

City University London
Term 1 Assessment, 2006/2007

School of Engineering and Mathematical Sciences

ME1105 Engineering Drawing & Design

Student Name , Group:

SOLUTIONS

Examination duration: 80 minutes
Reading time: 10 minutes
This paper has: 9 pages

Max. No of Marks: **30**

Authorized materials:

Electronic calculators and drawing instruments may be used.

Instructions to invigilators: Candidates are to complete the examination by writing and drawing **in this examination paper**, which must be collected at the end of the examination. No additional script books should be required.

Instructions to students:

Attempt **all** of the five questions. All questions are of equal value.
Space is provided **in this paper** to complete all the questions. No additional script books should be required. The whole paper must be left for collection by the invigilators at the end of the examination.

Be sure to write your student name and group in the space provided above.

Question 1

Indicate whether the following statements are True or False by **ticking** the appropriate selection box.

T	F	
	<input checked="" type="checkbox"/>	Technical sketching is only appropriate for fine detail work near the conclusion of the design process.
<input checked="" type="checkbox"/>		Ideation sketches are often done quickly in order to explore as many design ideas as possible.
	<input checked="" type="checkbox"/>	Technical sketching is only appropriate for capturing simplified conceptions of the design very early in the design process.
	<input checked="" type="checkbox"/>	The width and depth axes of an isometric sketch are drawn 45° above the horizontal.
<input checked="" type="checkbox"/>		A principal view in a sketch is always at right angles to the other principal views.
	<input checked="" type="checkbox"/>	An edge is only associated with one face in a solid object.
<input checked="" type="checkbox"/>		A face is joined to other faces via edges.
	<input checked="" type="checkbox"/>	The principal view is another name for the front view.
<input checked="" type="checkbox"/>		Perspective projection creates a more realistic image of an object than parallel projection.
	<input checked="" type="checkbox"/>	A perspective pictorial drawing is less realistic but easier to draw than an isometric pictorial.
	<input checked="" type="checkbox"/>	Parallel projection can only be used with objects with parallel edges.
<input checked="" type="checkbox"/>		A multiview and axonometric pictorial both use parallel projection.
<input checked="" type="checkbox"/>		In a valid wireframe model, each face must contain at least three vertices and form a closed loop.
<input checked="" type="checkbox"/>		One problem with wireframe models is ambiguity.
<input checked="" type="checkbox"/>		Orienting a face and the projection plane so that they are parallel creates an edge view of the face.
<input checked="" type="checkbox"/>		When laying out orthographic views, it is the usual practice to consider the frontal plane as lying in the plane of the paper, and the horizontal and profile planes as being rotated into the frontal plane.
	<input checked="" type="checkbox"/>	Perspective projection is sometimes substituted for parallel projection in a multiview projection.
	<input checked="" type="checkbox"/>	The top view is always vertically above the front view, but the side view may not always be horizontally in line with the front view.
<input checked="" type="checkbox"/>		The right side view is created using a profile plane of projection.
<input checked="" type="checkbox"/>		The front of the object in both the top and side views faces the front view.
<input checked="" type="checkbox"/>		First-angle projection is the multiview projection convention used in UK.
	<input checked="" type="checkbox"/>	There are only three principal views of an object.

