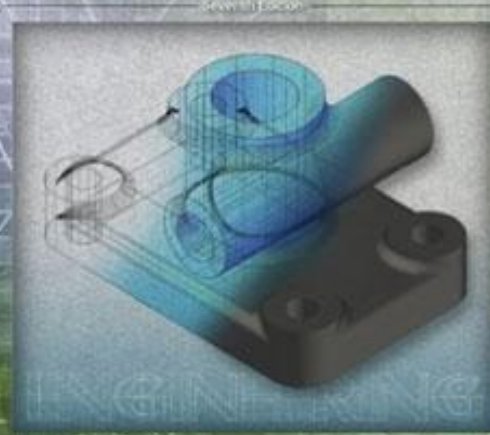


# SOLUTIONS MANUAL



## ENGINEERING DRAWING & DESIGN



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**Chapter 1 Engineering Graphics as a Language****Unit 1–4, 1. 1–4–A**

$$\begin{array}{ll}
 1. A = 2.6 & F = 9'-9 \\
 B = 4.00 & G = 58 \\
 C = 2 \frac{3}{16} & H = 108 \\
 D = 3 \frac{3}{4} & J = 270 \\
 E = 1'-10 & K = 1500
 \end{array}$$

**2.–4. 1–4–B**

ASSIGNMENT			
	2	3	4
A	104	4.10	4'-1½
B	69	2.70	2'-11½
C	26	1.04	1'-0½
D	28	1.10	1'-1
E	7	.28	0'-3½
F	19.5	.36	0'-4½
G	42	13/16	3¾
H	102	2	8
J	130	29/16	10½
K	82	15/8	7
L	155	17/32	47/8
M	45	3/8	1½
N	80	1.25	2'-6
O	582	9.20	18'-4
P	500	7.90	15'-9
Q	370	2.95	5'-10
R	280	2.20	4'-5
S	75	.60	1'-3
T	30	.24	0'-5
U	650	51/8	6'-10
V	1850	27/8	3'-10½
W	1250	113/16	2'-5
X	1125	1¾	2'-4½
Y	1200	17/8	2'-6½
Z	5900	9¼	12'-4½

**Chapter 2 Computer-Aided Drafting (CAD)****Unit 2–1**

- The term *CAD* (computer-aided drawing)—some engineers prefer computer-aided design—refers to a family of computer-based technologies that are used to create, analyze, and optimize engineering design.
- The acronym CAD is often paired with CAM, as in CAD/CAM, to reflect the close ties between drafting and manufacturing.
- Student answers should reflect their roles as members of the overall engineer-technical team, the use of computers, and reaching for success by achieving team goals.
- Students may answer any two of these: input and manipulate 2-D and 3-D geometry, create engineering drawings, do calculations, and provide drawings of parts and assemblies.
- High-speed networking and the Internet.
- Students should answer yes and then name a product made using CIM.

- Automotive, aerospace, engineering, and manufacturing would be acceptable answers. Students should be able to discuss and explain their answers.

**Unit 2–2**

- A CAD system consists of two major components: hardware and software. Hardware consists of the computer system, graphics display, input devices, output devices, and other specialized equipment.
- Graphics user interface (GUI).
- CAD workstations are usually either high-end PCs or UNIX-based graphics systems.
- The basic input device is the keyboard. Workstations also include a two- (or more) button mouse. Specialized devices can also be used, including tablets, mouse-type devices, and 3-D scanners.
- Printers and plotters are the two most common output devices. Other output devices can create photographic images, and some can create 3-D objects from CAD data.
- Operating systems are software that controls the function of the system's hardware and allocates system resources, such as memory and disk space.
- CAD applications programs.
- Network interface card (NIC).
- Students should name one of the following: fixed hard drives, RAIDs, Zip, Jaz, DLT, CD, or DVD.
- The most common type of utility programs are those that protect the system from unwanted intrusion or damaging viruses.
- Backing up files helps to prevent the loss of data and information that would be costly and time-consuming to replace.
- Viruses have the potential to corrupt and destroy all data and programs on a workstation.
- Gigabyte =  $2^{30}$  (or 1,073,741,824) bytes; megabyte =  $2^{20}$  (or 1,048,576) bytes, or 1000 kilobytes.
- CAD packages provide file manipulation, object and entity creation, entity modification such as scaling, control of display and work environments, analysis of mass properties (volume and mass), definition and generation of output, and utilities for file recovery, translation, and verification.

**Unit 2–3**

- LAN refers to a local area network, whereas WAN stands for wide area network, i.e., a widely dispersed geographical area.
- Engineers at different locations can view and discuss design problems and solutions.

**Unit 2–4**

- Manufacture parts in a machine shop.
- The ultimate goal of CIM is paperless engineering. Students might say that it will never work because engineering processes are too complex. Students may also provide case studies where CIM centers are able to reduce paper through increased use of electronic communications, e-mails, attachments, and the Internet.
- Students may answer that there are those who believe automation reduces employment opportunities. Automation also allows for materials handling of hazardous manufacturing operations, thus reducing the possibility of workers being injured.
- Students may offer a variety of answers, but the central focus should be on *customer-driven* products and services.