Problem Set 2

for the ENS161 B5-1 and B6 classes *offered in* A.Y. 2025-2026 S1

Instructions. Write your full solutions and answers in white A4 sheets of paper, in portrait orientation. Staple your submission, making sure to include the duly accomplished summary of answers.

Problem No.	**Parameters**	**Values**	
		B5-1	*B6*
1	F_{AB}, F_{AC}	20 lb, 40 lb	40 N, 20 N
2	F_B, F_C, F_E	15 kN, 10 kN, 20 kN	10 kip, 20 kip, 15 kip
3	F_1, F_2, F_3,	3 lb, 4 lb, 5 lb	7 kN, 6 kN, 5 kN
4	d, F	2.3, 5 N	4.5, 7 lb
5	F	69 lb	42 N

Unless otherwise specified, angles and vector directions are in degrees. Express final answers in five (5) decimal places and enclose them in boxes. Be sure to include appropriate units in your answers. Maintain cleanliness and comeliness in your submission (especially when erasure is unavoidable).

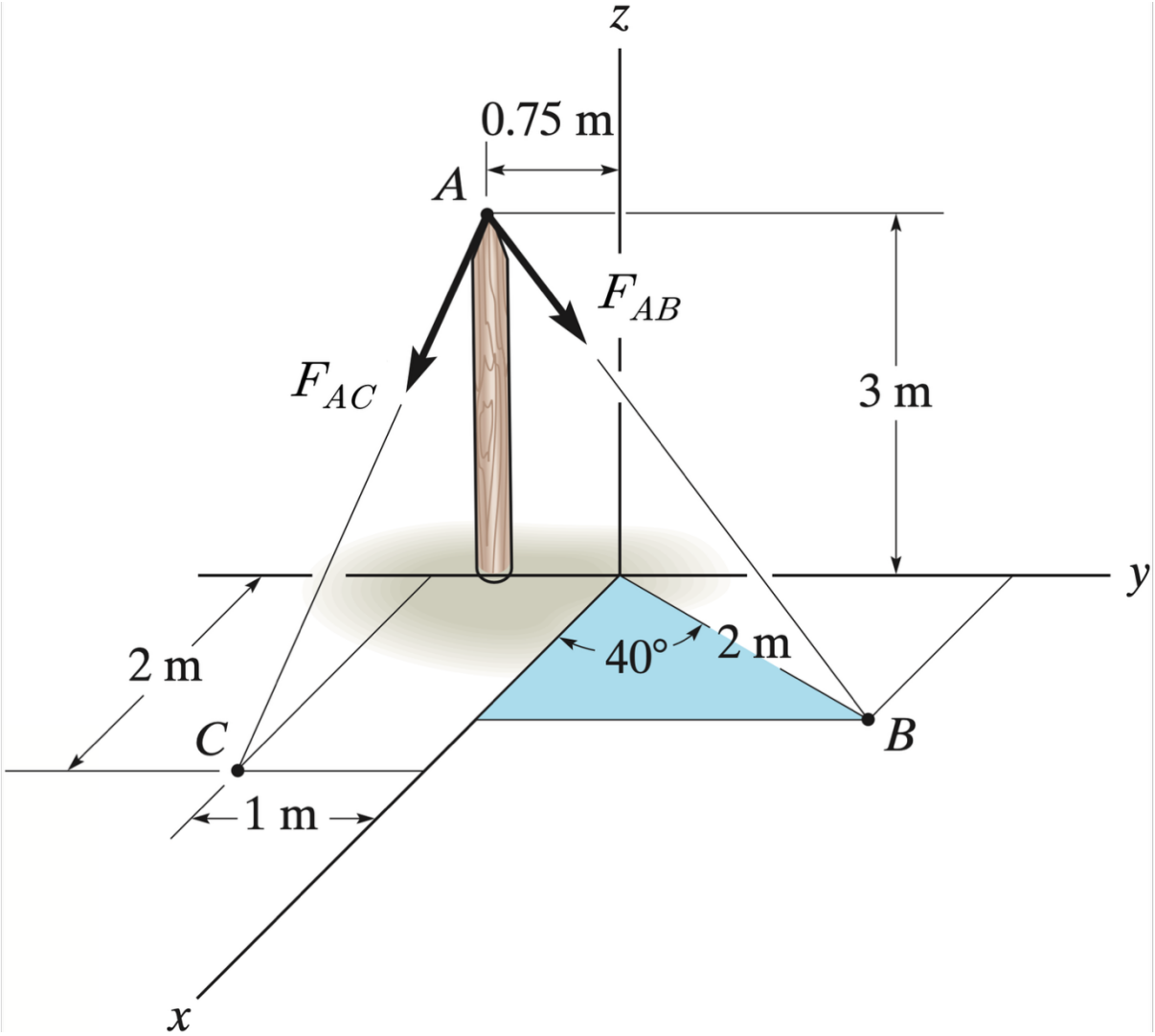
You obviously are not prohibited from dishonestly accomplishing this problem set, but you are expected to study the topics covered herein.

