المملكة العربية السعودية

وزارة التعليم

MINISTRY OF EDUCATION

هام

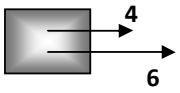
لكل المهتمين و المهتمات

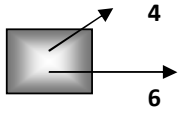
بدروس و مراجع الجامعية

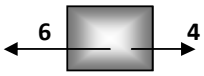
مدونة المناهج السعودية eduschool40.blog

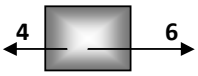
Chapter 5: FORCE AND MOTIN I

1. The figures below shows four situation in which forces act on a block that lies on a frictionless floor. In which figure the block has the **greatest acceleration**?

(a) 

(b) 

(c) 

(d) 

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2. A force of **0.2 N** acts on a mass of **100 g**, what is its **acceleration**?

(a) 2 x 10^{-2} m/s^2 (b) 2 x 10^{-6} m/s^2 (c) 2 x 10^{-3} m/s^2 (d) 2 m/s^2

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3. A man **pulls** a box of **mass 3 kgvertically upward** with a force of magnitude **40 N**. What is the **acceleration of the box**?

(a) $a = \frac{T - mg}{m}$ (b) $a = \frac{mg - T}{m}$ (c) $a = \frac{T + mg}{m}$ (d) $a = \frac{m}{T + mg}$

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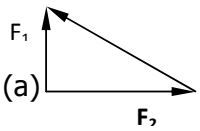
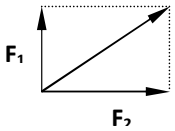
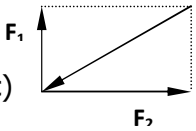
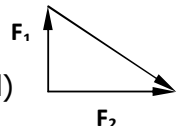
4. Which of the following figures correctly show the vector **addition of forces F_1 and F_2** ?

(a) 

(b) 

(c) 

(d) 

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5. If the **1 kg** body has an **acceleration of 2 m/s^2** at an angle of **20°** above the positive direction of the x-axis. What is the **net force** in unit vctor notation?

(a) $\vec{F} = 0.34\hat{i} + 0.94\hat{j}$ (b) $\vec{F} = 1.88\hat{i} + 0.68\hat{j}$ (c) $\vec{F} = 0.68\hat{i} + 1.88\hat{j}$ (d) $\vec{F} = 0.94\hat{i} + 0.34\hat{j}$

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6. Two forces act on a particle that moves with **constantvelocity** $\vec{v} = 3\hat{i} - 4\hat{j}$ **m/s**, one of the forces is $\vec{F}_1 = 2\hat{i} - 6\hat{j}$ **N**,what is the other force?

(a) $\vec{F}_2 = 2\hat{i} - 6\hat{j}$ (b) $\vec{F}_2 = 6\hat{i} - 10\hat{j}$ (c) $\vec{F}_2 = -2\hat{i} + 6\hat{j}$ (d) $\vec{F}_2 = -6\hat{i} + 10\hat{j}$

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7. A particle has a **weight of 22 N** at a point where **g = 9.8 m/s^2**, what are its **mass and weight** at a point where **g = 0** ?

(a) m = 2.2 kg, W = 0 (b) m = 0, W = 2.2 N (c) m = 0.45 kg, W = 0 (d) m = 0, W = 45 N

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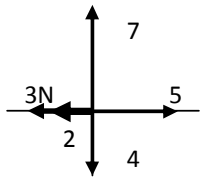
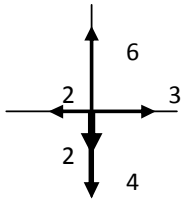
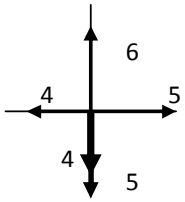
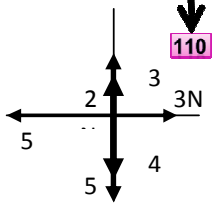
8. In which figure of the following the **y-component of the net force is zero**?

