**Assignment 1 - Dynamics**
Unit 2
(Outcomes 325-5, 325-8)

Name:_____

1   What topics does one deal with in dynamics?
    (A)   causes of motion   (C)   study of energy
    (B)   description of motion   (D)   study of motors and generators

2   Which of the following is the weakest force in nature?
    (A)   Gravitational Forces   (C)   Weak Nuclear Interactions
    (B)   Electrostatic Forces   (D)   Strong Nuclear Interactions

3   What does a triple beam balance measure?
    (A)   weight   (C)   mass
    (B)   length   (D)   volume

4   Which quantity is included in the study of dynamics but excluded from kinematics?
    (A)   acceleration   (C)   force
    (B)   displacement   (D)   velocity

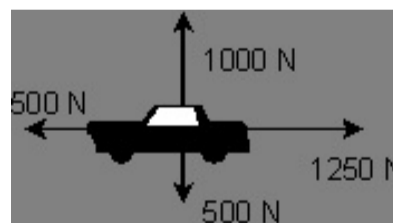5   Which choice shows the resultant of the two concurrent forces in the picture just below?

    a)   b)   c)   d)
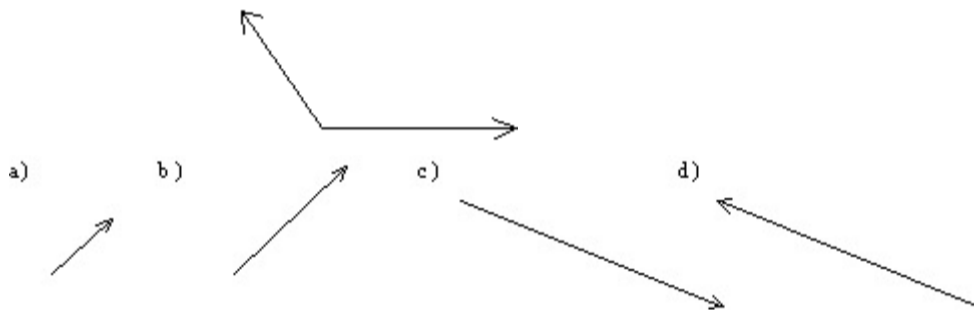
6   The free-body diagram of a block being pushed up a rough ramp is best represented by

    A   B   C   D   E
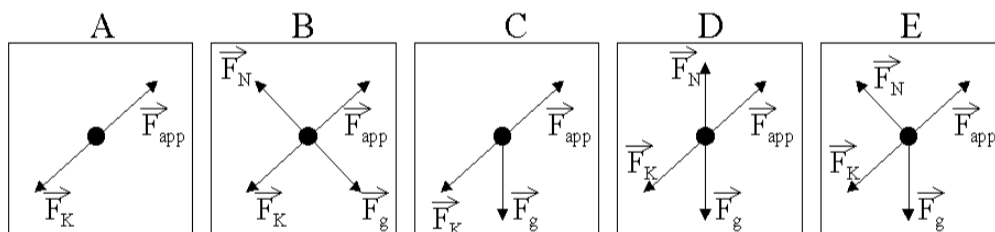
7   What is the magnitude of the unbalanced force acting on the object shown in the drawing?
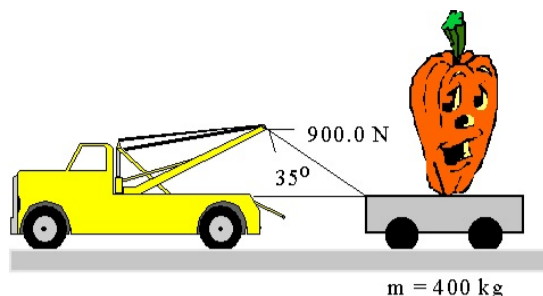   (A)   900 N
    (B)   1300 N
    (C)   560 N
   (D)   3300 N

8   A man has a weight of 350 N on a planet where the acceleration due to gravity is 7.0 m/s^2. What is his weight on Earth?
    (A)   2450 N   (C)   50 N
    (B)   490 N.   (D)   35 N

9   A force of 900.0 N is applied at an angle of 35° above the horizontal. Calculate the horizontal force on the cart in the picture
(A)   512 N
(B)   630 N
(C)   737 N
(D)   3920 N

900.0 N
35°
m = 400 kg

10   Suppose that a towing force of 100 N was applied to wagon. If the force was directed at an angle of 30° above the horizontal then which statement would be correct?
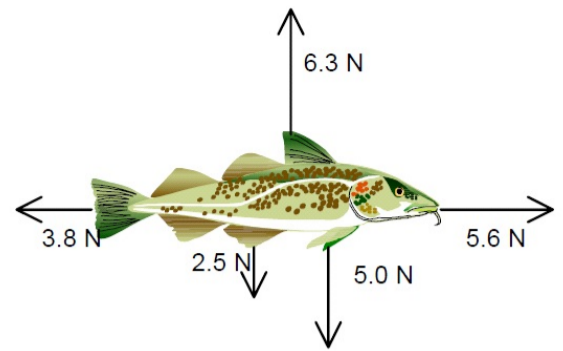