Summary of Answers *to* **Problem Set 2**
for the ENS161 B5-1 and B6 classes *offered in* A.Y. 2025-2026 S1

Name: _____
ID no.: _____
Section: _____

Problem 1	a.	b.
	c.	d.
	e.	
Problem 2	a.	b.
	c.	d.
	e.	f.
	g.	h.
Problem 4	a.	b.
	c.	d.
	e.	f.
Problem 5	a.	b.
	c.	d.
	e.	f.
	g.	h.

Score: _____



Problem 1. Determine the following.

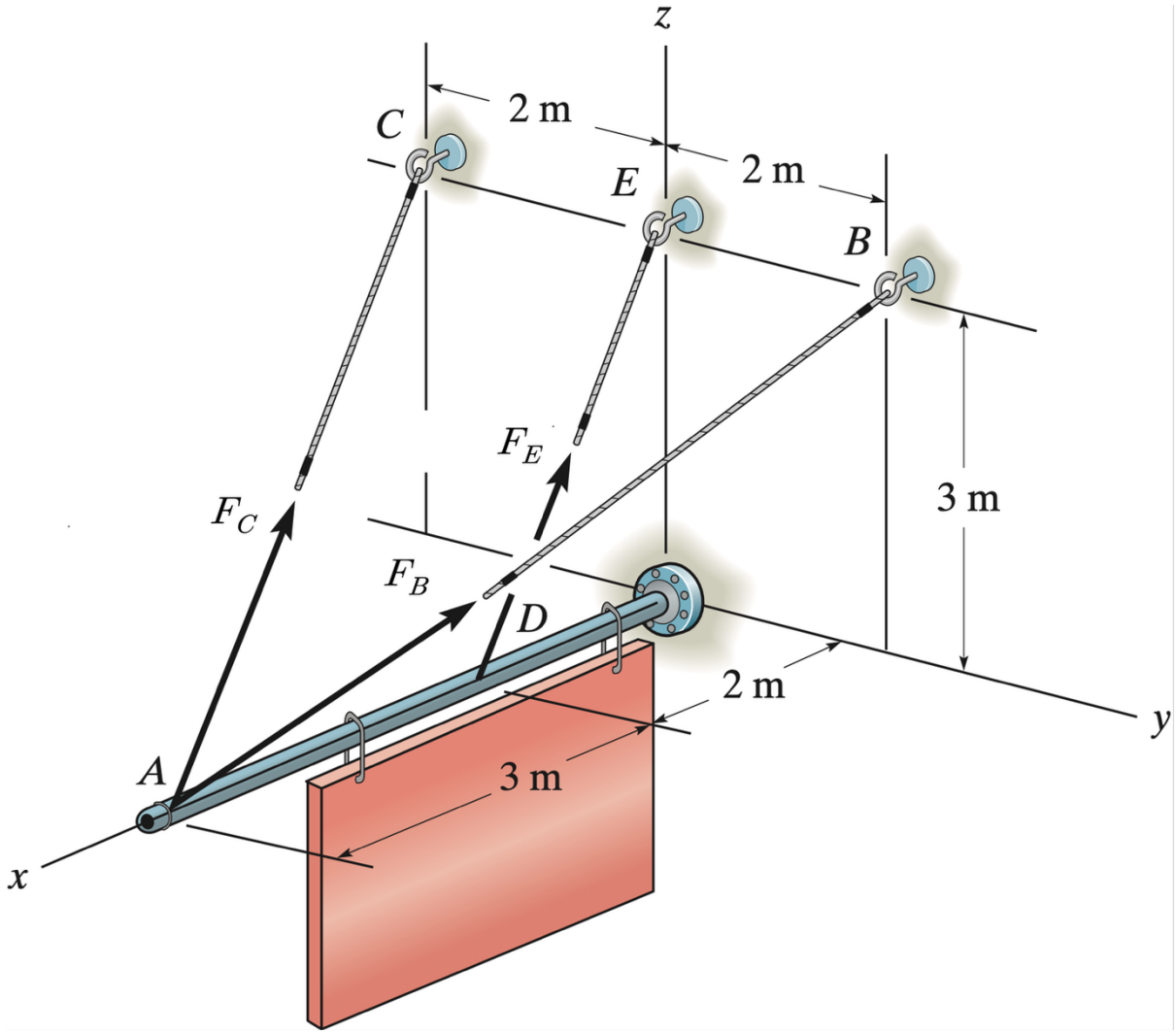
a. the magnitude of the resultant force acting at A

