



Introduction to Engineering Design

Final Examination

Parts A, B & C

ANSWER KEY

Spring 2007

For Teacher Use ONLY

Part A – Multiple Choice Questions

Question	Answer	IED Assessment Concepts
1	B	Unit 1.1 Introduction - History of Design
2	A	Unit 2.1 Introduction to Design - Design Process
3	D	Unit 2.2 Introduction to Design - Principles and Elements of Design
4	B	Unit 3.1 Student Portfolio Development
5	B	Unit 4.1 Sketching and Visualization - Sketching Techniques
6	C	Unit 5.2 Geometric Relationships - Geometric Constraints
7	D	Unit 4.2 Sketching and Visualization - Pictorial Sketching
8	A	Unit 4.3 Sketching and Visualization - Annotated Sketches
9	B	Unit 5.1 Geometric Relationships - Forms and Shapes
10	C	Unit 8.1 Modeling Analysis and Verification - Mass Properties
11	A	Unit 5.3 Geometric Relationships - Coordinate Systems
12	B	Unit 6.1 Modeling - Conceptual Modeling
13	D	Unit 6.1 Modeling - Conceptual Modeling
14	A	Unit 6.2 Modeling - Graphical Modeling
15	C	Unit 6.2 Modeling - Graphical Modeling
16	A	Unit 6.3 Modeling - Physical Modeling
17	B	Unit 6.3 Modeling - Physical Modeling
18	A	Unit 6.4 Modeling - Mathematical Modeling
19	B	Unit 6.4 Modeling - Mathematical Modeling
20	D	Unit 6.5 Modeling - Computer Modeling
21	D	Unit 6.5 Modeling - Computer Modeling
22	C	Unit 7.1 Assembly Modeling - Adding Components
23	D	Unit 7.2 Assembly Modeling - Assembly Constraints
24	C	Unit 7.2 Assembly Modeling - Assembly Constraints
25	A	Unit 7.3 Assembly Modeling - Part Library
26	D	Unit 7.4 Assembly Modeling - Sub-Assemblies
27	D	Unit 7.5 Assembly Modeling - Driving Constraints
28	B	Unit 9.2 Model Documentation - Dimensioning
29	C	Unit 8.2 Modeling Analysis and Verification - Tolerancing
30	A	Unit 9.1 Model Documentation - Working Drawings
31	B	Unit 9.3 Model Documentation - Annotation
32	A	Unit 9.1 Model Documentation - Working Drawings
33	C	Unit 10.1 Presentation - Communication Techniques
34	A	Unit 12.2 Packaging Requirements
35	C	Unit 9.1 Model Documentation - Working Drawings
36	A	Unit 7.6 Assembly Modeling - Adaptive Design
37	B	Unit 11.5 Quality Control
38	C	Unit 9.2 Model Documentation - Dimensioning
39	D	Unit 9.3 Model Documentation - Annotation
40	D	Unit 10.2 Presentation - Presentation Aids

Answer Breakdown: A-11; B-10; C-9; D-10



Part A – Scoring Conversion Chart

Raw Score	Conversion	Raw Score	Conversion	Raw Score	Conversion	Raw Score	Conversion
40	50	30	38	20	25	10	13
39	49	29	36	19	24	9	11
38	48	28	35	18	23	8	10
37	46	27	34	17	21	7	9
36	45	26	33	16	20	6	8
35	44	25	31	15	19	5	6
34	43	24	30	14	18	4	5
33	41	23	29	13	16	3	4
32	40	22	28	12	15	2	3
31	39	21	26	11	14	1	1

Part B – High School Credit

1. [6 points – 1 point each]
 - 1.1 G
 - 1.2 F
 - 1.3 B
 - 1.4 A
 - 1.5 D
 - 1.6 E

2. [4 points – 1 point each]
 - 2.1 A
 - 2.2 D
 - 2.3 F
 - 2.4 B

3. [4 points – 1 point each]
 - 3.1 d6 = d0*.25 OR d6 = d0/4
 - 3.2 d1 = d0*.5 OR d1 = d0/2
 - 3.3 d3 = d1*.75
 - 3.4 d8 = d6

4. [6 points – 1 point each]
 - 4.1 Rotation around the X-axis
 - 4.2 Rotation around the Y-axis
 - 4.3 Rotation around the Z-axis
 - 4.4 Translation along the X-axis
 - 4.5 Translation along the Y-axis
 - 4.6 Translation along the Z-axis