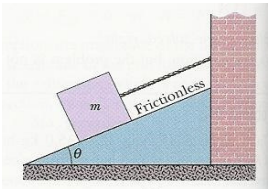
(a) 

(b) 

(c) 

(d) 

9. In the figure a cord holds stationary a block of mass **m = 8.5 kg** on a frictionless plane that is inclined at An angle **θ = 30°**, **the tension in the cord T** equals:



(a) 72.14 N (b) 83.3 N (c) 53.14 N (d) 41.65 N

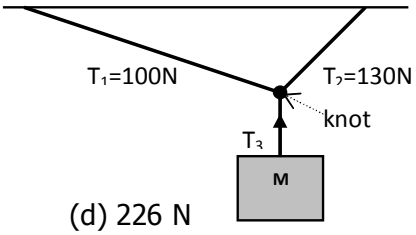
10. **In question9,** the **Normal forceN** acting on the block is:

(a) $N= F_g - mg\cos\theta$ (b) $N= F_g\cos\theta$ (c) $N= F_g+mg\cos\theta$ (d) $N= F_g$

11. **In question9,** if the cord is **cut** then the mass will slide with **acceleration equals**:

(a) $a = -4.9\ m/s^2$ (b) $a = -9.8\ m/s^2$ (c) $a = -8.5\ m/s^2$ (d) $a = -3.4\ m/s^2$

12. A block of mass **M= 20 kg** hangs from three cords by means of a knot, **(**the mass M does not move**)**, **what is the value of tensionT_3**?

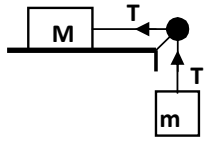


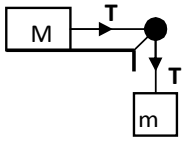
(a) 230 N (b) 196 N (c) 426 N (d) 226 N

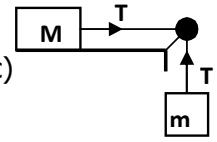
13. **What is the net force** acting on a body of a **mass of 48 kg** , when its **acceleration is 6 m/s^2** ?

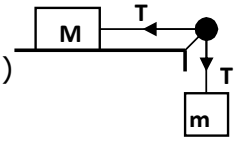
(a) 758 N (b) 182 N (c) 288 N (d) 470 N

14. Which figure of the following shows **the right direction of the tension T**? (the two masses are stationary).

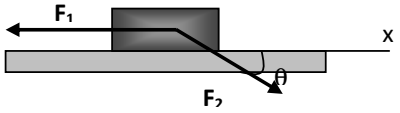
(a) 

(b) 

(c) 

(d) 

15. Two forces act on a block of mass **m= 0.5 kg** that Moves along the x-axis on a frictionless table, **F_1= 3 N** and **F_2= 1 N** directed at angle **θ=30°** as shown,
What is the acceleration of the block?



(a) – 4.3 m/s^2 (b) – 7.7 m/s^2 (c) - 5 m/s^2 (d) - 7 m/s^2

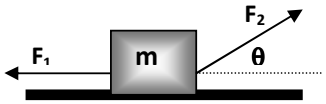
16. If **m_1= 2 kg** and **m_2= 4 kg** and the **same force is applied to both masses**, then the **ratio of their accelerations is**:

(a) $\frac{a_2}{a_1}=\frac{1}{2}$ (b) $\frac{a_2}{a_1}=2$ (c) $\frac{a_2}{a_1}=\frac{1}{4}$ (d) $\frac{a_2}{a_1}=4$

17. A force **F** applied to a body of mass **m_0** giving it an acceleration **a_0,** what is the mass of a body **x** if the same force is applied to it and accelerate it by **a_x** ?