b. the x-coordinate direction angle of the resultant force acting at A

c. the y-coordinate direction angle of the resultant force acting at A

d. the z-coordinate direction angle of the resultant force acting at A

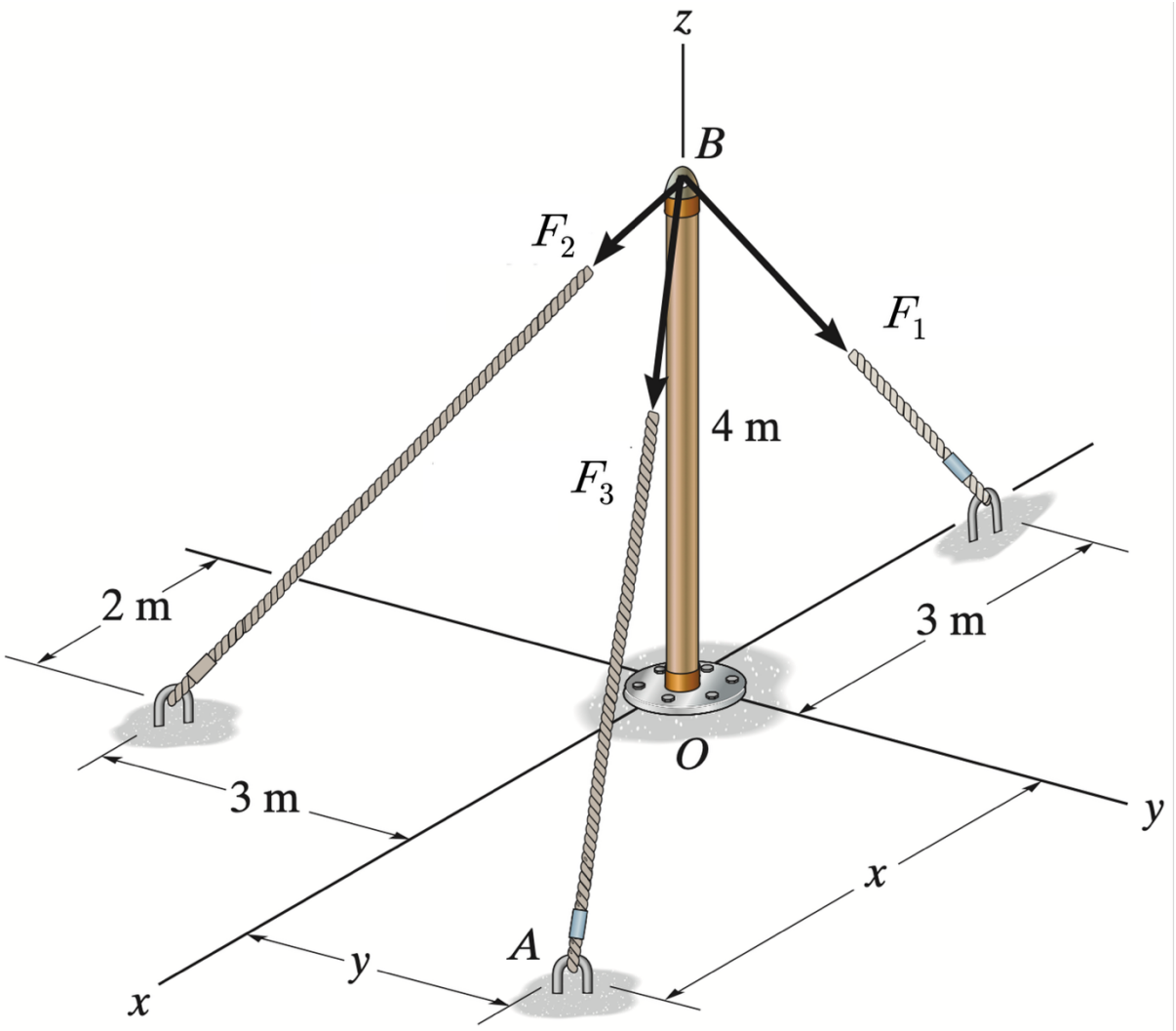
e. the smaller angle between the lines of action of F_{AC} and F_{AB}.



