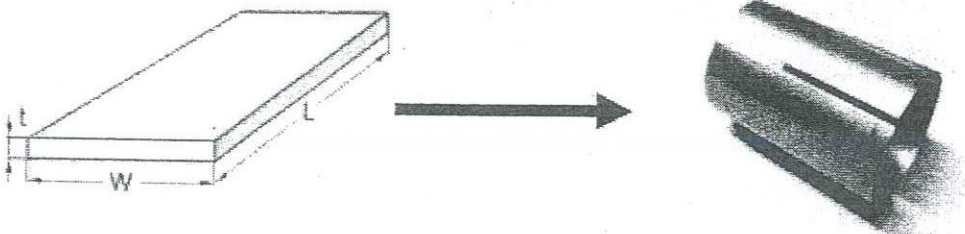
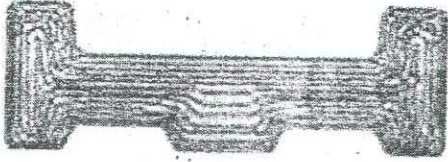
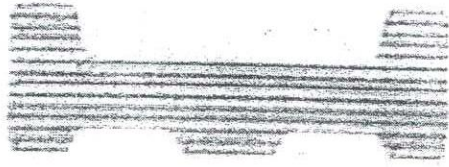


Figure Q2. b



a) Part Produced by Forging



b) Same Part Produced by Machining

Figure Q2. c