

**University of Saskatchewan
College of Engineering
Dept. of Mech. Engineering
ME 330.3 Final Exams
April 2009**

**Time: 2 Hours
Open Book Exam.**

Instructors: Chris Zhang

Name: _____

Student Number: _____

This exam question set consists of two parts. Part I consists of 10 questions. Part II consists of 3 questions. Attempt all questions.

Part I (40 marks)

Question I.1

In specifying the tolerances of a pair of parts to be assembled, please make one choice from the following:

- (a) Considering the functionality of the assembly only.
- (b) Considering the cost of parts manufacturing only.
- (c) Considering both (a) & (b), as they can likely conflict to each other.
- (d) Considering both (a) & (b), as they are always consistent to each other.

Question I.2

The following are tolerance specifications for a pair of two parts that are to be assembled.

- (1) 40H7/f8, (2) 50H7/f8, (3) 50H8/f8, (4) 50G8/h7

Please choose T/F among the following statements:

- (a) 50 G8/h7 is based on the basic hole system
- (b) The tolerance of the hole in (1) is larger than that of the hole in (2)
- (c) The tolerance of the hole in (2) is larger than that of the hole in (3)
- (d) The tolerance specification in (4) is a clearance fit

(T/F)
(T/F)
(T/F)
(T/F)

Question I.3

ISO has a document called ISO 9000 and ISO 9001. Choose the most correct one (only one) among the following lists:

- (a) ISO 9000 demands a company to purchase high-end metrology instrument for quality inspection.
- (b) ISO 9000 is a standard about the quality management practice of a company.
- (c) To get the ISO 9000 certificate, you need a well-defined quality inspection laboratory.
- (d) ISO 9000 is a standard for big company.

Question I.4

In the machining operation, productivity is measured by the multiplication of three parameters, v (cutting speed), f (feed rate), and d (depth of cut), namely productivity is (v)(f)(d). Please choose T/F among the following statements:

- (a) Such a productivity formula is only applicable to the lathe machining tool
- (b) There should be also a tool life in determining the machining productivity
- (c) Such a productivity is only used in WIDIA manual
- (d) WIDIA manual can only be used for the German standard system
- (e) WIDIA only considers the situation that the tool life is 15 minutes
- (f) Material imperfection has not been considered in WIDIA manual
- (g) Machining imperfection has not been considered in WIDIA manual
- (h) The term used in WIDIA manual called "approach angle" is new to our text used

(T/F)
(T/F)
(T/F)
(T/F)
(T/F)
(T/F)
(T/F)
(T/F)

Question I.5

The following equation is related to the metal rolling process. Please derive it from the general metal forming formula such as $\epsilon = \ln \frac{L_f}{L_0}$.

$\epsilon = \ln \frac{t_0}{t_f}$ true strain.

given $\epsilon = \ln \left(\frac{l}{l_0} \right)$

$\frac{l}{l_0} = r = \frac{d}{t_0}$ when $d = t_0 - t_f$

$r = \frac{t_0 - t_f}{t_0} \Rightarrow r = 1 - \frac{t_f}{t_0} \Rightarrow$

$\epsilon = \ln(r) \Rightarrow \epsilon = \ln \left(1 - \frac{t_f}{t_0} \right)$

$\epsilon = \ln(1) - \ln \left(\frac{t_0}{t_0 - t_f} \right)$

$\Rightarrow \epsilon = \ln \left(\frac{t_0}{t_0 - t_f} \right)$