Problem 2. Determine (a) the *x*-component, (b) the *y*-component, and (c) the *z*-component of the resultant force at *A*.

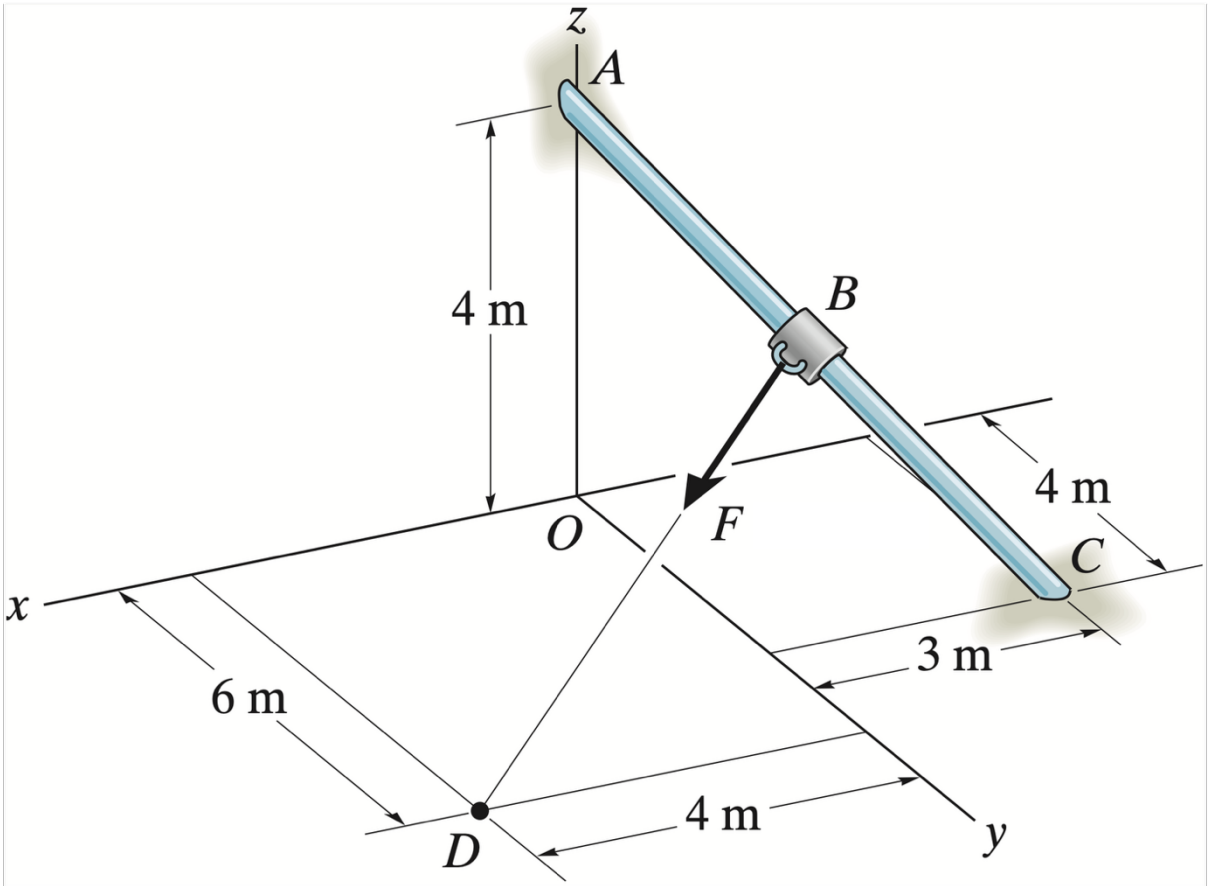
Use dot products to determine:

d. the smaller angle between cables *AC* and *AB*;
e. the smaller angle between cables *AC* and *DE*;
f. the smaller angle between cables *AB* and *AE*;
g. the smaller angle between cable *AC* and rod *AD*; and
h. the smaller angle between cable *DE* and rod *AD*.



Problem 3. Determine (a) the x-coordinate and (b) the y-coordinate of A so that the resultant of the forces applied at B is directed along the axis of the pole. (c) What is the magnitude of the said resultant? Then, determine:

d. the smaller angle between the pole and the cable shown leftmost;
e. the smaller angle between the pole and the cable anchored on A;
f. the smaller angle between the pole and the cable shown rightmost;
g. the smaller angle between the cable shown leftmost and the cable anchored on A;
h. the smaller angle between the cable shown rightmost and the cable anchored on A; and
i. the smaller angle between the cables shown leftmost and rightmost.



