Lego Mini AT AT

Trade 05: Mechanical Engineering Drawing and Design CAD ***2015-16***

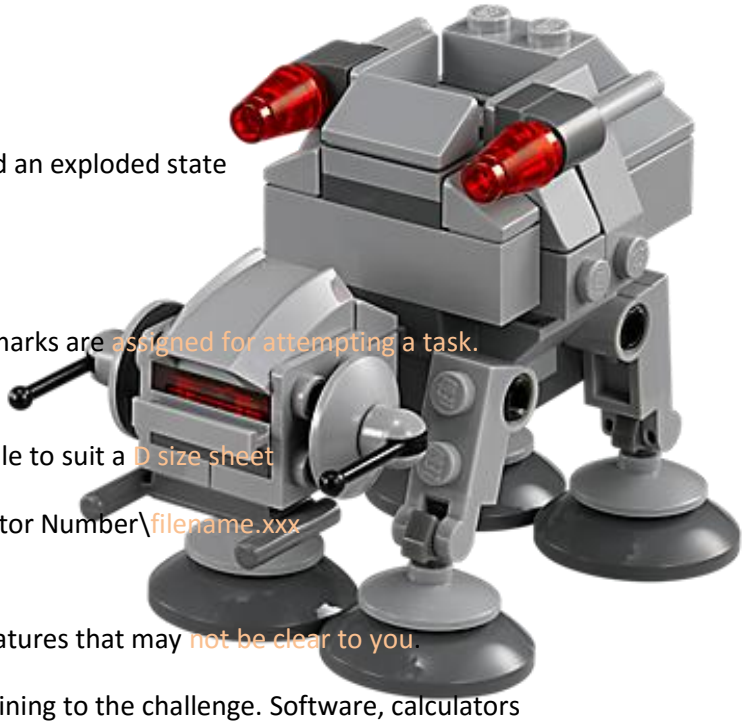
Task: Part Creation **Time**: 3 Hours **Marks**: 250 points

1. Given:

Lego star wars At At driver mini figure 75075

2. Task:

Model each of the parts, as detailed as possible Create an assembly with both an exploded view and a collapsed view



Models

- Each part should be modeled first
- Create the assembly with a collapsed and an exploded state
- Print out all part drawings

Notes:

Each task is independent of the others – partial marks are assigned for attempting a task.

3. Output

Print out of the 2D CAD drawings plotted at a scale to suit a D size sheet

Save the drawings and model files as C:\Competitor Number\filename.xxx

5. General:

5.1 You are to use your own discretion in determining features that may not be clear to you.

5.2 The invigilator **WILL NOT** answer any questions pertaining to the challenge. Software, calculators and reference manuals are allowed.

5.3 You must submit the hardcopy file and part files on the computer provided. Use your competitor number to identify the drawing file. For example yours may be 156-Handle.dwg etc

5.5 ANY DRAWING FILE IDENTIFIED BY NAME OR SCHOOL WILL NOT BE JUDGED.

5.6 Do NOT exit the drawing file or switch off the machine, judges may wish to mark or view aspects of the design on the screen

In the event of a tie the person who models using the least number of features will win.

Marks are deducted for:

- Sketches not being fully defined

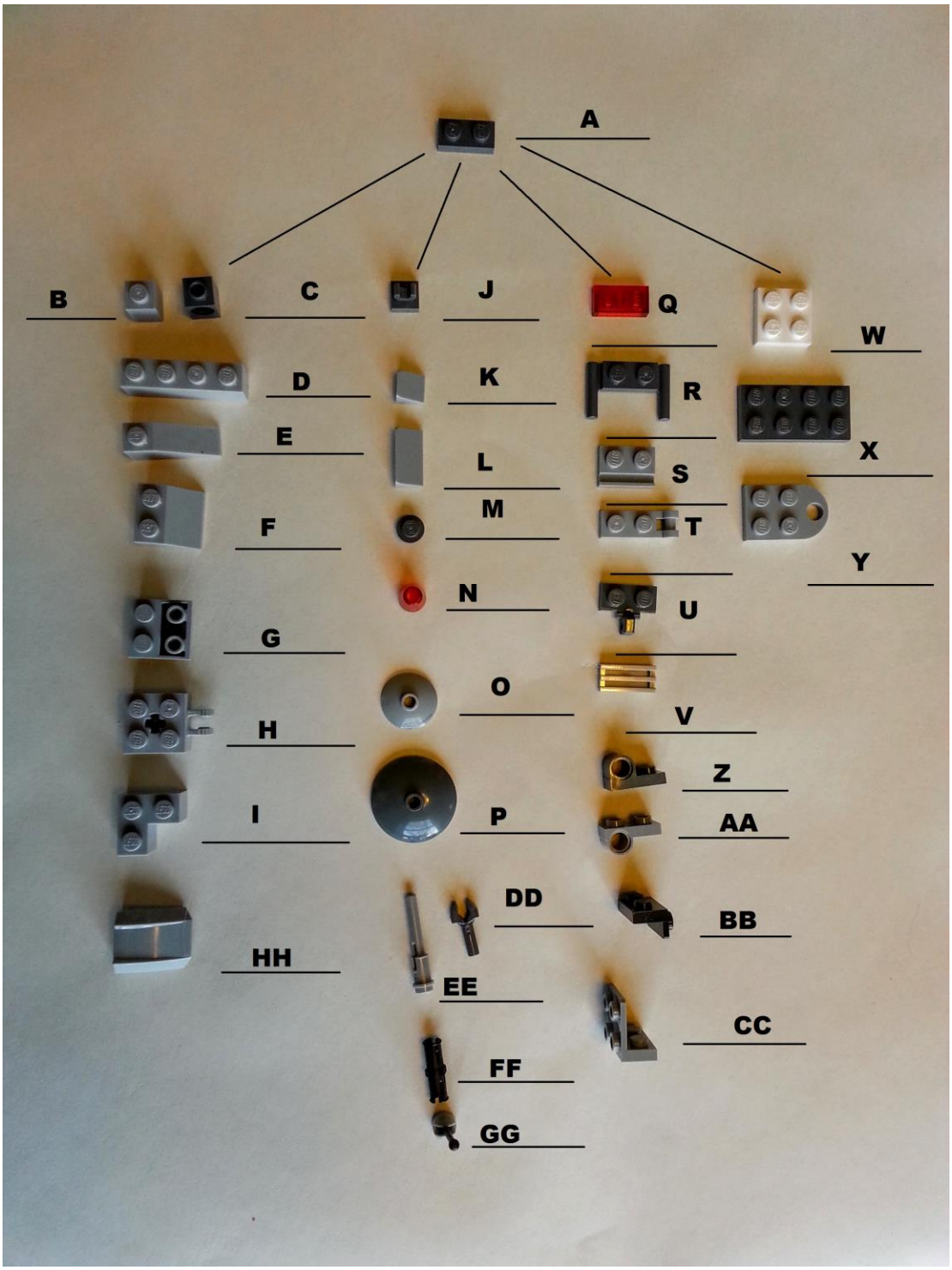
- Extra dimensions added (use only the dimensions supplied to create your parts)
- Orthographic views not as shown
- No chamfer on a thread (chamfer should be between 0.005-0.01” larger than the thread height)

• **Post – Secondary** will lose additional marks for:

- Not including a note to remove all sharp edges
- Not including a general surface finish note
- Not creating an appropriate general tolerance chart in the title block
- The ¼-20 thread must be made with a revolve cut if applicable

Components

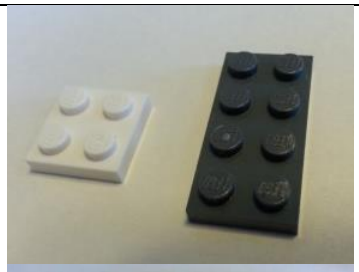
Using google identify each part name:

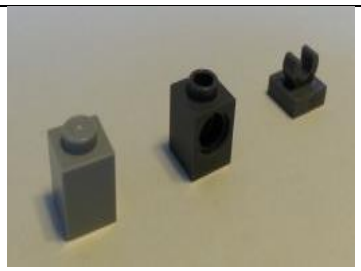
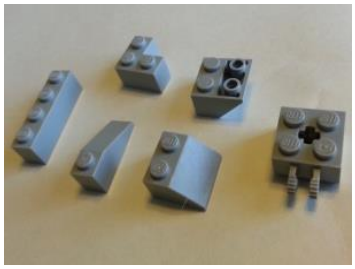
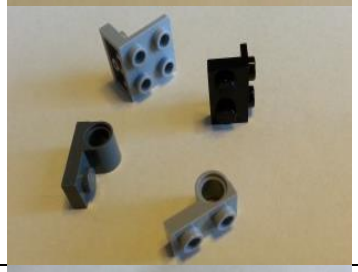
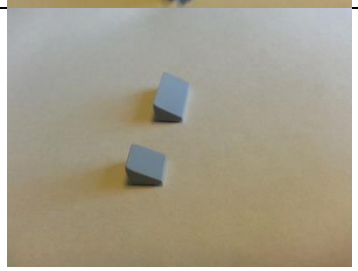


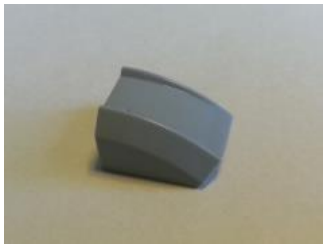
(bricklink.com) (thedailybrick.co.uk)

PART	NAME
A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
L	
M	
N	
O	
P	
Q	
R	
S	
T	
U	
V	
W	
X	
Y	
Z	
AA	
BB	
CC	
DD	
EE	
FF	
GG	
HH	

Before starting any Modeling please read and fully understand this article on sizing

