THE OPEN UNIVERSITY OF SRI LANKA
FACULTYOF ENGINEERING TECHNOLOGY
DIPLOMA IN TECHNOLOGY
FINAL EXAMINATION-2008/2009
MEX3233 – WORKSHOP TECHNOLOGY

DATE : **29th March 2009**

TIME : **0930hrs –1230hrs**

DURATION : **03 hours**

INSTRUCTIONS:

(a) This question paper consists of eight (08) questions. Answer any five (05) questions.

(b) All questions carry equal marks.

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1. (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.

2. (a) Draw a cross section of a paddling furnace which is used to manufacture "wrought iron" and name the important parts of it and explain the functions of each part.

   (b) "Paddling furnace is a reverberatory furnace". Explain the meaning of this statement.

   (c) Discuss the advantages of having slag in "wrought iron".

3. (a) What is the function of a "dividing head" used in a milling machine ?

   (b) The Brown and Sharpe Milling head is provided with three index plates as follows:

   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 holes.

How do you index the following divisions on a Brown and Sharpe head?

(i) 11 (ii) 19 (iii) 25 (iv) 36 (v) 52 (vi) 34

(c) The index plate used on Cincinnati and Parkinson heads is of larger diameter than the Brown and Sharpe plates and is reversible. It is provided with the following hole circles:

On one side: 24, 25, 28, 30, 34, 37, 38, 39, 41, 42 and 43 holes.
On the reverse side: 46, 47, 49, 51, 53, 54, 57, 58, 59, 62 and 66 holes.

How do you index the following angles on a Cincinnati head?

(i) 38° (ii) 49° (iii) $61^{\circ}20'$ (iv) $8^{\circ}15'$ (v) $24^{\circ}36'$

4. (a) Find the rotational speed in rev/min for a 25mm bar to cut at 30 meters per minute.

(b) Find the cutting speed in m/min for mild steel working on a cut of 3mm with a feed of 0.75mm.

You may use the following formulae given in usual notation.

$$S = \frac{\pi DN}{1000} \quad S = \frac{R}{\sqrt[3]{A}}, \text{ for mild steel take } R = 24$$

(c) What are the factors that determine the selection of speeds and feeds for linear and rotational motions?

5 (a) What are the factors that have to be considered, in designing the pattern in casting?

(b) Name the types of patterns used in castings.

(c) Write short notes on the following pattern allowances.

i. Shrinkage allowance

ii. Pattern draft allowance

iii. Finish allowance

6 (a) Draw a sectional view of a pressure regulator used in gas welding and explain how a pressure regulator functions.

(b) What are the main functions of a blow pipe?

(c) Name the types of welding flames and explain how you obtain these flames.

7. (a) (i) Draw a sketch of an electric arc used in arc welding and label it.

(ii) What are the factors that the electrode's voltage potential depends on?

(b) What is the importance of the length of the electric arc in welding?

(c) Compare AC and DC welding processes.

8. (a) Explain the following terms in connection with soft solders and brazing alloys.

(i) Solidus temperature

(ii) Liquidus temperature

(iii) Wetting characteristics

(b) "Soldering is used as a metal joining technique". Explain.

(c) When you are selecting a solder for a certain application what are the factors that you need to consider.

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