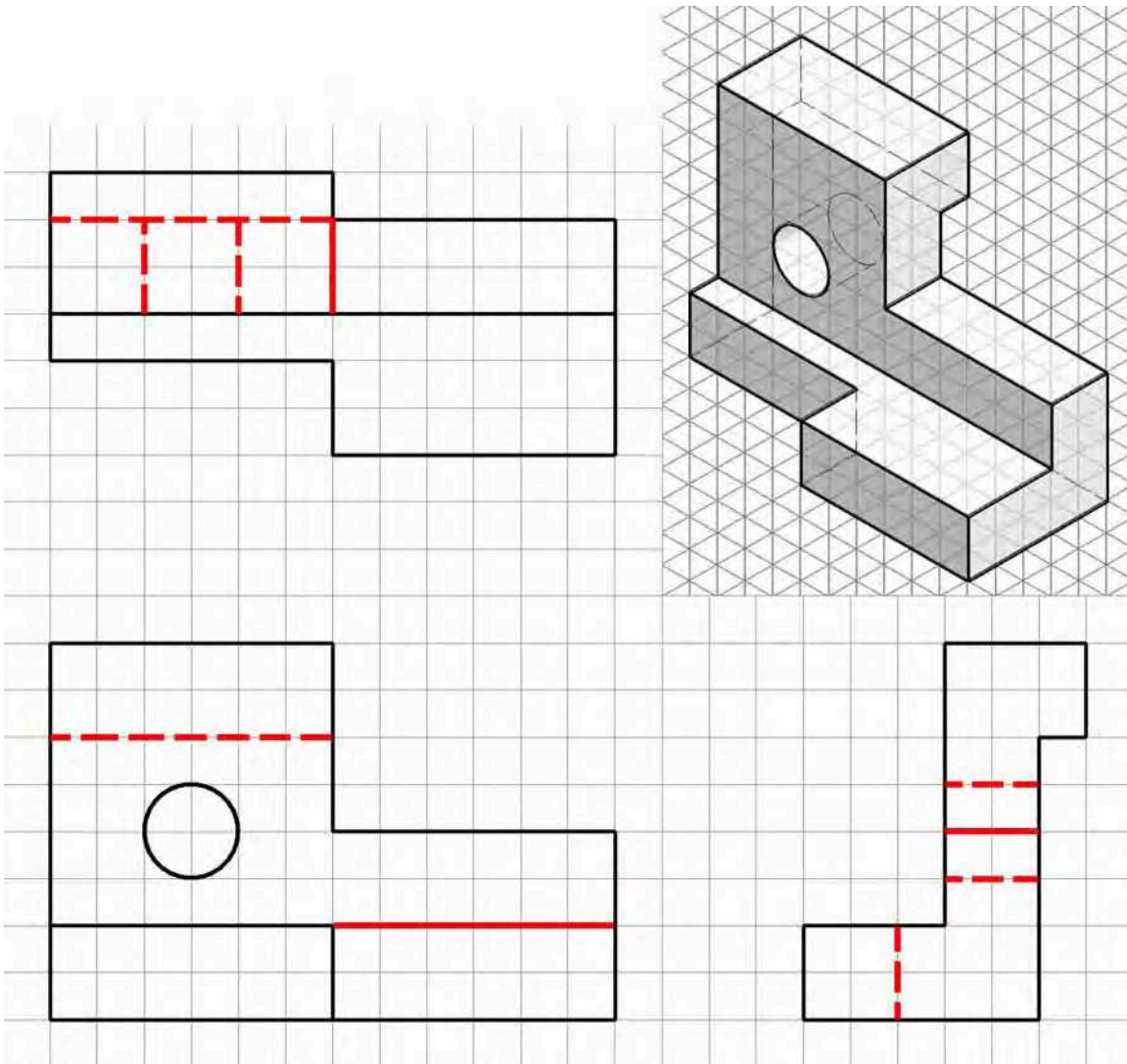
5. [4 points – 2 points each] **Note: Students' answers may vary from those identified. Credit should be awarded if a student's answer is feasible.**
 - 5.1 Given: Apply a **Mate** constraint between **surface 6** (Key) and **surface 2** (Shaft).
Apply a **Mate** constraint between **surface 4** (Key) and **surface 3** (Shaft).
Apply a **Flush** constraint between **surface 5** (Key) and **surface 1** (Shaft).
 - 5.2 Apply an **Insert** constraint between the pin edge (Hinge Plate 1) and the Hole Edge (Hinge Plate 2).
Apply an **Angle** constraint between surface C (Hinge Plate 1) and surface D (Hinge Plate 2), and set the value so that the angle between the two surfaces is 80°.

