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

072

Study Programme	:	Bachelor of Technology Honours in Engineering
Name of the Examination	:	Final Examination
Course Code and Title	:	**DMX3206 Introduction to Manufacturing Processes**
Academic Year	:	2022/23
Date	:	14th February 2024
Time	:	1330 hours -1630 hours
Duration	:	**3 hours**

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **Five (05)** questions and answers all questions.
3. Answer for each question should commence from a new page.
4. This is a Closed Book Test (**CBT**).
5. Answers should be in clear handwriting.
6. Do not use Red colour pen.
7. Write the name of the question paper with course code on the first page of the answer book.
8. Write your index number (not the registration number) on every page of your answer book.
9. Write in the bottom of the first page of your answer book clearly the question numbers you answered.

Question 01

(a) i) Name some of the common iron ores used in the production of iron and steel. *(02 marks*
ii) What are the major applications of wrought iron? *(01 marks)*
iii) Briefly explain the production process of wrought iron. *(03 marks)*

(b) i) Name the types of Destructive Tests (DT) and Non-Destructive Tests (NDT). *(02 marks)*
ii) Explain one of the tests from each type. *(04 marks)*

(c) i) Describe the process of ***"sintering"*** in Powder Methodology. *(03 marks)*
ii) Name three important products manufactured by powder metallurgy. *(02 marks)*
iii) Explain the process of injection moulding. *(03 marks)*

Question 02

(a) i) Distinguish between high pressure and low-pressure oxy acetylene systems in welding. *(04 marks)*
ii) Explain the working principle of high pressure and low-pressure welding torches with the aid of clearly drawn sketches. *(06 marks)*

(b) Write short notes in followings welding techniques with comparing of merits and demerits of each process.
- MIG Welding.
- Spot Welding. *(04 marks)*

(c) i) What are the factors to be considered when selecting a solder? *(02 marks)*
ii) Why a flux is necessary in the soldering process? *(02 marks)*
iii) Name two types of fluxes commonly used in soldering *(02 marks)*

Question 03

(a) A cylindrical workpiece ***60 mm*** in diameter and ***500 mm*** long is to be turned in a center lathe. Cutting speed = ***2.30 m/s***, feed = ***0.32 mm/rev***. Determine followings. *(05 marks)*
- Spindle speed
- Cutting time

(b) i) Sketch and state the types of milling cutters. *(02 marks)*
ii) Describe the working principle of dividing head. *(03 marks)*
iii) Briefly explain the following. *(04 marks)*
- Spot facing
- Trepanning

(c) i) A cylindrical work piece of ***40mm*** in diameter and ***60mm*** in length is to be machined to a square bar ***(30 x 30mm)***. Name the machine that can be used for this operation. *(02 marks)*
ii) Briefly explain how to change the stroke of the particular machine to be used. Calculate the depth of metal to be removed. *(04 marks)*

Question 04

(a) i) Explain why casting is an important manufacturing process. *(02 marks)*

ii) Describe the stages involved in the metal casting process. *(03 marks)*

iii) What are the major limitations of the sand-casting process? Describe in brief how they overcome? *(05 marks)*

(b) i) Which is the most widely used type of pattern in casting process? Describe its advantages *(04 marks)*

ii) Write short notes on the following casting terms: *(06 marks)*

- Sprue
- Gate
- Runner

Question 05

(a) A wire with circular section of ***6mm*** diameter is bent round to form a U-shaped clip in the middle. The bending circle of the U is ***38mm*** diameter. The bend radius near the flange is ***3mm*** inside. The clip is shown by Figure 05 (a).

Find the length of the wire needed to do this bending. *(08 marks)*

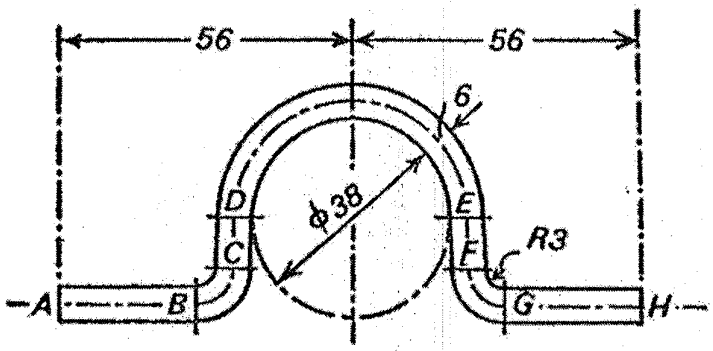

Figure Q05(a)

(b) i) What are the three main categories of plastic used in the plastic industry? *(04 marks)*

ii) Give examples of each category. *(02 marks)*

(c) i) Define the term ***"blanking"*** in sheet metal forming. *(02 marks)*

ii) Explain the economic advantages of this process in the industry. *(04 marks)*

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