(a) $m_x=m_0\frac{a_x}{a_0}$ (b) $m_x=m_0\frac{a_0}{a_x}$ (c) $m_x=\frac{a_x}{a_0}$ (d) $m_x=\frac{a_0}{a_x}$

18. In the figure, two forces acting on a box of mass **m** moving over a **frictionless** ice along the **x-axis** .
What is the **acceleration** of the box?



(a) $a_x=\frac{F_1+F_2\cos\theta}{m}$ (b) $a_x=\frac{F_2\cos\theta-F_1}{m}$ (c) $a_x=\frac{F_2\cos\theta}{m}$ (d) $a_x=\frac{F_1-F_2}{m}$

19. The magnitude of the **centripetal force** is

(a) $F=m\frac{v^2}{R^2}$ (b) $F=\frac{v^2}{R}$ (c) $F=m\frac{v}{R}$ (d) $F=m\frac{v^2}{R}$

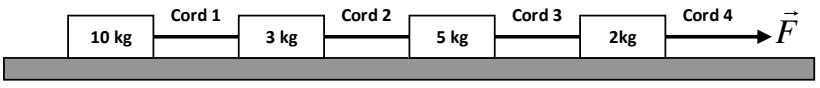
1. What is the **gravitational force** on a man of mass **m** when he is sitting in a car that accelerates at **a** ?

(a) F_g= m a (b) F_g= m (g – a) (c) F_g= m g (d) F_g= m (a – g)

20. Two forces act on a particle that moves with **constantvelocity** $\vec{v}=3\hat{i}-4\hat{j}$ **m/s**, one of the forces is $\vec{F}_1=2\hat{i}-6\hat{j}$ **N**,what is the other force?

(a) $\vec{F}_2=2\hat{i}-6\hat{j}$ (b) $\vec{F}_2=6\hat{i}-10\hat{j}$ (c) $\vec{F}_2=-2\hat{i}+6\hat{j}$ (d) $\vec{F}_2=-6\hat{i}+10\hat{j}$

21. The figure shows a train of four blocks being pulled across a frictionless floor by force $\vec{F}$, what **total mass is accelerated to the right byCord 2**?

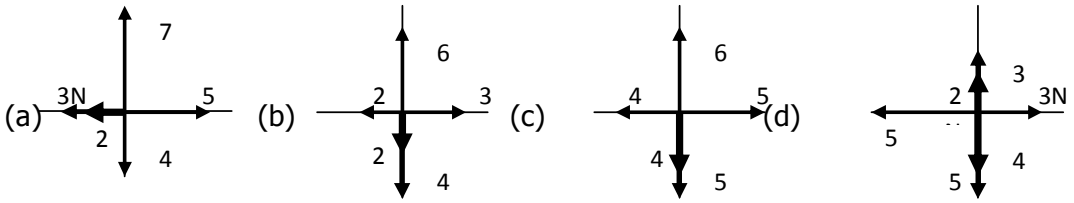


(a) 10 kg (b) 18 kg (c) 13 kg (d) 7 kg

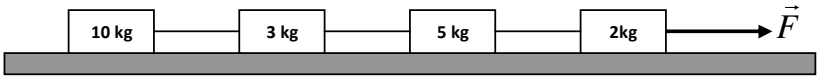
22. A particle has a **weight of 22 N** at a point where **g = 9.8 m/s^2**, what are its **mass and weight** at a point where **g = 0** ?

(a) m = 2.2 kg, W = 0 (b) m = 0, W = 2.2 N (c) m = 0.45 kg, W = 0 (d) m = 0, W = 45 N

23. In which figure of the following the **y-component of the net force is zero**?



24. The figure shows a train of four blocks being pulled across a frictionless floor by force $\vec{F}$, what total mass is accelerated to the right by force $\vec{F}$?