T	F	
	X	Ordinarily, in selecting the front view, the object is placed to obtain the smallest number of hidden surfaces.
	X	In making an orthographic multiview drawing, one view should be completed before starting the others.
	X	Points of tangency between surfaces are represented with centre-lines in a multiview drawing.
X		A fillet is a rounded interior corner.
X		In making any orthographic multiview drawing, true projection is never violated.
X		The alphabet of lines is specified by British standards.
X		An isometric drawing of an object is slightly larger than the isometric projection.
X		Hidden lines should be omitted on an isometric drawing, unless absolutely necessary for clarity.
	X	The angles of an inclined line in an orthographic view can be transferred directly to an isometric drawing.
X		A cabinet oblique view is drawn true length along the receding axis.
X		An auxiliary view of an inclined surface is not one of the principal views.
X		An oblique drawing is drawn with features in two of the dimensions in true size and shape.
X		A tertiary auxiliary view is used to show the true size and shape of an oblique surface.
X		An auxiliary view of an inclined surface is generated by defining a line of sight perpendicular to its normal view.
	X	An auxiliary view of an inclined surface is generated by defining a line of sight perpendicular to its edge view.
	X	An oblique line will appear foreshortened in all three principal projection planes.
X		In a sectional view, it is considered good practice to omit all hidden surfaces unless such surfaces are necessary to clarify the representation of the object.
	X	For an offset section, it is common practice to use visible lines in the section view to show the bends in the cutting plane.
X		Thin features, such as webs, are left unsectioned when cut parallel to the feature by the cutting plane.
X		A revolved section is a section, which has been rotated 90° and placed adjacent to the orthographic view.
	X	A detail drawing is a complete set of standardized drawings specifying the manufacturing and assembly of a product.
X		A half section is used when a view is needed showing both the exterior and interior constructions of a symmetrical object.
X		An assembly drawing shows how a group of parts in a design go together.
	X	In an assembly drawing, standard parts such as fasteners bushings, bearings, etc. are not drawn as details.

Q2: 6 marks

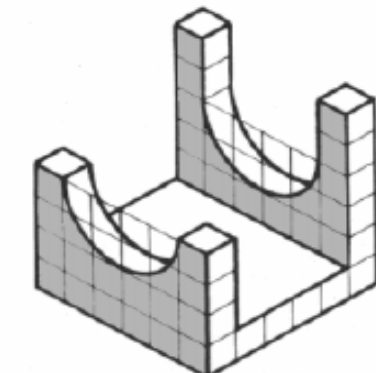
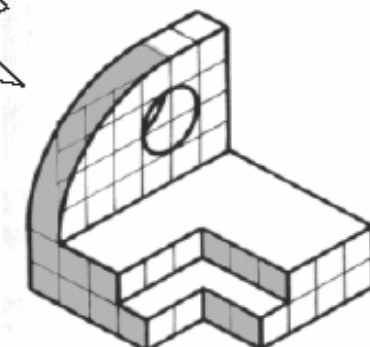
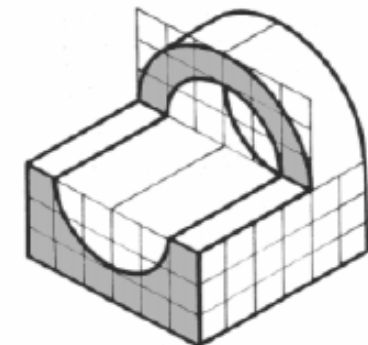
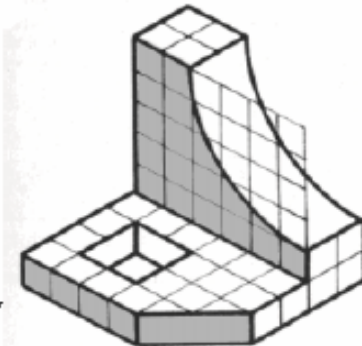
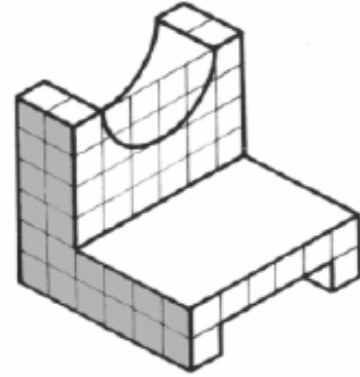
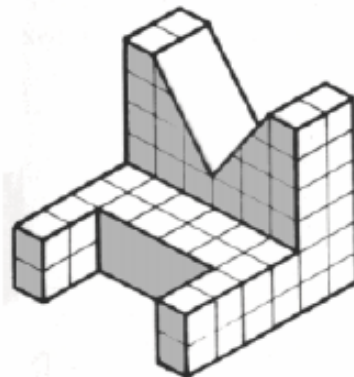
1 mark for each correct orthographic projection

