Engineering Management Coursework: Costing

Greetings

This is a coursework consist of engineering management, Microsoft Excel work and Solidwork activity. Please consider other files such as the reference files for further information about this coursework.

i) Description:

1) Estimate the manufacturing cost for a bearing housing following the data sheet.

Consider these values:

A= 8
B= 4
C= 2
D= 6
E= 7
F= 4

Materials and dimensions of the bearing housing will depend on these values. The example of bearing housing drawings in default dimension is provided in the Appendix section of this document. Solidworks files are also provided (No design needed)

Materials:	
Pedestal (top/base):	B is even: mild steel; B is odd: aluminium
Bearing, pin:	C is even: stainless steel; C is odd: brass
Assume extra 1.5mm per machined side for raw material billets/bars.	

Dimensions (see Appendix):	
Length of Pedestal base = 84 + D =	..... mm
= 104 + D =	..... mm
Height of Pedestal base = 60 + E =	..... mm
Diameter of hole in bearing = 32 - F =	..... mm

2) The Bearing housing assembly is comprised of 4 components, plus fasteners:

1. Base of the pedestal
2. Top of the pedestal
3. Bearing (plain bearing for rapidly rotating shafts)
4. Locking Pin (interference fitting with bearing, loose fitting with pedestal)
a. Two threaded studs (fasteners)
b. Two nuts (and washers) (fasteners)

3) Use Solidworks databases for the definition of material properties (such as material densities) and for the selection of suitable fasteners (Design library\ Solidworks toolbox). Alternatively, the following external resource would be useful for obtaining the material properties:

- Matweb (www.matweb.com)

The Solidworks model can be used to calculate the volume removal (i.e. "Quantity" in the costing worksheet) for each of the manufacturing process, and at the same time, capturing the images for the manufacturing process route(s).
Alternatively, hand calculation can be applied to input the equivalent volume removal. Also, hand sketch and/or PowerPoint drawing or equivalent would be acceptable, in lieu of the Solidworks captured images.

ii) Requirements

It is required to submit the following two completed documents (1 and 2).

1. A completed Costing Sheet (template provided) comprised of

1.1) An individual costing worksheet with detailed description of the selected manufacturing process route:
- Worksheet "Assembly"
- Worksheet "Pedestal Base"
- Worksheet "Pedestal Top"
- Worksheet "Bearing"
- Worksheet "Pin"

1.2) Use the given worksheet "Tolerance Bearing" and define tolerance fitting required for the Bearing:
- Bearing fitting to the Pedestal Top
- Bearing fitting to the Pedestal Base
- Bearing fitting to the Pin

1.3) Use the given worksheet "Summary" and complete the necessary information:
- Table detailing cost for parts and assembly
- Table and Pie-charts detailing cost of materials and manufacturing processing (machining, set-up, assembly, etc.)

1.4) Use the given worksheet "Stud" and estimate the cost of making the threaded studs in lieu of buying off-the-shelf fasteners, assuming alloy steel. Comment on the results

2. Engineering Drawing

A4 sized PDF document(s)* answering the following:
*the document(s) can be either descriptive (your own thoughts in written text, a single page max) or reproduced technical drawings saved in PDF format via Solidworks.

2.1). Considering the BSI/ISO standards for producing the technical drawings, how would you update and reproduce the drawings by paying close attention to the assembly, dimension, tolerance and surface finish?

[Assembly]
- Any other information or dimension needs to be included here?

[Dimension]
- All the part drawings correctly dimensioned?

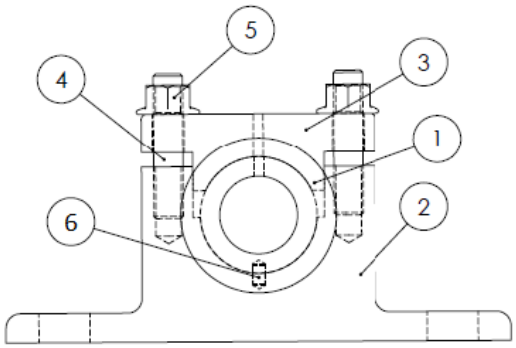
[Tolerance and Surface finish]
- Any thoughts on general tolerance and surface finish, reflecting your raw material and chosen manufacturing process routes?
- Any thoughts on specific tolerance and surface finish, considering the fitting and assembly?

