IE-352
Section 1, CRN: 48700/1/2
Section 2, CRN: 48703/4/5
Section 3, CRN: 48706/7/8
Second Semester 1434-35 H (Spring-2014) – 4(4,1,2)
"MANUFACTURING PROCESSES – 2"

Tuesday, March 04, 2014 (03/05/1435H)

Quiz 3 ANSWERS

Name:	Student Number:	Section:
AHMED M. EL-SHERBEENY, PHD	4	S/M8/M10

Given the following information for a shaft-hole system,

$$Nominal\ Size = 2.\frac{3}{8}"$$

$$LC5\ fit$$

Nominal Size Range, Inches Over	To	Class LC 5 Clearance[a]	Standard Tolerance Limits Hole H7	Shaft g6
0 –	0.12	0.1 0.75	+0.4 0	−0.1 −0.35
0.12 –	0.24	0.15 0.95	+0.5 0	−0.15 −0.45
0.24 –	0.40	0.2 1.2	+0.6 0	−0.2 −0.6
0.40 –	0.71	0.25 1.35	+0.7 0	−0.25 −0.65
0.71 –	1.19	0.3 1.6	+0.8 0	−0.3 −0.8
1.19 –	1.97	0.4 2.0	+1.0 0	−0.4 −1.0
1.97 –	3.15	0.4 2.3	+1.2 0	−0.4 −1.1

1. **What is the basic size?** [1 Point] **ANSWER:** **2.3750"**

$BS = 2\frac{3}{8}" = 2.3750\ in$ (note, answer must be expressed to 4 d.p.)

2. **What is the shaft MMC?** [1 Point] **ANSWER:** **2.3746**

$MMC = BS + Allowance = 2.3750 + (-0.0004) = 2.3746$

3. **What is the hole MMC?** [1 Point] **ANSWER:** **2.3750**

$MMC = BS\ (since\ basic\ hole\ system) = 2.3750$

4. What is the shaft LMC? [1 Point] **ANSWER:** **2.3739**

$$LMC = BS + (-0.0011) = 2.3750 - 0.0011 = 2.3739$$

5. What is the hole LMC? [1 Point] **ANSWER:** **2.3762**

$$LMC = BS + (+0.0012) = 2.3750 + 0.0012 = 2.3762$$

6. Express the hole and shaft sizes below in the specified formats [$\frac{1}{2}$ pt. each]

	Hole Size	Shaft Size
a) Stacked Form	ϕ 2.3762 LMC / 2.3750 MMC	ϕ 2.3746 / 2.3739
b) Referenced to Basic Size	$\phi 2.3750\ ^{+0.0012}_{0}$	$\phi 2.3750\ ^{-0.0004}_{-0.0011}$

7. What is the minimum clearance? [1 Point] **ANSWER:** **0.0004**

$$minimum\ clearance = clearance\ at\ MMC = allowance$$
$$= hole_{MMC} - shaft_{MMC} = 2.3750 - 2.3746 = 0.0004$$

Note, get from fits data, then check from table above (e.g. stacked form)

8. What is the maximum clearance? [1 Point] **ANSWER:** **0.0023**

$$maximum\ clearance = clearance\ at\ LMC = hole_{LMC} - shaft_{LMC}$$
$$= 2.3762 - 2.3739 = 0.0023$$

Note, get from fits data, then check from table above (e.g. stacked form)

9. What standard fit *category* is this system? [1 Point]

ANSWER: **Location fit**

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"MANUFACTURING PROCESSES – 2"

Wednesday, March 05, 2014 (04/05/1435H)

Quiz 3 ANSWERS

Name:	Student Number:	Section:
AHMED M. EL-SHERBEENY, PHD	4	S/M8/M10

Given the following information for a shaft-hole system,

$$Nominal\ Size = 2.\frac{3}{8}"$$

$$LT5\ fit$$

Nominal Size Range, Inches Over	To	Class LT 5 Fit[a]	Std. Tolerance Limits Hole H7	Shaft n6
0 –	0.12	–0.5 +0.15	+0.4 0	+0.5 +0.25
0.12 –	0.24	–0.6 +0.2	+0.5 0	+0.6 +0.3
0.24 –	0.40	–0.8 +0.2	+0.6 0	+0.8 +0.4
0.40 –	0.71	–0.9 +0.2	+0.7 0	+0.9 +0.5
0.71 –	1.19	–1.1 +0.2	+0.8 0	+1.1 +0.6
1.19 –	1.97	–1.3 +0.3	+1.0 0	+1.3 +0.7
1.97 –	3.15	–1.5 +0.4	+1.2 0	+1.5 +0.8

1. **What is the basic size?** [1 Point] **ANSWER:** **2.3750"**

$BS = 2\frac{3}{8}" = 2.3750\ in$ (note, answer must be expressed to 4 d.p.)