Problem 4. Collar B is located d m along rod AC from A.

Determine:

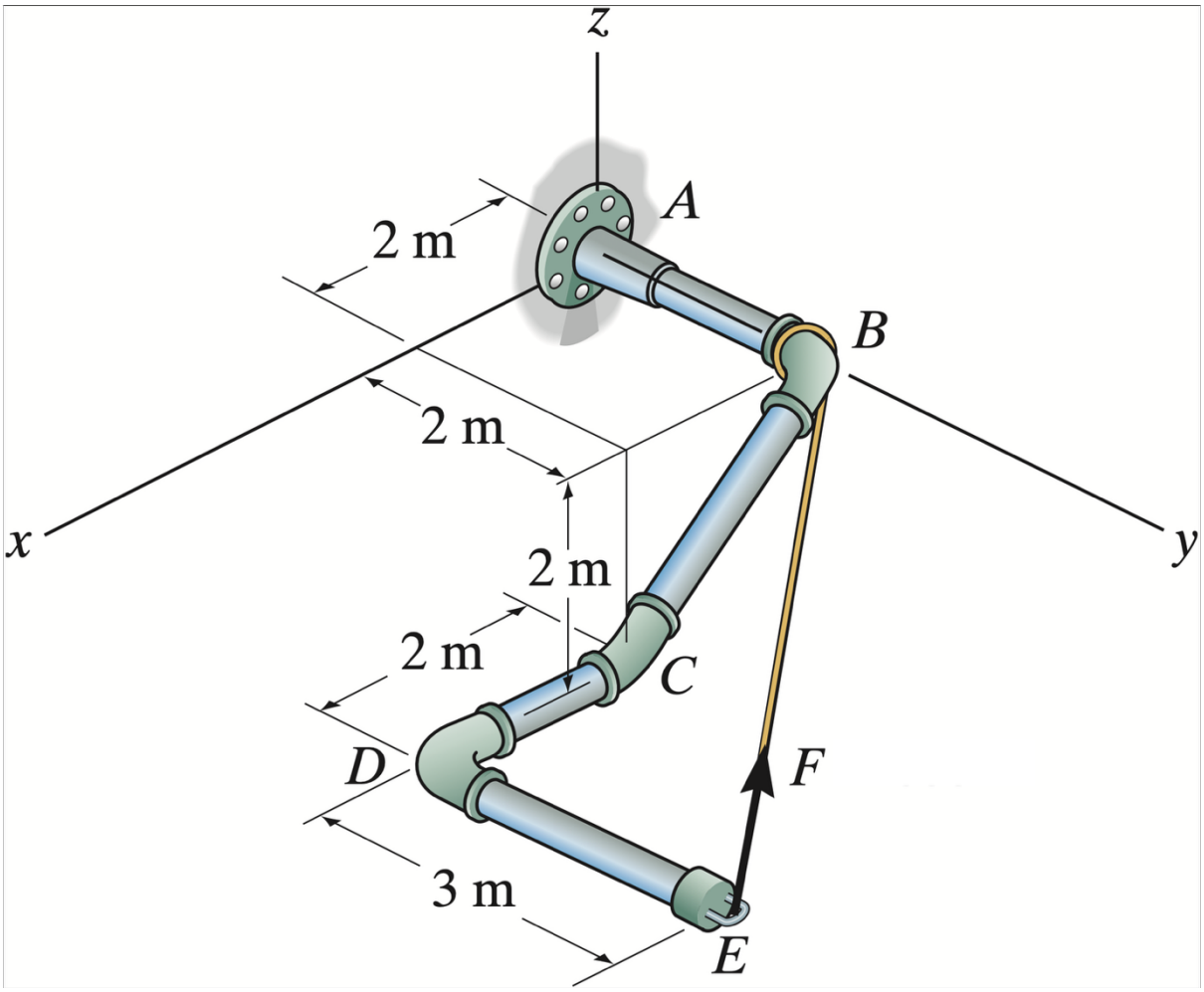
a. the ***i***-component,
b. the ***j***-component, and
c. the ***k***-component

of the component of F along the rod.

Determine:

d. the ***i***-component,
e. the ***j***-component, and
f. the ***k***-component

of the component of F perpendicular to the rod.



Problem 5. Determine the magnitudes of the following components of F:

a. along AD;
b. perpendicular to AD;
c. along AC;
d. perpendicular to AC;
e. along CE;
f. perpendicular to CE;
g. along AE; and
h. perpendicular to AE.