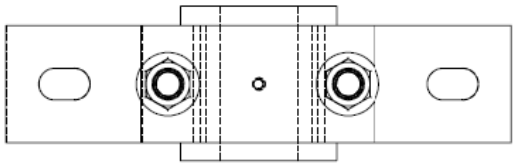
iii) Appendix

Make similar engineering drawing as below but consider the (ABCDEF values above)

Default dimensions:

Bearing Housing Drawings





ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	bearing		1
2	Pedestal Base		1
3	Pedestal top		1
4	AM -- M12 x 60 C		2
5	B18.2.2.4M - Hex flange nut, M12 x 1.75 --N		2
6	pin		1

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBUR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN			
CHK'D			
APPV'D			
MFG			
Q.A			

TITLE:

Assembly

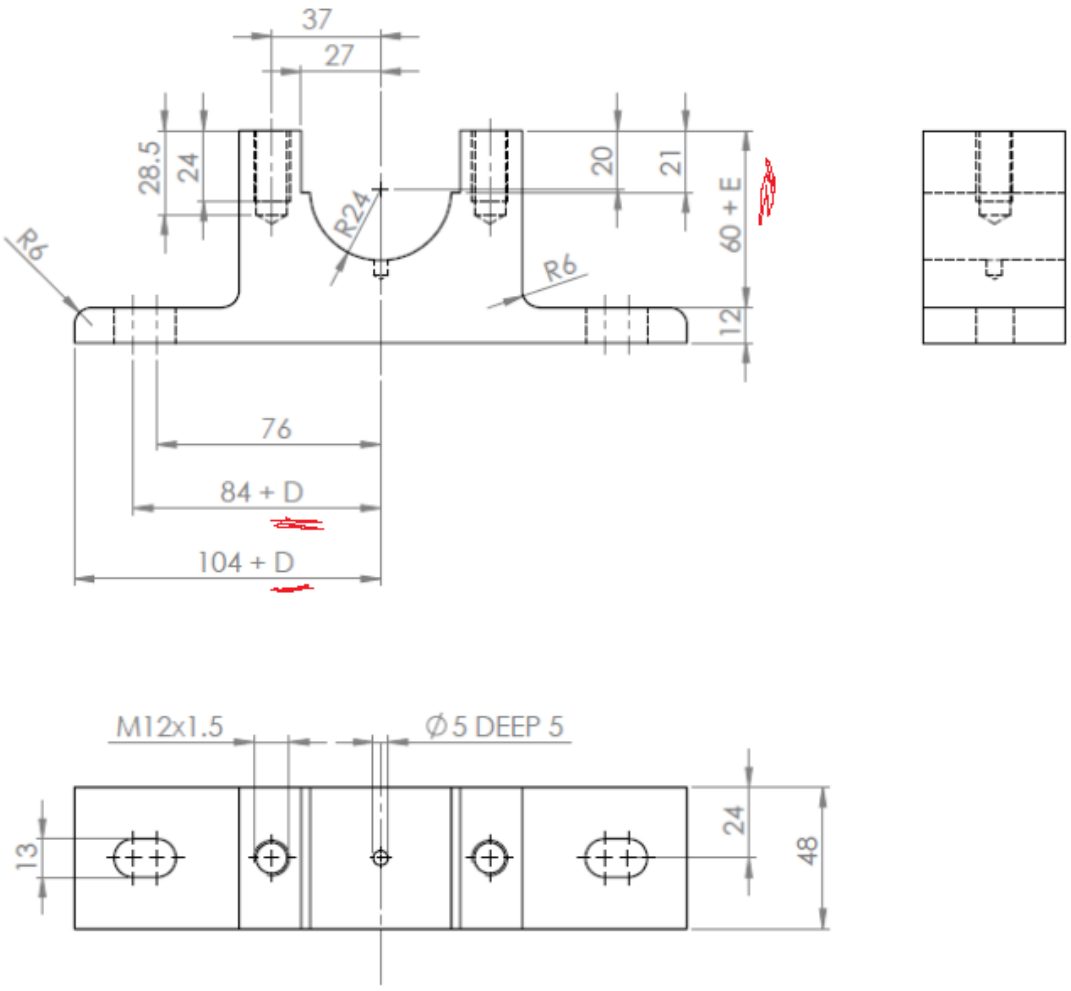
DWG NO.

