Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Computer Science and Technology
200 level 1st Semester Examination – Sept. / Oct. 2015
SCT 265-2 Engineering Workshop Technology

Uva Wellassa University

Instructions to candidates
Duration: 02 hours
Number of questions: 04
Mark allocation: 100 mark
Answer All Questions

1.

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

i. Column
ii. Base
iii. Overarm
iv. Saddle
v. Table
vi. Dividing Head
vii. Universal Head
viii. Arbor
ix. Arbor Support
x. Vice

(30 mark)

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

i. Slab milling
ii. End milling
iii. Deep hole drilling
iv. Tapping
v. Facing (25 mark)

c. Name four (04) methods of indexing and discuss their applications . (20 mark)

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

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50, 190, 350, 525, 775, 950, 1300, 2400

Following operations are to be done on the above machine. Select the most suitable rotational speed for the cutter of the following operations. Show calculations and give reasons for your selection.

i. Drilling with 2 mm drill bit on a 50 mm diameter mild steel work piece.
ii. Facing with 75 mm diameter face mill cutter on a 200 mm x 200 mm square aluminium block.
iii. Cutting a 10 mm wide 8 mm deep slot on a mild steel work piece using a 50 mm diameter slot drill cutter.
iv. Parting off a 3 inch diameter mild steel rod using a 4 inch diameter slitting saw.
v. Cutting a 100 mm diameter nylon gear using a 50 mm diameter gear cutter.

(25 mark)

2.

Lathe machine is a type of basic machine available in engineering workshops.

a. Name ten (10) parts of a lathe machine you are familiar with, and briefly describe their functions.

(25 mark)

b. Following are some of the operations that can be performed by a lathe machine. Draw sketches and explain the type of surfaces they can produce. Where possible give the tool geometry.
   i. Facing.
   ii. Boring.
   iii. Slot cutting.
   iv. Parting off.
   v. Formed tool tapering.

(25 mark)

c. A taper is to be turned according to the following dimensions.

Diameter of face 1 is 15 mm.

Diameter of face 2 is 35 mm.

Length of the taper is 140 mm.

i. Find the half taper angle.

ii. Select the most suitable tapering method.

iii. Draw the profile of the tool.

iv. Calculate the rotational speed of the tool.

d. Following part shown in Fig. 01 is to be machined using a lathe machine. Give the necessary setup details, tools used and the operations to be performed on each feature using the machine. (50 mark)

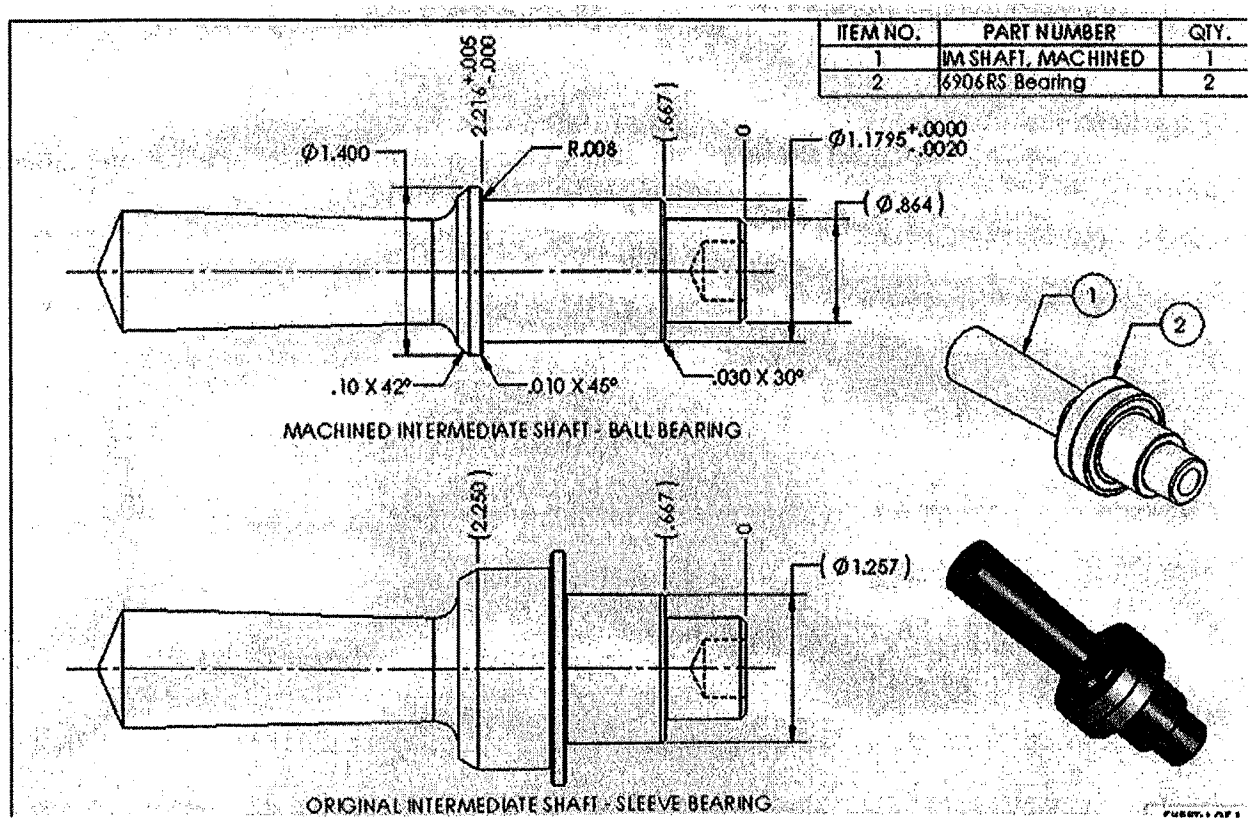

Fig. 01

3.

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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?

(20 mark)

b. Draw a sketch of welding equipment and explain the oxy-acetylene welding process.

(20 mark)

c. How do you decide on the most suitable current setting to be used for a given application using arc welding?

(20 mark)

d. Draw and explain the different types of joints used in welding.

(20 mark)

e. How do you decide on the most suitable welding process for any application? Describe using examples.

(20 mark)

4.

Calculate the indexing requirement for the following divisions on a milling machine equipped with a differential indexing head. 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.

a. 61 divisions

b. 77 divisions

c. 10 degrees

d. 84 divisions

e. 98 divisions (100 mark)