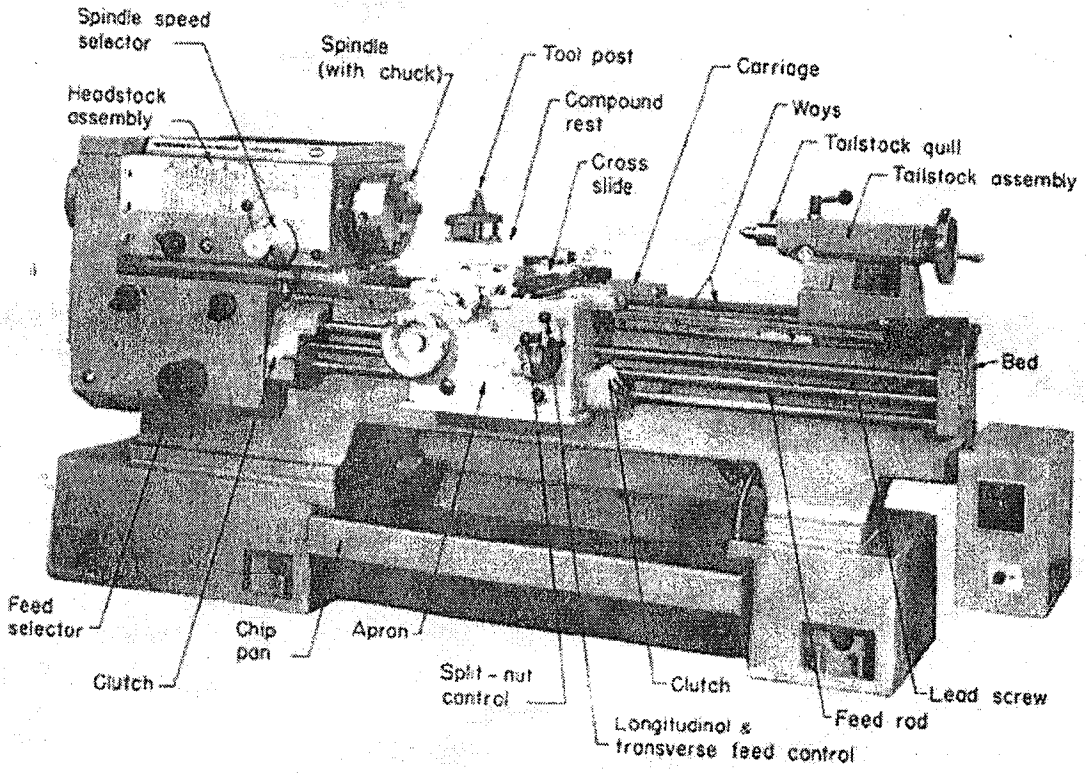
Uva Wellassa University, Sri Lanka
End Semester Examination – September 2011
SCT 263-2 Engineering Workshop Technology
(2nd yr 2nd semester)
Time: Two (02) Hours

Total 03 Questions
Answer all questions

1. FigQ01 shows a named diagram of a lathe machine.



FigQ01

a. Briefly explain the functions of the following parts of the lathe machine.

i. Headstock assembly

ii. Tailstock assembly

iii. Chuck

iv. Apron

v. Cross slide

vi. Compound slide

vii. Tool post

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viii. Bed

ix. Compound rest

x. Lead screw

(25 marks)

b. Describe the operation and the type of finished surface that you can obtain by performing following operations on a lathe machine.

i. Facing

ii. Tapering

iii. Knurling

iv. Turning

v. Drilling

(25 marks)

c. What are the four (4) methods to obtain a tapered surface using a lathe machine? By using sketches describe the methods you named.

(20 marks)

d. A conventional lathe machine has the following rotational speeds (in rpm).

50, 190, 350, 525, 775, 950, 1300, 2500

Following lathe operations are to be done using mild steel on the above machine. Select the most suitable speeds for the following operations. Show the calculations and give reasons for your selection.

i. Thread cutting on a 1/2" diameter rod.

ii. Facing of a cylindrical bar of diameter 3" with a 1" diameter hole at the center.

iii. Taper turning on a 12" long rod with diameters 2" and 4" at the ends.

iv. Drilling using an 18 mm diameter drill bit.

v. Turning of a 1 ½" diameter rod.

(30 marks)

2. Milling machine is another type of basic machine we come across in engineering workshops.

   a. Name five parts of a milling machine you are familiar with and describe their functions briefly.

   (20 marks)

   b. Following are some types of milling cutters we use in milling machine. Draw sketches and explain the type of surfaces they can produce.

      i. End mill cutter

      ii. Dove tail cutter

      iii. Tee slot cutter

      iv. Face mill cutter

      v. Side and face cutter

   (25 marks)

   c. Calculate the indexing requirement for 103 divisions on a milling machine equipped with a differential indexing head. If you are using differential indexing method find the suitable type of change gears also. The index plates available are

   Plate no. 1 15, 16, 17, 18, 19, 20 holes

   Plate no. 2 21, 23, 27, 29, 31, 33 holes

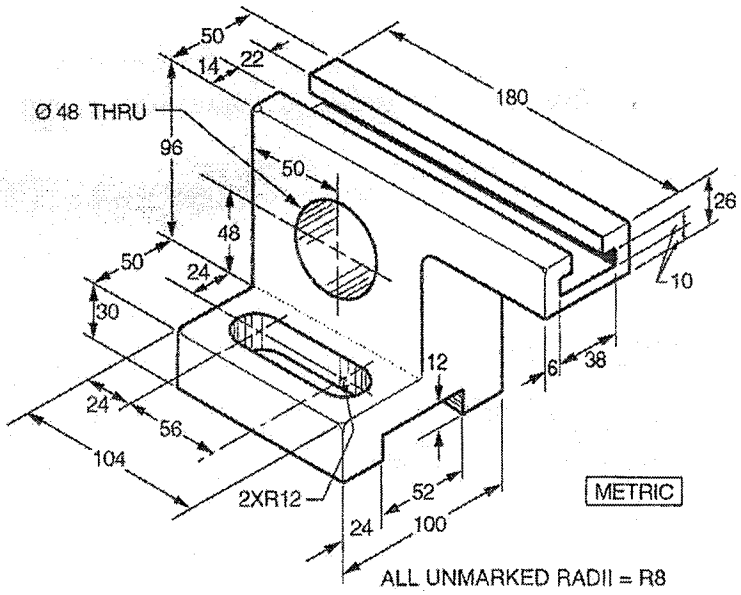
   Plate no. 3 37, 39, 41, 43, 47, 49 holes

   The change gear set available is 24, 24, 28, 32, 40, 44, 48, 56, 64, 72, 86, 100.

   (25 marks)

   d. Following part shown in FigQ02 is to be machined using a milling machine. Give the necessary setup details, tools used and the operations to be performed using the milling machine.

   (30 marks)



FigQ02

3. Welding is a joining process commonly used in workshops which has several advantages over other joining processes.

   a. What are the facts you have to consider when you want to select a welding electrode for arc welding?

   (20marks)

   b. Draw a sketch of welding equipment and explain the electrical arc welding process.

   (20marks)

   c. How do you decide on the most suitable flame to be used for a given application using oxy-acetylene gas welding?

   (20marks)

   d. Briefly describe the oxy-acetylene gas welding process using sketches of equipment used.

   (20marks)

   e. Compare electrical arc welding against oxy-acetylene gas welding.

   (20marks)