Question 2

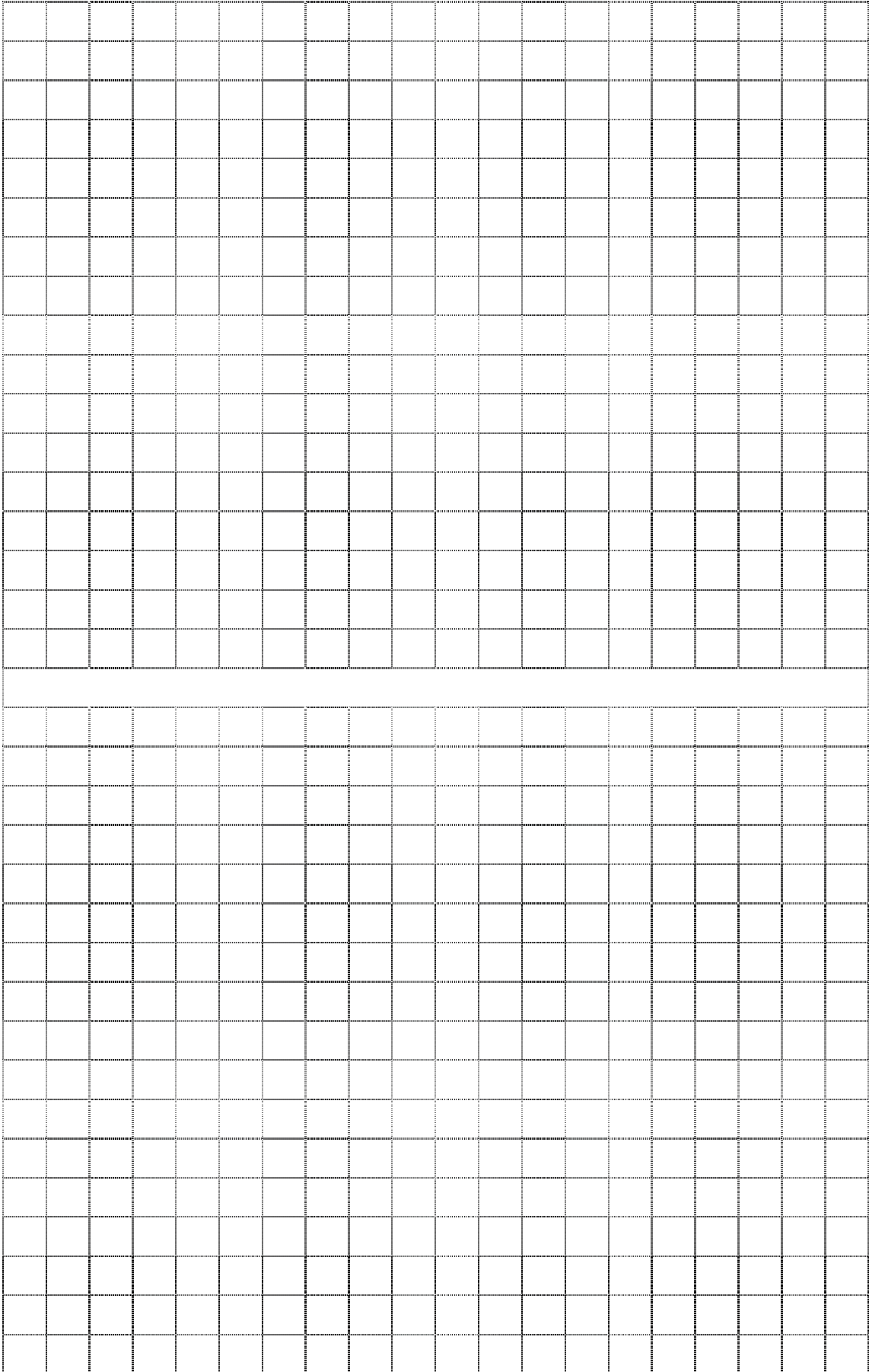
- Use the A4 paper provided. Fill in the title boxes, including the appropriate projection symbol.
- Draw freehand or with a straight edge, using a pencil.
- Assume one square on the pictorial view below equals one square on the drawing sheet.
- Front view should be in the direction of the shaded faces.

