Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
100 level 1st Semester Examination – Sept. / Oct. 2015
SCT 142-3 Engineering Workshop Technology

Uva Wellassa University

Instructions to candidates
Duration: 03 hours
Number of questions: 06
Mark allocation: 100 mark
Answer **all** Questions

1.

Milling machine is a 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. (10 mark)

b. Following are some types of miling cutters we use in milling machines. 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 (5 mark)

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 suitable type of change gears also. The index plates available are

d.

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. (10 mark)

e. Following part shown in Fig.01 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. (5 mark)

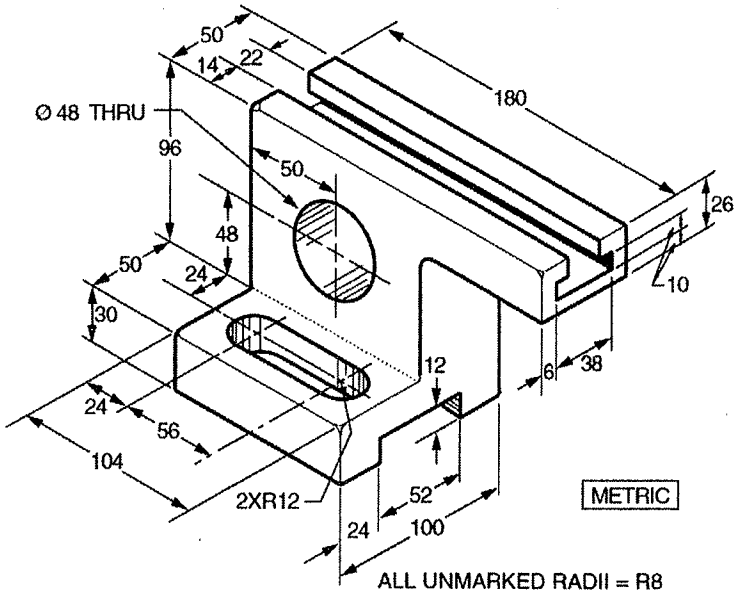

Fig.01

2.