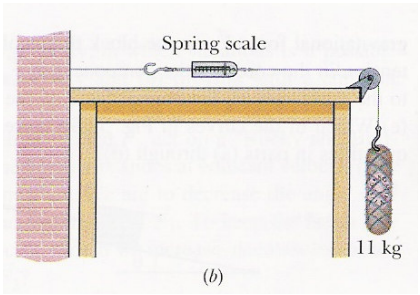


(a) 10 kg (b) 18 kg (c) 13 kg (d) 245 m/s

25. Three forces act on a particle that moves with **unchanging** velocity $\vec{v} = 2\hat{i} - 7\hat{j}$, two of the forces are $\vec{F}_1 = 2\hat{i} + 3\hat{j} - 2\hat{k}$ and $\vec{F}_2 = -5\hat{i} + 8\hat{j} - 2\hat{k}$. what is the **third force** ?

(a) $3\hat{i} - 11\hat{j} + 4\hat{k}$ (b) $7\hat{i} - 5\hat{j}$ (c) $-3\hat{i} + 11\hat{j} - 4\hat{k}$ (d) $-7\hat{i} + 5\hat{j}$

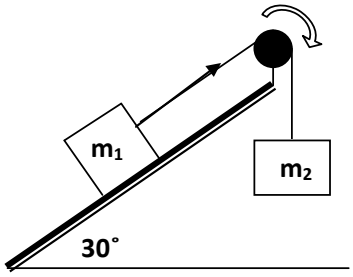
26. An **11 kg** object is supported by a cord that Runs around a pulley and to a scale. The opposite end of the scale is attached by a cord to a wall.
What is the reading on the scale?



(a) 11 N (b) 9.8 N (c) 107.8 N (d) 215.6 N

27. A block of mass $\mathbf{m_1=3.7\ kg}$ on frictionless inclined plane of angle **30°** is connected by a cord over a massless frictionless pulley to a second block of mass $\mathbf{m_2=2.3\ kg}$ hanging vertically **as shown**.

If the magnitude of the **acceleration** of each block is $\mathbf{0.735\ m/s^2}$, what is the **tension in the cord** ?



(a) 36.3 N (b) 22.5 N (c) 20.8 N (d) 18.1 N

28. **In question 27**, what is the **normal force** acting on the block $\mathbf{m_1}$?

(a) $N=F_g - m_1g\cos\theta$ (b) $N=F_g\cos\theta$ (c) $N=F_g + m_1g\cos\theta$ (d) $N=F_g$

29. **In question 27**, if the cord is cut what is the **acceleration** of mass $\mathbf{m_2}$?

(a) $a = -4.9\ m/s^2$ (b) $a = -9.8\ m/s^2$ (c) $a = -0.735\ m/s^2$ (d) a = zero

30. If the **1 kg** body has an **acceleration of 2 m/s²** at an angle of **20°** above the positive direction of the x-axis. What is the **net force** in unit vctor notation?

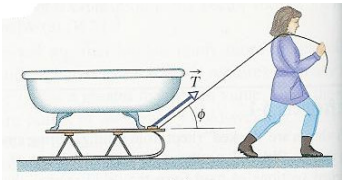
(a) $\vec{F}=0.34\hat{i}+0.94\hat{j}$ (b) $\vec{F}=1.88\hat{i}+0.68\hat{j}$ (c) $\vec{F}=0.68\hat{i}+1.88\hat{j}$ (d) $\vec{F}=0.94\hat{i}+0.34\hat{j}$

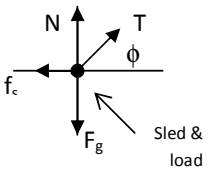
Test bank Chapter 5 solutions

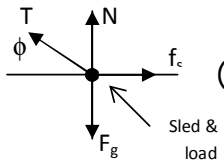
1. a
2. d
3. a
4. b
5. b
6. c
7. a
8. b
9. d
10. b
11. a
12. b
13. c
14. c
15. a
16. a
17. b
18. b
19. d
    1. (after question 19) (c)
20. c
21. c
22. a
23. b
24. 20 kg
25. a
26. c
27. c
28. b
29. b
30. b

