

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



00055

Study Programme	:	Bachelor of Technology Honours in Engineering
Name of the Examination	:	Final Examination
Course Code and Title	:	DMX3533/ MEX3233 Workshop Technology
Academic Year	:	2019/20
Date	:	03 rd October 2020
Time	:	0930 hours -1230 hours
Duration	:	3 hours

General instructions

1. Read all instructions carefully before answering the questions.
2. This question paper consists of **eight (08) questions and three (03) pages**.
3. **Answer any 05 questions only**. All questions carry equal marks.
4. Answer for each question should commence from a new page
5. Relevant charts/ equations are provided.
6. This is a Closed Book Test (CBT).
7. Answers should be in clear handwriting.
8. Do not use Red colour pen.

Question 01 – (20 marks)

- (a) Explain the principle behind the modern hardness tests?
- (b) Name three common hardness tests.
- (c) Among the tests named above in part (b), explain the test in which two loads called major and minor loads are applied.
- (d) Explain importance of following testing methods with neat sketches.
 - i. Tensile test
 - ii. Impact test

Question 02 – (20 marks)

- (a) What are the processes available for manufacturing of steel?
- (b) Explain the process of steel making in an electric arc furnace with the help of a sketch.
- (c) What is the purpose of refining molten metal?
- (d) What are the major uses of copper? Explain about the alloying elements in brass and bronze, respectively.

Question 03 – (20 marks)

- (a) What is a “Phase Diagram”?
- (b) Sketch a simplified form of Iron-Carbon equilibrium diagram and mark the important points and areas.
- (c) What is the difference between an Eutectic reaction and a Peritectic reaction?
- (d) What are the changes of physical and mechanical properties of steel when Nickel and Chromium are alloyed with steel? Give a common application of the alloy of Nickel-Chromium steel and state why this alloy is mostly used in this application.

Question 04 – (20 marks)

- (a) Define the following terms used in casting
 - i) Blow hole
 - ii) Drag
 - iii) Gate
- (b) Write down the procedure followed, when making a casting.
- (c) What are the factors that you have to consider in designing the pattern?
- (d) “Pouring temperature is very important factor in casting process” verify above statement clearly.

Question 05 – (20 marks)

- (a) Explain the Friction Welding process.
- (b) Explain the gas cutting process.
- (c) What are the differences between the oxy-acetylene cutting torch and oxy-acetylene welding torch?
- (d) Write short notes of followings.
 - Submerged arc welding
 - MIG welding

Question 06 – (20 marks)

- (a) What factors needed to be taken into account when selecting the amount of current for a welding operation?
- (b) Explain the significance of arc length in relation to weld performance in Electric Arc Welding.
- (c) Explain three types of general defects in welding
- (d)
 - i) Distinguish between soft soldering and brazing.
 - ii) What is the purpose of a flux used in soft soldering?

Question 07 – (20 marks)

- (a) Name the cutting tool profiles that are used in the centre lathe.
- (b) Describe the function of the chasing dial used in thread cutting in the centre lathe.
- (c) Calculate the time taken to turn a brass component of 49 mm in diameter by 70 mm in length if the cutting speed is 44 m/min and the feed rate is 0.5 mm/revolution. Only one cut is taken (take π as $22/7$).
- (d) i) What do you mean by dressing in related to grinding wheels?
ii) What are the important of having nontraditional material removal processes?

Question 08 – (20 marks)

- (a) What are the surfaces that can be generated on a shaping machine?
- (b) Calculate the number of cycles (double strokes) per minute for shaping cast iron at a cutting speed of 25 m/min, if the stroke length is 250 mm.
- (c) The Brown and Sharpe milling head is provided with the following index plates.
 - Plate No. 1: 15, 16, 17, 18, 19 and 20 holes
 - Plate No. 2: 21, 23, 27, 29, 31 and 33 holes
 - Plate No. 3: 37, 39, 41, 43, 47 and 49 holesHow do you index the following divisions on a Brown and Sharpe head?
 - i) 20 ii) 38 iii) 46 iv) 66
- (d) i) Indicate some of the advantages of cold working relative to warm and hot working.
ii) What is the difference between deep drawing and bar drawing?

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