THE OPEN UNIVERSITY OF SRI LANKA
FACULTY OF ENGINEERING TECHNOLOGY
DIPLOMA IN TECHNOLOGY – LEVEL 4
FINAL EXAMINATION 2005/2006
MEX4236/MED2208 -WORHSHOP PRACTICE AND PRODUCTION TECHNOLOGY PART B

DATE : 02nd MAY 2006.
TIME : 14.15-16.30HRS.
DURATION : TWO HOURS AND FIFTEEN MINUTES.

ASWER FIVE QUTIONS ONLY, ALL QUESTIONS CARRY EQUAL MARKS.

Question 01

(i) What are the salient differences between planning and universal milling machines?

(ii) Illustrate the process of gang milling.

(iii) Determine the time required to mill a slot in a work piece of 300 mm long as shown on Figure Q1 in a horizontal milling machine with a side milling cutter of 100 mm in diameter having a width of 25mm and 18 teeth. The depth of cut is 5mm, the feed rate and the cutting speed are 0.1mm/s and 30 m/min respectively.

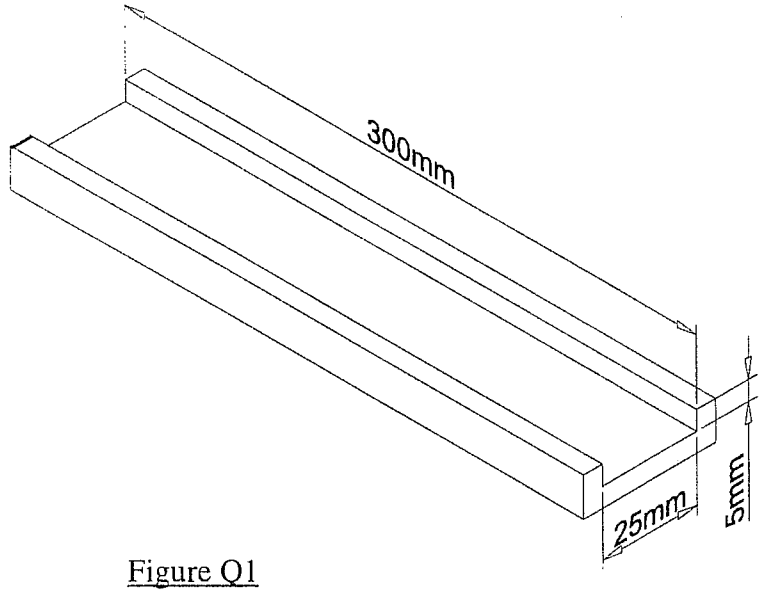


Figure Q1

Question 02

Answer following questions with particular reference to hot forming.

(i) Differentiate closed die-drop forging from open die-drop hammer forging and give an application for each method.

(ii) Why is friction a major concern in metal forming? How could you reduce friction in the metal forming process?

(iii) Illustrate the basic rolling process of a metal billet.

Question 03

(i) What is meant by joining of metal by welding?

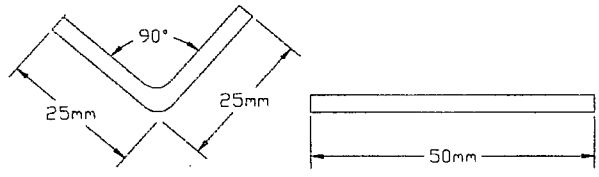
(ii) Draw the typical oxyacetylene flame and associated temperature distribution.

(iii) What are the problems that might occur when steel components are welded at high temperature?

Question 04

(i) What is a power press? Draw a neat sketch of a commonly used power press and label the main parts.

(ii) Make a sketch of a simple press tool set layout for producing the component of which the cross section is given in Figure Q4, using the given blank. Assume that the length of the component is 30 mm.



Cross section of the item

Cross section of the blank

Figure Q4

(iii) Determine the maximum punch force necessary to produce a 2 mm thick steel washer with 40 mm outside diameter and 20 mm inside diameter. Assume shearing strength of the material to be 460 N/mm^2.

Question 05

(i) Differentiate square thread from acme thread using suitable sketches. Give an application for each type of thread.

(ii) What are the items/ tools available in a complete tap and die set?

(iii) Illustrate and briefly explain the techniques that can be used to measure the internal thread diameter when,

(a) Thread diameter is large.

(b) Thread diameter is small.

Question 06

(i) Explain the instances where the limit gauges and standard gauges are used.

(ii) In what aspects the universal interchangeability is different from the local interchangeability.

(iii) The maximum and minimum clearances for a hole and a shaft with basic size of 25 mm are 0.04 mm and 0.01 mm respectively. Calculate the limit size for the hole and shaft adapting,

(a) Hole basis system

(b) Shaft basis system

Assume that the hole tolerance is twice as the shaft tolerance.

Question 07

(i) Explain with the suitable sketches a collet used for work holding on a lathe. Also explain the use of mandrels and two types of rests used on a lathe.

(ii) With a neatly drawn sketch show tooling station of a turret lathe.

Question 08

(i) How do you distinguish a jig from a fixture?

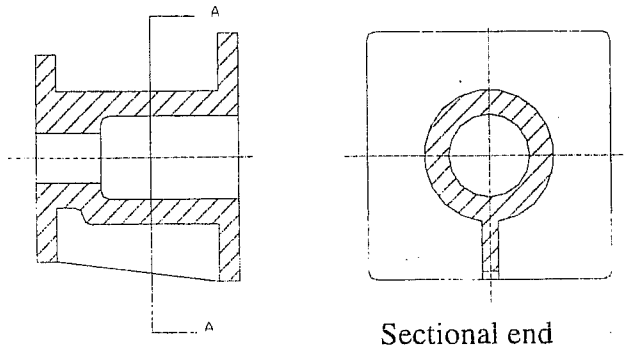
(ii) What basic criteria should be considered in designing jigs and fixtures?

(iii) What is the principle of electrostatic work holder? Why is electrostatic work holders used in place of electromagnetic work holders?

Question 09

(i) A good casting at minimum cost requires a well-designed pattern. List the factors to be considered in the design stage of a pattern for sand casting.

(ii) Figure Q9 shows the sectional front elevation and the sectional end elevation of a component to be cast.



Sectional front elevation

Sectional end elevation

Figure Q9

Describe the process of core making and sketch the principal stages in production of the mould for component by sand casting.