



Study Programme	: Bachelor of Science Honours in Engineering
Name of the Examination	: Final Examination
Course Code and Title	: DMX4212 MANUFACTURING ENGINEERING
Academic Year	: 2022/23
Date	: February 10, 2024
Time	: 09:30 hrs. – 12:30 hrs.
Duration	: 3 hours

General instructions

- 1) Read all instructions carefully before answering the questions
 - 2) This question paper consists of 05 questions. All questions carry equal marks.
 - 3) Answer all questions.
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Question 01.

- a) Define metrology and explain its significance in manufacturing processes.
- b) Compare and contrast primary and secondary standards in metrology.
- c) Differentiate between systematic and random errors in measurements. Provide examples of each.

Question 02.

- a) Discuss the methods used for measuring the pitch diameter and thread angle of screw threads.
- b) Define surface roughness and surface texture. Explain how are these terms related, and why are they important in manufacturing.
- a) Define the terms tolerance, limit, and fit in the context of mechanical engineering.

Question 03.

- a) Discuss the fundamental principles of metal cutting, including the mechanics involved in chip formation.
- b) A carbide tool is used to machine a 20 mm diameter steel shaft at a spindle speed of 1000 revolutions per minute. Calculate the cutting velocity of the above turning operation.
- c) Discuss the concept of tool wear in metal cutting operations. Explain the common types of tool wear, and how can they be minimized.

Question 04.

- a) Describe the sources of heat generation in metal cutting and explain how does heat affects the cutting process.
- b) Describe the Taylor's tool life equation and its significance in metal cutting. Explain how the Taylor's equation can be used to optimize machining processes.
- c) Determine the dimensions of hole and shaft for a fit $50H_7g_6$. 50 mm lies between 30 and 50mm. $IT_7 = 16i$, $IT_6 = 10i$, $i = 0.45D^{1/3} + 0.001D$, fundamental deviations for 'H' hole = 0 and 'g' shaft = $-2.5D^{0.34}$

Question 05.

- a) Discuss the common methods used for gear cutting.
- b) Explain the various geometrical tests that are to be conduct to get a better accuracy in machine tools. Discuss the measurement techniques and what instruments are commonly used for these measurements.
- c) Explain the principles of plastic deformation in metal forming processes. Discuss how plastic deformation differs from elastic deformation.

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