1) Choose one of the six components shown here and create a **1st angle projection** drawing of it, showing the **Front view**, the **Left Side** or **Right Side** view and the **Plan** view.

2) Choose another one of the components and create a **3rd angle projection** drawing showing the **Front view**, the **Left Side** or **Right Side** view and the **Plan** view.



Remember:
think about
where the plan /
front view will be
placed.



Question 3

Q3: **6 marks**

a) 2 marks

b) 4 marks

a) Define what is Engineering design process

an iterative decision making activity, to produce plans by which resources are converted, preferably optimally with due consideration for environment into systems and devices (products) to meet human needs.

b) Define what a FIT is and list the classification of fits (three categories). Briefly explain each of these categories.

The **fit** represents the tightness or looseness resulting from the application of tolerances to mating parts, e.g. shafts and holes. Fits are generally classified as one of the following:

Clearance fit: Assemble/disassemble by hand.
Creates **running & sliding assemblies**, ranging from loose low cost, to free-running high temperature change applications and accurate minimal play locations.

Transition fit: Assembly usually requires press tooling or mechanical assistance of some kind.
Creates **close accuracy** with little or no interference.

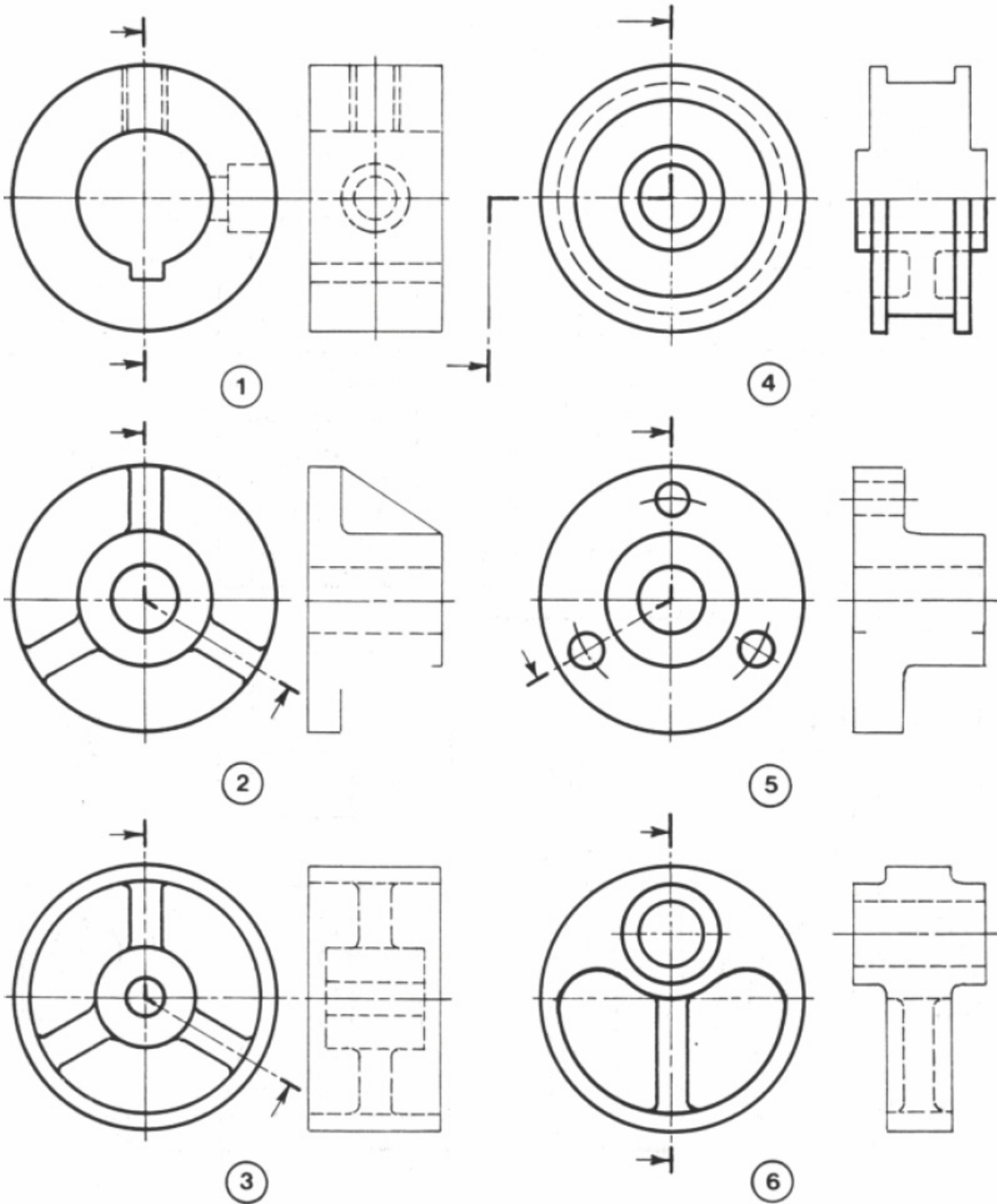
Interference fit: Parts need to be forced or shrunk fitted together.
Creates **permanent assemblies** that retain and locate themselves.

