

John's Solution - Main

CONCORDIA UNIVERSITY FACULTY OF ENGINEERING AND COMPUTER SCIENCE <i>Department of Mechanical and Industrial Engineering</i>	
MIDTERM TEST 1 Machine Drawing and Design: MECH 313 – M and N - Winter 2014 Maximum Marks = 100	
Date: 15 th February 2014	Time: 90 minutes

FILL IN THE FOLLOWING

NAME: Cheung John
(Please Print) SURNAME GIVEN NAME

STUDENT ID: _____ SECTION (MA/MB/MC or NA/NB/NC): _____

SIGNATURE: _____

COURSE GIVEN BY: Dr. Javad Dargahi and Dr. John Cheung

Name and student I/D must be written in INK.
Must illustrate all the work in order to gain full marks assigned to the question.
INDIVIDUAL WORK – OPEN BOOK TEST
Material allowed: Approved calculator, text book, copy of limits and fits table metric system
Answer the questions in the space provided. Return the paper at the end of the schedule time.
DO NOT FORGET TO SIGN THE ATTENDANCE SHEET AT THE DESK

Q1 (22)	Q2 (18)	Q3 (30)	Q4 (30)	Total (100%)

Question 1: (22 Marks)

1. How are a number of counter-bored holes on a given diameter in a circular flange represented on a working drawing using the Canadian Engineering Standard drawing practice? Explain and also use a sketch to show your answer.

Answer: (5 marks)

Draw two or three holes on a given diameter and the center for the rest.

2. Under what condition, you will need to hatch a web of a component in a cross sectional view? Explain and use a sketch to support your answer.

Answer: (5 marks)

When the aspect ratio between the web length and thickness is small, then you need to hatch the web section.

3.

You have been asked to analysis the two different fits for the shaft/bearing assembly, as shown in Fig. 1. You need to find the limits of size and the minimum and maximum clearances or interferences for the assembly.

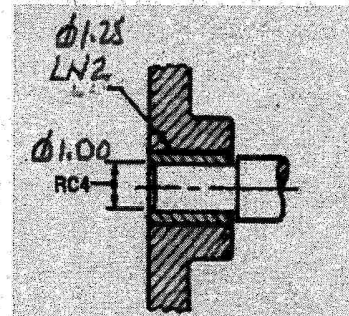


Figure 1: Shaft in bushed hole

Answer: (12 marks)

Basic Diameter Size	Fit - symbol	Basis	Feature	Limits of size		Clearance or interference	
				Max.	Min.	Max.	Min.
1.000 inch. Fig. 1	Inch - RC4	Hole	Hole	1.0012	1.0000	.0028	.0008
			Shaft	.9992	.9984		
1.250 inch. Fig. 1	Inch - LN2	Hole	Hole	1.2510	1.2500	-.0016 (Int)	0.000 (No clearance)
			Shaft	1.2516	1.2510		

Show your calculations on the next page:

1 mark per answer + work out.

Question 1:3 Continued.

A. Basic size 1.000 + RC4 fit

Hole tol: min clearance shaft tol
 $+1.2/+0$ $+0.8$ $+0/-0.8$

Hole: MMC = 1.0000, LMC = $1.0000 + .0012 = \underline{1.0012}$

Min clearance = 0.8 (.0008)

Shaft: MMC = $1.0000 - .0008 = .9992$ "

LMC = $.9992 - .0008 = .9984$ "

Max clearance = $1.0012 - .9984 = .0028$ "

Min clearance = $1.0000 - .9992 = \underline{.0008}$ "

B. Basic size 1.250 + LN2 fit

Hole tol: $+1.0/+0.0$, Max Int = 1.6, Shaft tol: $+0/-0.6$

Hole: MMC = $1.250 + 0.000 = 1.2500$

LMC = $1.250 + .001 = 1.2510$

Max Int: $1.6 = .0016$ "

Shaft: MMC = $1.2500 + .0016 = 1.2516$ "

LMC = $1.2516 - .0006 = 1.2510$ "

Max Int: $1.2500 - 1.2516 = -.0016$ (int)

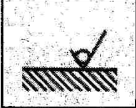
Max clearance:

$1.2510 - 1.2510 = .0000$ (No clearance)

Question 2:

You need to interpret the following engineering specifications on a working drawing. Give your answer in the allocated box. **(18 Marks)**

Answer:

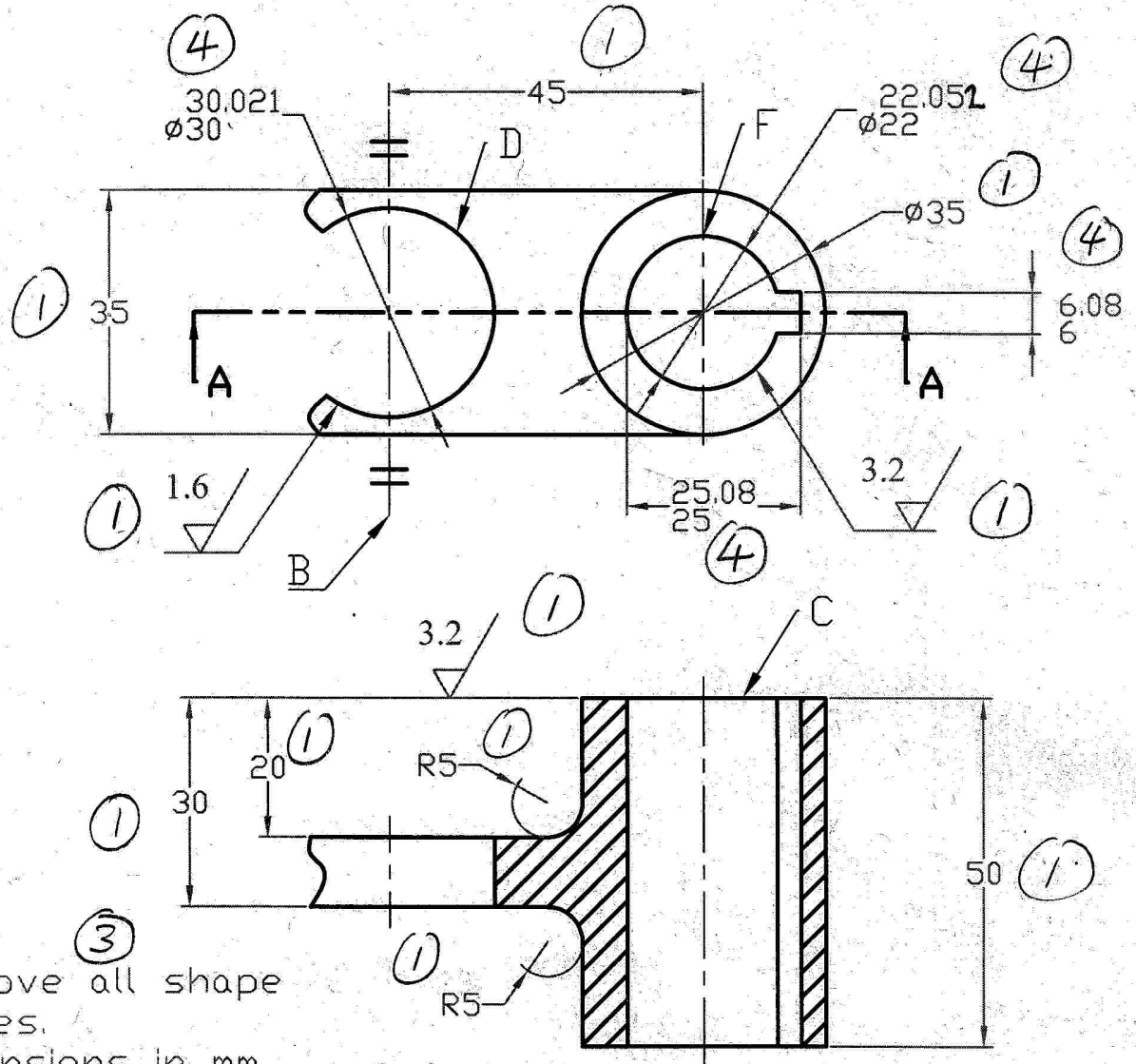
M20 x 2.5	Metric thread of 20mm in diameter with 2.5mm pitch.
30 (Metric)	Dimension of 30mm has not been drawn to scale.
	No removal of material.
SR	Spherical radius.
2x45° (Metric)	Chamfer 2mm axial length at 45 degrees.
2xØ5 V Ø11.5x82°	Two 5mm diameter through holes having 11.5mm countersink diameter at 82 degrees.

Question 3: (30 marks)

Dimension the shaft bracket shown below to achieve the least tolerance accumulation and according to Canadian Engineering Standard. Also, you must include **one general note** in the working drawing.

Notes:

1. Scale the drawing for sizes.
2. Dimensions in mm.
3. Center line B is a datum. Surface C is also a datum with a surface finish of 3.2um.
4. Bore D has a sliding fit H7/g6 and surface finish of 1.6um. Bore F has a free running fit H9/d9 with a surface finish of 3.2um.
5. Both the depth measuring from the bottom dead center and the width of the key-seat have a unilateral tolerance of +0.08/+0 mm.



Notes:

1. Remove all shape edges.
2. Dimensions in mm.
3. ~~Fillets~~ R.5

SECTION A-A