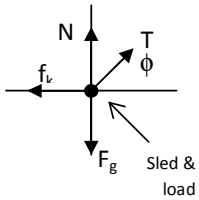
Chapter 6: FORCE AND MOTIN II

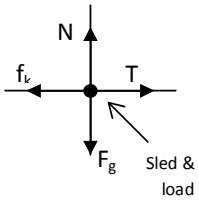
1. In the figure a woman **pulls** a loaded sled of mass **m** along a horizontal surface at **constant velocity**. The coefficient of kinetic friction between the runners and the snow is μ_k .
Which figure shows the correct **free body diagram** for the sled and load?



(a) 

(b) 

(c) 

(d) 

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2. In question 2, The **equation of the forces acting on the load and sled** (from Newton's second law) is:

(a) $\vec{T}+\vec{N}+\vec{F}_g+\vec{f}_k=0$

(b) $\vec{T}+\vec{N}+\vec{F}_g+\vec{f}_s=0$

(c) $\vec{T}+\vec{N}+\vec{F}_g+\vec{f}_k=m\vec{a}$

(d) $\vec{T}+\vec{N}+\vec{F}_g+\vec{f}_s=m\vec{a}$

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3. A **12 N** horizontal force pushes a block of **weight 5 N** to make it move with **constant speed**, the value of the **coefficient of friction** μ_k is:

(a) 2.4 (b) 0.24 (c) 4.1 (d) 0.41

---

4. A car has a **weight of 1.1 N** slides on the road with acceleration **a=1.24 m/s^2**, **what is the force of friction** between the car and the road?

(a) - 1.13 N (b) - 11 N (c) - 1.4 N (d) - 0.14 N

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5. A **12 N** horizontal force pushes a block of **weight 5 N** to make it move with **constant speed**, the value of the **coefficient of friction** μ_k is:

(a) 2.4 (b) 0.24 (c) 4.1 (d) 0.41

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6. A block lies on a floor.If the maximum value $f_{x,max}$ of the static frictional force on the block is **10 N**, what is the magnitude of the **frictional force** if the magnitude of the horizontally applied force is **8 N**?

(a) 10 N (b) 8 N (c) 2 N (d) 18 N

7. A **470 N** horizontal force pushes a block of **mass 79 kg** to make it move with **constant speed**, what is the value of the **coefficient of friction** μ_k ?

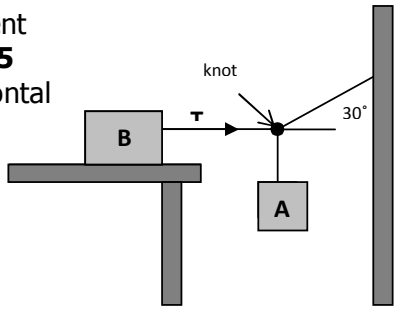
(a) 0.61 (b) 6 (c) 1.6 (d) 0.06

8. A block lies on a floor.If the maximum value $f_{x,max}$ of the static frictional force on the block is **10 N**, what is the magnitude of the frictional force if the magnitude of the horizontally applied force is **12 N**?

(a) 10 N (b) 12 N (c) 2 N (d) 22 N

9. In the figure, **block B weighs 711 N**. The coefficient of static friction between the block and the table is **0.25** assume that the cord between **B** and the **knot** is horizontal

What is the magnitude of the tension T?



(a) 205.2 N (b) 355.5 N (c) 820.1 N (d) 1422 N

10. **In question 9**, the weight of block **A** is :

(a) T cos 30 (b) T sin 30 (c) F_g – T cos 30 (d) F_g – T sin 30

Chapter 6 Test Bank Solutions

1. c
2. a
3. a
4. d
5. a
6. b
7. a
8. c
9. a (T is the tension in the rope attached to the wall not to block B)
10. b (T is the tension in the rope attached to the wall not to block B)