Q4: 6 marks

1 mark for each correct orthographic projection

Question 4

For the six components below complete the end section as indicated using correct line styles, thicknesses and hatching.



Q5: 6 marks
Each view 1 mark; Dimensions 3 marks

Question 5

An isometric view of a cast iron 'frame guide' is shown in figure 5.

Make a fully-dimensioned, multiview detail drawing of the frame guide on page 9, where a convenient layout of views is suggested. Use 3rd angle projection.

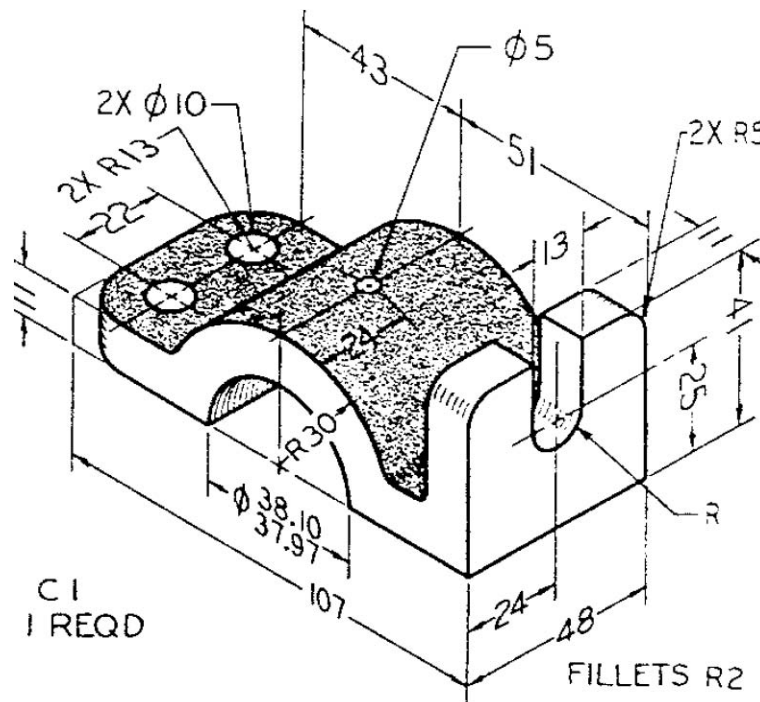


Figure 5