2. **What is the shaft MMC?** [1 Point] **ANSWER:** **2.3765**

$MMC = BS + (+0.0015) = 2.3750 + 0.0015 = 2.3765$

3. **What is the hole MMC?** [1 Point] **ANSWER:** **2.3750**

$MMC = BS\ (since\ basic\ hole\ system) = 2.3750$

4. What is the shaft LMC? [1 Point] **ANSWER:** **2.3758**

$$LMC = BS + (+0.0008) = 2.3750 + 0.0008 = 2.3758$$

5. What is the hole LMC? [1 Point] **ANSWER:** **2.3762**

$$LMC = BS + (+0.0012) = 2.3750 + 0.0012 = 2.3762$$

6. Express the hole and shaft sizes below in the specified formats [$\frac{1}{2}$ pt. each]

	Hole Size	Shaft Size
a) Stacked Form	$\phi^{2.3762}_{2.3750}$ LMC / MMC	$\phi^{2.3765}_{2.3758}$
b) Referenced to Basic Size	$\phi 2.3750\ ^{+0.0012}_{0}$	$\phi 2.3750\ ^{+0.0015}_{+0.0008}$

7. What is the maximum *clearance*? [1 Point] **ANSWER:** **0.0004**

$$maximum\ clearance = clearance\ at\ LMC = hole_{LMC} - shaft_{LMC}$$
$$= 2.3762 - 2.3758 = 0.0004$$

Note, get from fits data, then check from table above (e.g. stacked form)

8. What is the maximum *interference*? [1 Point] **ANSWER:** **0.0015**

$$maximum\ intereference = shaft_{MMC} - hole_{MMC} = 2.3765 - 2.3750$$
$$= 0.0015$$

Note, get from fits data, then check from table above (e.g. stacked form)

9. What standard fit *category* is this system? [1 Point]

ANSWER: **Location fit**

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Wednesday, March 05, 2014 (04/05/1435H)

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Name:	Student Number:	Section:
AHMED M. EL-SHERBEENY, PHD	4	S/M8/M10

Given the following information for a shaft-hole system,

$$Nominal\ Size = 2.\frac{3}{8}"$$

$$LN2\ fit$$

Nominal Size Range, Inches Over	To	Class LN 2 Limits of Interference	Standard Limits Hole H7	Standard Limits Shaft p6
0 –	0.12	0 0.65	+0.4 0	+0.65 +0.4
0.12 –	0.24	0 0.8	+0.5 0	+0.8 +0.5
0.24 –	0.40	0 1.0	+0.6 0	+1.0 +0.6
0.40 –	0.71	0 1.1	+0.7 0	+1.1 +0.7
0.71 –	1.19	0 1.3	+0.8 0	+1.3 +0.8
1.19 –	1.97	0 1.6	+1.0 0	+1.6 +1.0
1.97 –	3.15	0.2 2.1	+1.2 0	+2.1 +1.4

1. **What is the basic size?** [1 Point] **ANSWER:** **2.3750"**

$BS = 2\frac{3}{8}" = 2.3750\ in$ (note, answer must be expressed to 4 d.p.)

2. **What is the shaft MMC?** [1 Point] **ANSWER:** **2.3771**

$MMC = BS + (+0.0021) = 2.3750 + 0.0021 = 2.3771$

3. What is the hole MMC? [1 Point] **ANSWER:** **2.3750**

$MMC = BS\ (since\ basic\ hole\ system) = 2.3750$

4. What is the shaft LMC? [1 Point] **ANSWER:** **2.3764**

$LMC = BS + (+0.0014) = 2.3750 + 0.0014 = 2.3764$

5. What is the hole LMC? [1 Point] **ANSWER:** **2.3762**

$LMC = BS + (+0.0012) = 2.3750 + 0.0012 = 2.3762$

6. Express the hole and shaft sizes below in the specified formats [$\frac{1}{2}$ pt. each]

	Hole Size	Shaft Size
a) Stacked Form	$\phi^{2.3762}_{2.3750}$ (LMC / MMC)	$\phi^{2.3771}_{2.3764}$
b) Referenced to Basic Size	$\phi 2.3750\ ^{+0.0012}_{0}$	$\phi 2.3750\ ^{+0.0021}_{+0.0014}$

7. What is the minimum interference? [1 Point] **ANSWER:** **0.0002**

$minimum\ interference = shaft_{LMC} - hole_{LMC} = 2.3764 - 2.3762 = 0.0002$

Note, get from fits data, then check from table above (e.g. stacked form)

8. What is the maximum interference? [1 Point] **ANSWER:** **0.0021**

$maximum\ interference = shaft_{MMC} - hole_{MMC} = 2.3765 - 2.3750 = 0.0015$

Note, get from fits data, then check from table above (e.g. stacked form)

9. What standard fit *category* is this system? [1 Point]

ANSWER: **Location fit**