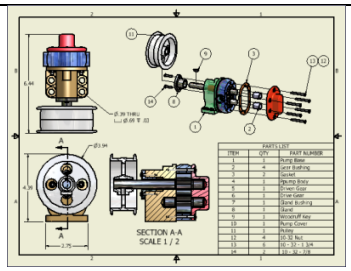
<table>
<tr><th>Description</th><th></th><th>Comments</th><th>Marks</th></tr>
<tr>
<td>Base Part</td>
<td>  </td>
<td>- Component to be modelled as individual parts
- Part to have logical names
- Part to contain a “shell”
- Colors are to be accurate to the original
- BEFORE CONTINUING CHECK WITH INSTRUCTOR FOR SIZE VERIFICATION</td>
<td>/8
<table><tr><td>Dim</td><td>1</td></tr><tr><td>Body</td><td>1</td></tr><tr><td>Studs</td><td>1</td></tr><tr><td>Shell</td><td>1</td></tr><tr><td>Emboss</td><td>1</td></tr><tr><td>Orthographic Views</td><td>3</td></tr></table></td>
</tr>
<tr>
<td>2. Plates</td>
<td> 
  </td>
<td>- Component to be modelled as individual parts
- Parts to have logical names
- Colors are to be accurate to the original</td>
<td><table><tr><td>Dim</td><td>1</td></tr><tr><td>Body</td><td>4</td></tr><tr><td>Studs</td><td>4</td></tr><tr><td>Shell</td><td>2</td></tr><tr><td>Emboss</td><td>1</td></tr><tr><td>Orthographic Views</td><td>3</td></tr></table>/8</td>
</tr>
</table>

<table>
<tr>
<td>3. Bricks</td>
<td> 
A
 
B</td>
<td>- Component to be created as individual parts
- Interior details to not necessary to be shown
- Parts to have logical names
- Colors are to be accurate to the original
- Parts from section B are worth 2x marks</td>
<td>
<table>
<tr><td>Dim</td><td>4</td></tr>
<tr><td>Body features</td><td>4</td></tr>
<tr><td>Studs</td><td>2</td></tr>
<tr><td>Shell</td><td>2</td></tr>
<tr><td>Emboss</td><td>1</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Orthographic Views</td><td>3</td></tr>
</table>
/16
</td>
</tr>
<tr>
<td>4.
Flat Features</td>
<td> 
  </td>
<td>- Component to be modelled as individual parts
- Parts to have logical names
- Colors are to be accurate to the original
-</td>
<td>
<table>
<tr><td>Dim</td><td>4</td></tr>
<tr><td>Body features</td><td>4</td></tr>
<tr><td>Studs</td><td>2</td></tr>
<tr><td>Shell</td><td>2</td></tr>
<tr><td>Emboss</td><td>1</td></tr>
<tr><td>Orthographic Views</td><td>3</td></tr>
</table>
/16
</td>
</tr>
<tr>
<td>6. Angles</td>
<td>  </td>
<td>- Component to be modelled as individual parts
- Parts to have logical names
- Colors are to be accurate to the original</td>
<td>
<table>
<tr><td>Dim</td><td>2</td></tr>
<tr><td>Shell</td><td>2</td></tr>
<tr><td>Orthographic Views</td><td>1</td></tr>
</table>
/5
</td>
</tr>
</table>

<table>
<tr>
<td>7. Round Parts</td>
<td>  </td>
<td>- Component to be created as one part
Use revolve</td>
<td>
<table>
<tr><td>Dim</td><td>2</td></tr>
<tr><td>Revolve</td><td>1</td></tr>
<tr><td>Orthographic Views</td><td>2</td></tr>
</table>
/3
</td>
</tr>
<tr>
<td>8 Complex Parts</td>
<td> 
A
 
Part B</td>
<td>- Component to be created as one part
- Colors & Material are to be accurate to the original

Part from section B are worth 2x marks</td>
<td>
<table>
<tr><td>Each Part</td><td>5</td></tr>
<tr><td>Material</td><td>1</td></tr>
<tr><td>Orthographic Views</td><td>2</td></tr>
</table>
/8
</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td></td>
</tr>
</table>

<table>
<tr>
<td>Sub Assemblies</td>
<td> 
Leg
 
Head
 
Body
  </td>
<td>- Component to be fully assembled
- Parts that have natural flex should have flex in their constraints
- Colors & Material are to be accurate to the original</td>
<td>Leg
<table><tr><td>All Parts</td><td>5</td></tr><tr><td>Flexible</td><td>3</td></tr><tr><td>Orthographic Views</td><td>3</td></tr></table>/11
Head
<table><tr><td>All Parts</td><td>15</td></tr><tr><td>Orthographic Views</td><td>3</td></tr></table>/18
Torso
<table><tr><td>All Parts</td><td>45</td></tr><tr><td>Orthographic Views</td><td>3</td></tr></table>/48</td>
</tr>
<tr>
<td>Assembly</td>
<td> 
  </td>
<td>- Component to be modelled as individual parts and assembly created
- Assembly is constrained so that it will only move as actual part would
- 6 Sub-assemblies are present
- (3 constraints per sub-assembly)</td>
<td><table><tr><td>Constraints (6x3)</td><td>24</td></tr><tr><td>There is no misalignment of mating parts or interference or parts</td><td>10</td></tr></table>/34</td>
</tr>
</table>

Drawing			- D sized sheet - All individual parts are scaled 1:1 -	

Components	15
Exploded and collapsed views included	5
Exploded line sketches are included	5
Balloon items	5
Bill of Materials	5