

Midterm Exam - Practice**Time allowed: 50 minutes****Open book, open notes****No cell phones****All answers and should be on these pages. Use the backs of pages if necessary, but clearly identify which question your work is associated with.****GRADING SHEET – MIDTERM**NAME: MCNEIL

		Points awarded	Max points
Question 1. (20 points)	a) b) c) d)		4 4 6 6
Question 2. (20 points)	a) b) c) Magnitude Direction		5 5 5 5
Question 3. (25 points)	a) Free body diagram b) Equilibrium Equations c) Forces		5 10 10
Question 4. (20 points)	Response Rationale Relationship to code of ethics		5 5 10
Question 5. (15 points total)	Factor 1 Factor 2 Factor 3		5 5 5
TOTAL			100

QUESTION 1. (Short Answer Questions)

a. What does ASCE stand for?

American Society of Civil Engineers.

b. What is ASCE?

ASCE is the professional society for Civil Engineers. It provides continuing education, networking opportunities and technical information.

c. What qualifications does a Engineer-in-Training (EIT) have?

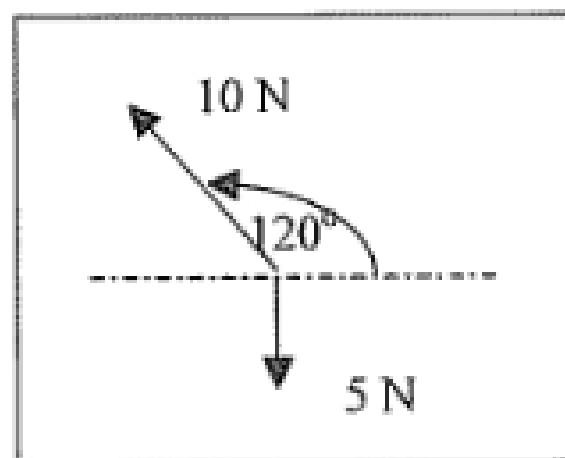
1. Degree from ~~a student~~ an accredited engineering program
2. Completed & passed Fundamentals of Engineering exam.

d. Describe in one or two sentences a sub-discipline of civil engineering?

Structural engineering is the design of buildings and other structures to serve the purpose they were intended.

QUESTION 2.

A 10 N force is applied at 120° to the horizontal. A 5 N weight hangs vertically from the same point. The following free body diagram represents the two forces.



a. Compute the horizontal and vertical components of the 10 N force.

$$F_x = 10 \text{ N} \times \cos 120 = 10 \times 0.5 \\ = -5.0 \text{ N}$$

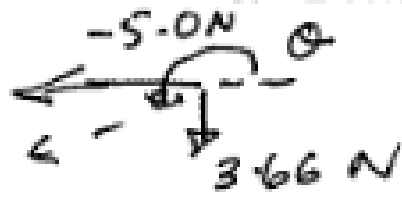
$$F_y = 10 \text{ N} \sin 30 \\ = 10 \times 0.866 \\ = 8.66 \text{ N}$$

- b. Compute the total force in the horizontal and vertical directions for both the 10 N and 5 N forces.

$$F_x = -5.0 \text{ N}$$

$$F_y = 8.66 - 5 = 3.66 \text{ N}$$

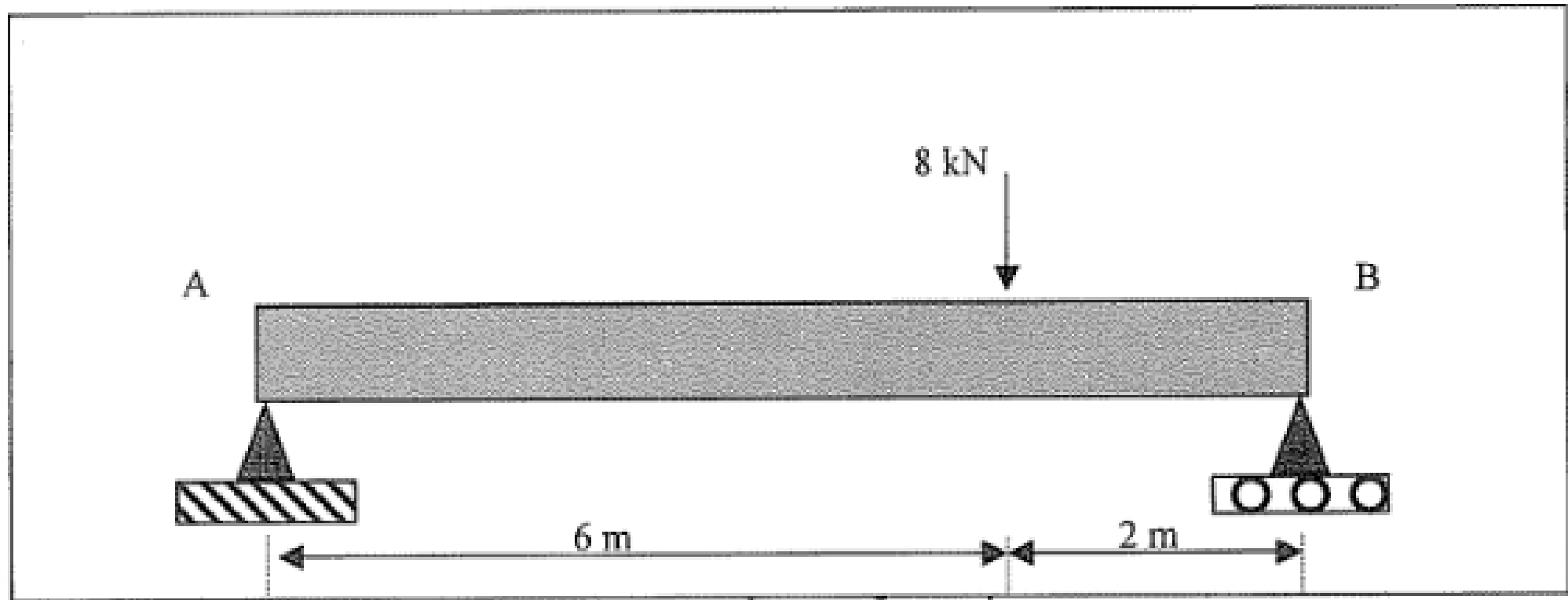
- c. Determine the magnitude and direction of the resultant force.



$$\text{Magnitude: } F = \sqrt{5^2 + 3.66^2} = 6.2 \text{ N.}$$

$$\text{Direction: } \theta = 180 + \tan^{-1} \frac{3.66}{5.0} = 180 + 36.2 = 216.2$$

QUESTION 3.



Assume the beam in the above diagram is weightless.

- a. Draw the free body diagram for the beam



- b. Write the equilibrium equations for

- i. The forces in the vertical direction.

$$V_A + V_B = 8 \text{ kN.}$$