THE OPEN UNIVERSITY OF SRI LANKA

FACULTY OF ENGINEERING TECHNOLOGY

DIPLOMA IN TECHNOLOGY – LEVEL 4

FINAL EXAMINATION 2006/2007

MEX4236/MED2208/MEE4208- WORK SHOP PRACTICE AND PRODUCTION TECHNOLOGY- PART B

DATE : 16th MARCH 2007.

TIME : 14.45-17.00HRS.

DURATION : TWO HOURS AND FIFTEEN MINUTES.

PART – B

Answer five questions only. All question carry equal marks.

Question 1

(a) What are the individual elements which determine the accuracy of a gear wheel by making separate direct measurements?

(b) Describe briefly, the common methods to assess the profile of a gear tooth.

(c) Enumerate the disadvantages of helical gears.

Question 2

(a) Explain the uses of inside calipers.

(b) What are some of the tools used for laying out work?

(c) How should a scriber be used in laying out work?

Question 3

(a) Why are standards in measurements so important?

(b) Describe the three types of fits in metrology. Explain each fit with a clear sketch.

(c) What are the requirements of a precision measuring instrument?

Question 4

(a) Name the principal parts of a standard twist drill using a sketch.

(b) Using a clear sketch describe the operation of countersinking.

(c) Name and describe standard reamers used in drilling machine.

Question 5

(a) Describe the parts of the lathe headstock and tailstock of a lathe explaining their functions.

(b) Explain the thread cutting mechanism.

(c) Determine the gears suitable for cutting the following metric threads on a lathe with a lead screw of 6 mm pitch.

1) Thread with a pitch of 3mm, and

2) Thread with a pitch of 4.5mm.

Following gears are available.

12, 24 (two gears), 28, 32, 40, 44, 48, 56, 64, 72, 86 and 100

Question 6

(a) Explain how the cutting speed V (m/min) is calculated when the diameter D (mm) of the work piece and its rotational speed (rpm) are known.

(b) Find the spindle speed (N) of a cast iron rod being turned on a lathe with a depth of cut of 2 mm at a feed of 0.85 mm. Assume that the diameter of the bar in 40 mm.

Cutting speed is given by $S=K/(A)^{1/3}$

S= cutting speed (m/min).

K=constant for material being cut.

A=area of cut (mm^2).

Material being cut	Soft steel	Hard steel	Cast iron	Bronze	Brass
K	24	13	18	21	48

(c) What can be done to carry away the heat from the cutting tool?

Question 7

(a) What are some of the advantages of down cut milling?

(b) How does the dividing head operate?

(c) You are required to divide a cylindrical work piece into 63 divisions. Select suitable indexing method for this purpose and explain each step of the selected method with supporting calculations.

Milling machine is provided with three index plates as follows.

Plate 1: 15, 16, 17, 18, 19 and 20 holes

Plate 2: 21. 23. 27. 29. 31and 42 holes

Plate 3: 37, 39, 41, 43, 47 and 54 holes

Question 8

(a) Explain why open-die forging is not a practical technique for large-scale production of identical parts.

(b) What is the difference between open die and impression die forging?

(c) What is coining? Explain the coining process briefly.

Question 9

(a) $50\frac{H7}{g6}$ Indicates the size of two mating parts. Define the expression $50\frac{H7}{g6}$ clearly.

(b) Calculate the geometrical mean diameter of the diameter step 60 –100 mm.

(c) Calculate the tolerance on the shaft, tolerance of the hole, and the minimum clearance in the two parts shown in Fig Q9.

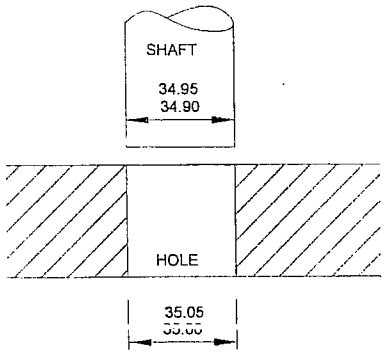


Figure no Q9