Fig.02 shows a named diagram of a lathe achine

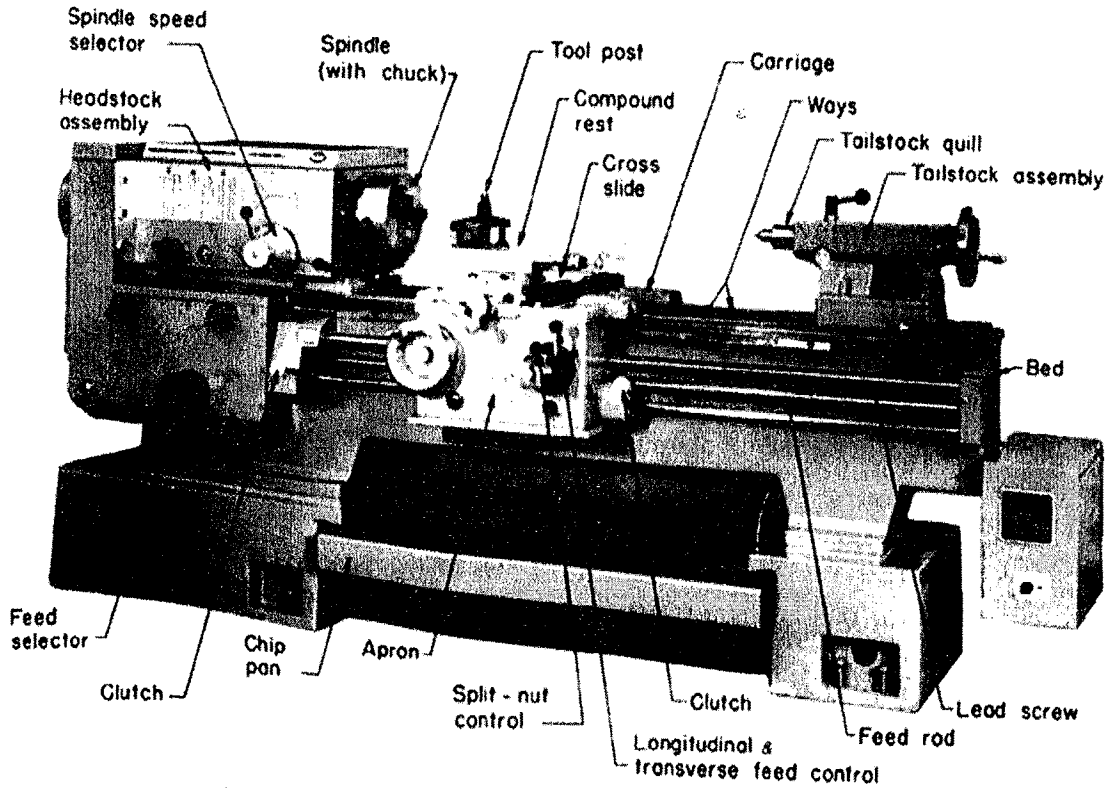

Fig.02

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

i. Headstock assembly
ii. Tailstock assembly
iii. Chuck
iv. Apron
v. Cross slide
vi. Compound slide
vii. Tool post
viii. Bed
ix. Compound rest
x. Lead screw

(5 mark)

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

(5 mark)

c. Briefly explain the importance of Merchant Circle in cutting force analysis? (5 mark)

d. Is it necessary to use cutting fluid in machining? Explain. (5 mark)

3.

Fig.03 shows different angles related to the lathe tool operations. Name features 1-7 in the figure.

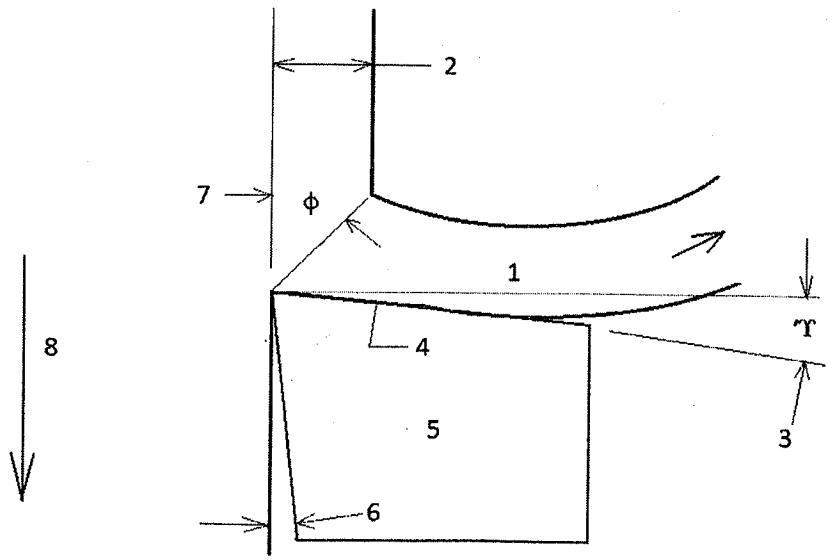

Fig.03

1) ..... 2) .....

3) ..... 4) .....

5) ..... 6) .....

7) ..... 8) ..... (20mark)

4.

Welding is a joinning process commonly used in workshops which has several advantages over other joinning processes. Briefly explain two types of welding processes using sketches.

(10 mark)

5.

With a pair of gears or gear sets, power is transmitted by the force developed between contacting teeth. Derive an equation for transmitted power at the point P using Fig.04, where F_t = transmitted force, F_n= normal force, F_r= resultant force, Φ = pressure angle. (10 mark)

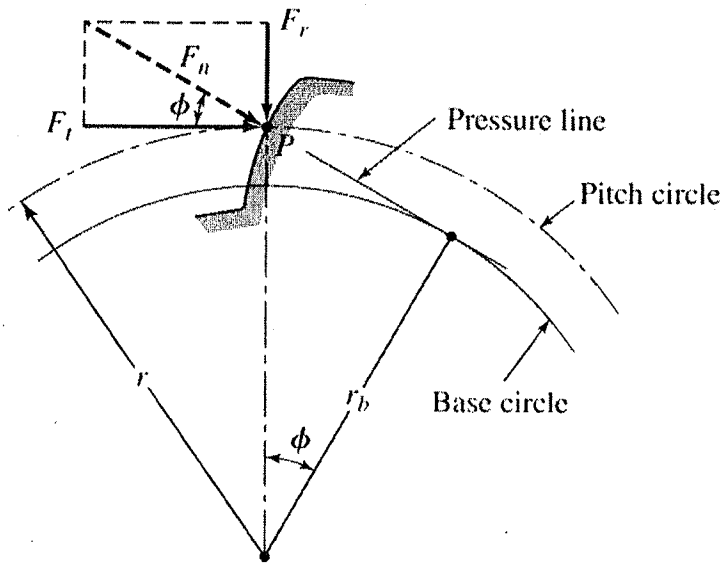

Fig.04

6. What are the basic types of chips in metal macinning? Briefly explain each of them.

(10 mark)

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