THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY
DIPLOMA IN TECHNOLOGY-LEVEL 3
FINAL EXAMINATION-2010/2011
MEX 3233 – WORKSHOP TECHNOLOGY
DATE : 22nd March 2011
TIME : 1400-1700hrs
DURATION : 03 hours

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INSTRUCTIONS:

(i) Question paper consists of eight (08) questions. Answer any five (05) questions only.

(ii) All questions carry equal marks.

1. (a) Explain the principle behind the modern hardness tests? **(6marks)**

(b) Name three common hardness tests. **(6marks)**

(c) Among the tests mentioned in part (b), explain the test which is used two loads called major and minor loads. **(8marks)**

2. (a) What are the different processes available for manufacturing of steel? **(6marks)**

(b) Explain the process of steel making in an electric arc furnace with the help of a sketch. **(6marks)**

(c) What is the purpose of refining molten metal? **(8marks)**

3. (a) What is a "Phase Diagram"? **(6marks)**

(b) Sketch a simplified form of Iron-Carbon equilibrium diagram and mark the important invariant points and all phase fields. **(8marks)**

(c) What is the difference between a Eutectic reaction and a Peritectic reaction? **(6marks)**

4. (a) Define the following terms used in casting.

(i) Blow hole (ii) Drag (iii) Gate **(9marks)**

(b) Write down the procedure to be followed, when making a casting. **(5marks)**

(c) What are the factors that you have to consider in designing a pattern? **(6marks)**

5. (a) List the types of welding processes used in welding and briefly explain, the Friction welding process. **(6marks)**

(b) Explain what gas cutting is. **(6marks)**

(c) What are the differences between the oxy-acetylene cutting torch and oxy-acetylene welding torch? **(8marks)**

6. (a) Describe the functions of a flux during soldering operation. **(6marks)**

(b) What factors do you consider in selecting the amount of current for a particular welding operation? **(6marks)**

(c) Explain the significance of arc length in relation to weld performance in Electric Arc Welding. **(8marks)**

7. (a) Name the cutting tool profiles that are used in the centre lathe. **(6marks)**

(b) Describe the function of the chasing dial used in thread cutting in the centre lathe. **(6marks)**

(c) Calculate the time taken to turn a brass component of 49 mm in diameter and 70 mm in length if the cutting speed is 44 m/min and the feed is 0.5 mm/revolution. Only one cut is taken. (Take π as 22/7) **(8marks)**

8. (a) What are the surfaces that can be generated on a shaping machine? **(6marks)**

(b) A through hole of 12 mm diameter is required to be drilled on a work made out of brass. The thickness through which the work piece has to be drilled is 15 mm.

Determine the spindle speed of the machine and the time taken for the drilling operation using the information given below. **(8marks)**

Cutting speeds for High Speed Steel (HSS) twist drills:

Material Being Drilled	**Cutting Speed (m/min)**
Aluminium	70-100
Brass	35-50
Bronze (phosphor)	20-35
Cast iron (grey)	25-40

Feeds for High Speed Steel (HSS) twist drills:

Drill Diameter (mm)	Rate of Feed (mm/rev)
1.0-2.5	0.040-0.060
2.6-4.5	0.050-0.100
4.6-6.0	0.075-0.150
6.1-9.0	0.100-0.200
9.1-12.0	0.150-0.250
12.1-15.0	0.200-0.300

(c) Calculate the traverse rate for a shaping machine equipped with a 6 mm lead traverse screw and a 40-teeth ratchet wheel, when set to an increment of two teeth per double stroke. **(6marks)**

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