6. [3 points – 1 point each]
 - 6.1 A
 - 6.2 D
 - 6.3 G

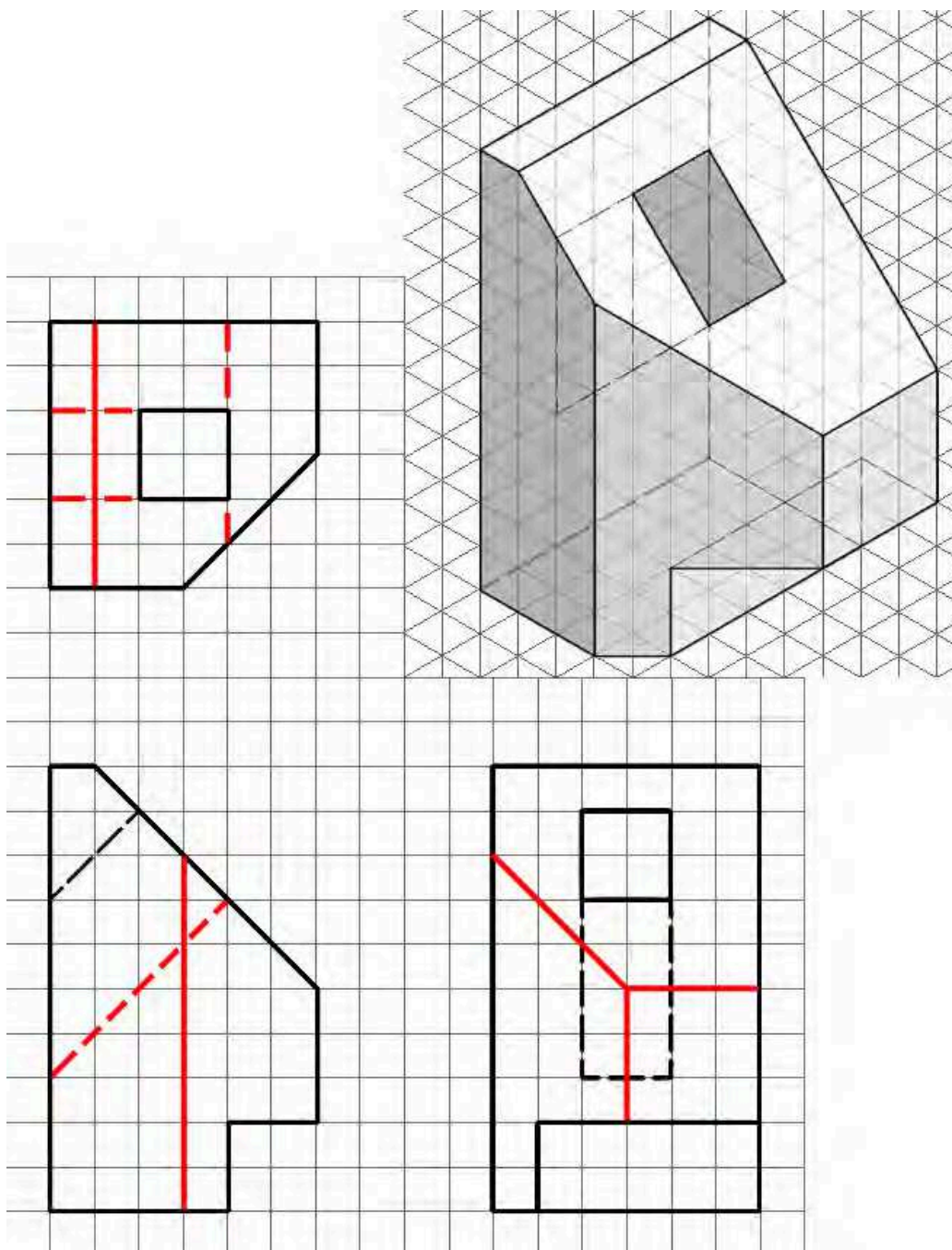
7. [7 points – 1 point each]
 - 7.1 G
 - 7.2 C
 - 7.3 H
 - 7.4 B
 - 7.5 A
 - 7.6 I
 - 7.7 E

8. [6 points – 1 point each]
 - 8.1 B or The overall part depth
 - 8.2 .312
 - 8.3 .625
 - 8.4 4.375
 - 8.5 .249
 - 8.6 .625

9. Missing line question [10 points total – 1 point each line]
 Answer Key: Missing lines are in red.



8. Missing line question [9 points total – 1 point each line]
 Answer Key: Missing lines are in red. (*The discontinuous hidden line in the top view represents a single hidden edge and is considered to be one line.*)



IED STI Notebook - Lesson Contents

Item No.	Description
1	Example Design Process.doc
2	Example Design Process Graphic.doc
3	Activity 1.2.1 – Isometric Sketches.doc
4	Isometric Graph Paper.pdf
5	Isometric Parts Sheet 1.pdf
6	Isometric Parts Sheet 2.pdf
7	Activity 1.2.4 – Multiview Sketches.doc
8	How do I create a project pathway.doc
9	Activity 2.2.1 – What Is Wrong With This Picture?.doc
10	Activity 2.2.2a – General Rules for Dimensioning.doc
11	Assembly angle constraint solutions.doc
12	Building a New Title Block.doc
13	Problem 3.4.3a – Decision Matrix Template.doc