100 N
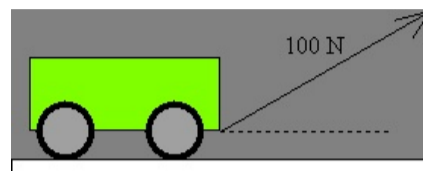
(A)   The horizontal and vertical components would be equal.
(B)   The horizontal component would be greater than the vertical component.
(C)   The horizontal component would be less than the vertical component.
(D)   The horizontal component would be equal to 100 N

11   Given the information from the previous question, which action would increase the horizontal component of the force?
(A)   Change the direction to 30° below the horizontal.
(B)   Change the direction to 40° above the horizontal.
(C)   Change the direction to 20° above the horizontal.
(D)   Change the magnitude to 50 N.

12.   A)   A 2.00 kg object is hung from a spring scale that is capable of measuring up to 20.0 N before breaking. Will the object damage the spring scale? Support your answer with calculations. (Assume the location is Earth)

B)   A space rover has a mass of 1830 kg. Determine the rover's weight and mass on Planet *Scisyhp* where the gravitational field strength is approximately 2.2 times larger than that of Earth's?

13.   Draw a free body diagram for each situation below:

(A)   A box is pulled horizontally across   (B)   A box is lifted vertically at a
a rough floor   constant speed

14. Find the magnitude and direction of the net force on the object shown at the right.

6.3 N
3.8 N
2.5 N
5.0 N
5.6 N

15. Draw a free body diagram and find the net force in the following:

a) Two men exert forces of 100.0 N [E] and 150.0 N [E] respectively while friction generates a force of 200.0 N as a car is pushed along a level road.

b) A hot air balloon experiences a lift force of 2050 N while the wind exerts a force of 500.0 N [E]. The balloon has a weight of 1800 N.

16. Two tow ropes are attached to a sled. A force of 300.0 N is applied to one rope in a direction [40.0° N of W]. A force of 420.0 N is applied to the second rope in a direction [60.0° S of W].

a) Draw a neat vector diagram that shows this information.
b) Use the component method to find the resultant of the two vectors. Determine both the magnitude and direction.

17. In each case below, calculate the x and y components of the applied force. Assume that the top of page is North.
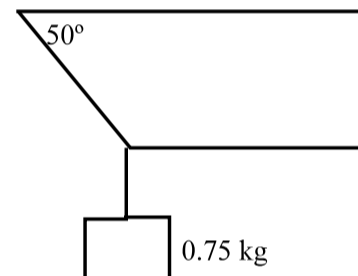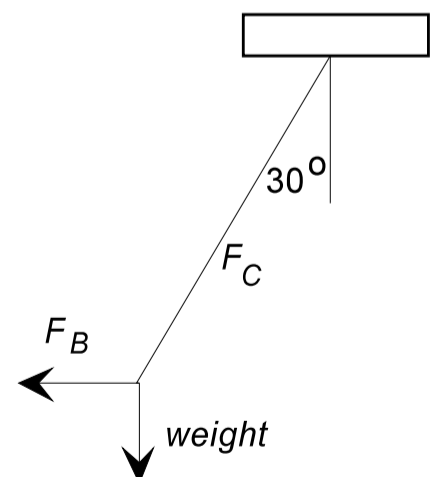
a)

24.5 N

18.0 º

b)

32.5 N

28.0 º
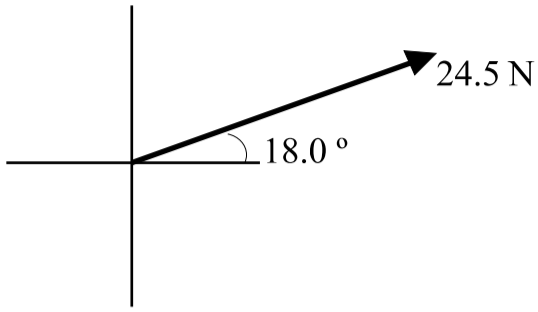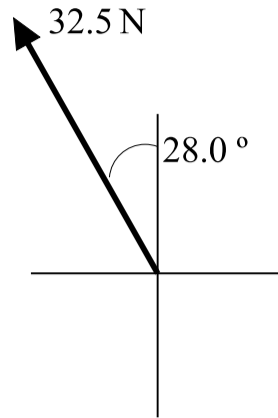
18. The diagram shows a mass suspended by strings asshown. What is the tension in each string?   {4}

50º

0.75 kg

19. a)   What force (F_B)is required to hold a swing in place at an angle of 30° with the vertical if the person on the swing has a weight of 500.0 N? {2}

30 º

F_C

F_B

weight

b)   What is the tension (F_C) in the rope supporting the swing?