A4

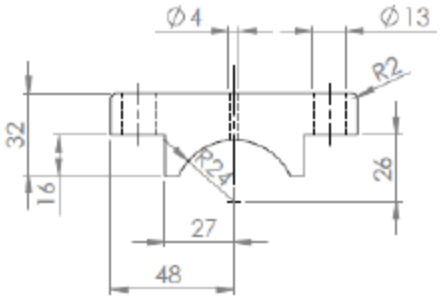
WEIGHT:

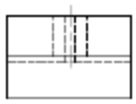
SCALE:1:2

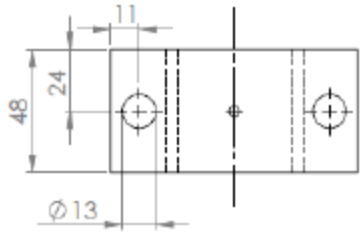
SHEET 1 OF 1

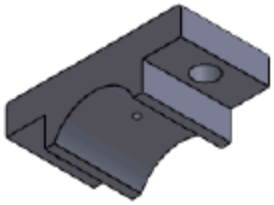


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:			DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING / REVISION
	NAME	SIGNATURE	DATE			TITLE: Pedestal base
DRAWN						
CHK'D						
APPV'D						
MFG						
Q.A						DWG NO. A4

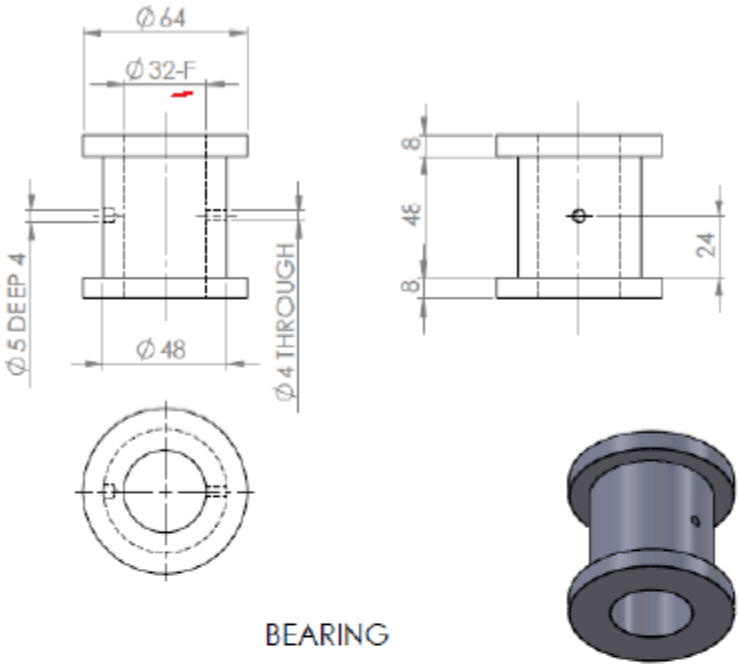




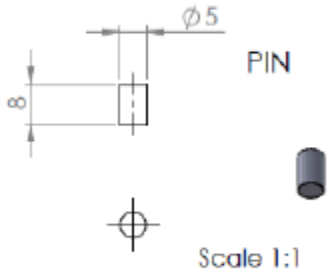




UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:			FINISH:			DEBUR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING
	NAME	SIGNATURE	DATE				TITLE:
DRAWN							Pedestal top
CHKD							
APVD							
MFG							
Q.A							DWG NO. A4
				WEIGHT:			SCALE:1:2 SHEET 1 OF 1



BEARING



PIN

Scale 1:1

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:			FINISH:			BREAK AND REMOVE SHARP EDGES	DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE				TITLE: bearing and pin	
DRAWN								
CHD								
APPD								
MFG								
Q.A								
							DWG NO.	A4
					WEIGHT:		SCALE:1:1	SHEET 1 OF 1