CHAPTER 7

Choose the correct answer:

1. The **kinetic energy** of a **90 kg** football player running at speed **10 m/s** is:

(a) 4500 kg m/s^2 (b) 4500 kg m^2/s^2 (c) 4500 kg m/s (d) 4500 kg^2 m^2/s^2

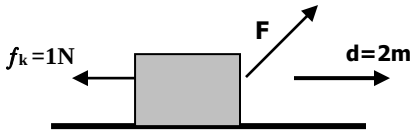
---

2. A force $\vec{F} = 3\hat{i} + 5\hat{j}$ is applied to a block that moves a distance $\vec{d} = 2\hat{i}$ on a surface. The **work** done on the block **by the force F** is:

(a) 6 J (b) 10 J (c) 16 J (d) 11.7 J

---

3. In the figure the force F moved the block a distance d, the **work** done on the block **by the frictional force** is:



(a) 2 J (b) 0 (c) -1 J (d) - 2 J

---

4. Which of the following particles that moves along the x-axis has a **negative work done on it** ?

Particle	K_i (initial KE)	K_f (final KE)
A	9 J	4 J
B	4 J	4 J
C	5 J	8 J
D	3 J	Zero

(a) **A** and **D** (b) **B** and **C** (c) **C** and **D** (d) **D** and **B**

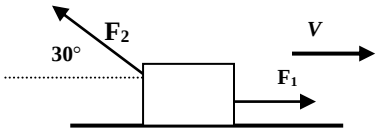
---

5. The work done by the gravitational force on a **5 kg** body raised vertically (رفع إلى أعلى) a distance **0.5 m** is:

(a) + 24.5 J (b) + 2.5 J (c) – 24.5 J (d) – 2.5 J

---

6. The **power** due to **F_1** and **F_2** acting on a box sliding **to the right** across a frictionless floor with velocity **v** is:



(a) $P_1 = F_1 v \cos 180$
$P_2 = F_2 v \cos 150$

(b) $P_1 = F_1 v \cos 180$
$P_2 = F_2 v \cos 30$

(c) $P_1 = F_1 v \cos 0$
$P_2 = F_2 v \cos 30$

(d) $P_1 = F_1 v \cos 0$
$P_2 = F_2 v \cos 150$

---

7. In which of the following situation the **net power = zero ?**

situation	P_1	P_2	P_3
A	**12**	**5**	**-7**
B	**-13**	**3**	**-2**

اعداد : أ. مها دفتردار

أ. خديجة سعيد

C	**15**	**-12**	**-3**
D	**10**	**2**	**-7**

(a) **A** (b) **B** (c) **C** (d) **D**

---

8. A spring of **k = 408 N/m** is pulled to the position **x = 17 mm**, the **work done by the spring force** is:

(a) -5.9×10^{-2} J (b) -59×10^{-2} J (c) -0.59×10^{-2} J (d) -590×10^{-2} J

---

9. If the kinetic energy of a particle is **initially 5 J** and there is a net transfer of **2 J to the particle**, then the **final kinetic energy** is :

(a) 3 J (b) 7 J (c) 5 J (d) 2.5 J

---

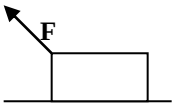
10. Which of the following bodies has the **largest kinetic energy** ?

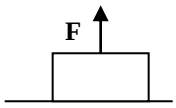
Body	Mass (kg)	Velocity(m/s)
A	**3 m**	**V**
B	**3 m**	**2 V**
C	**2 m**	**3 V**
D	**m**	**4 V**

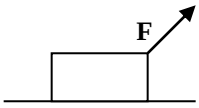
(a) body A (b) body B (c) body C (d) body D

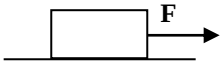
---

11. A force **F** acts on a box that **slides to the right** a distance **d** across a **frictionless** floor. In which situatin of the following the **work done** by this force on the box is **zero** ?

(a) 

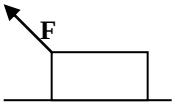
(b) 

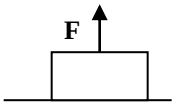
(c) 

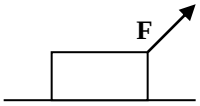
(d) 

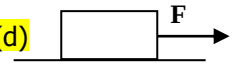
---

12. In **question 11**, which figure gives **W = F d** ?

(a) 

(b) 

(c) 

(d) 

---

13. Which of the following is the correct **unit of work** ?

(a) $N.m^2$ (b) $N^2.m$ (c) Joule (d) Joule.m

---

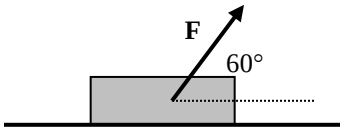
14. A particle moves through a **displacement** $\vec{d} = (15m)\hat{i} - (12m)\hat{j}$ along a straight line while being acted on by a **force** $\vec{F} = (210N)\hat{i} - (150N)\hat{j}$. **The work** done on the particle by this force is:

(a) 4950 J (b) 1350 J (c) 3150 J (d) 1800 J

اعداد : أ. مها دفتردار

أ. خديجة سعيد

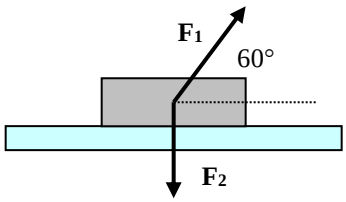
15. The figure shows a force **F** applied to a box that **moves to the right** for a **distance d** over a frictionless floor. The **work done on the box** by the force **F** is:



(a) F cos 60 (b) F d cos 60 (c) F sin 60 (d) F d sin 60

---

16. The figure shows two forces applied to a box that **moves to the right** for a **distance of 3 m** over a frictionless floor. The force magnitudes are **F_1=9 N , F_2=3 N**. What is the **work done on the box** by the force **F_1**?



(a) 23.4 J (b) zero (c) 13.5 J (d) 27 J

---

17. In **question 16**, what is the work done by the force **F_2?**

(a) 23.4 J (b) zero (c) 13.5 J (d) 9 J

---

18. A force $\vec{F}$ acts on a box that **slides to the right** a distance d across a **frictionless** floor. In which situation of the following the **work done** by this force on the box is **zero**?

(a) The angle between $\vec{F}$ and $\vec{d}$ is 150° (b) The angle between $\vec{F}$ and $\vec{d}$ is 90° (c) The angle between $\vec{F}$ and $\vec{d}$ is 45° (d) The angle between $\vec{F}$ and $\vec{d}$ is 0°

---

19. In **question 18**, which situation gives **W = F d**?

(a) The angle between $\vec{F}$ and $\vec{d}$ is 150° (b) The angle between $\vec{F}$ and $\vec{d}$ is 90° (c) The angle between $\vec{F}$ and $\vec{d}$ is 45° (d) The angle between $\vec{F}$ and $\vec{d}$ is 0°

---

20. A particle moves through a **displacement** $\vec{d} = -4\hat{i}$ meter along a straight line while being acted on by a **force** $\vec{F} = 2\hat{i} - 3\hat{j}$ Newton. **The work** done on the particle by this force is:

(a) +2 J (b) – 4 J (c) +5 J (d) – 8 J

---

21. Two men sliding a box of mass **m** a displacement **d** along the x-axis, if the work done by the first man was **W_1= 60 J**, and the net work on the box was **W=120 J**. What is the work **W_2** done by the second man?

(a) W_2= 0 (b) W_2= 60 J (c) W_2= 120 J (d) W_2= 180 J

---

22. In **question 21**, What is the work done on the box (**W_g**) by the **gravitational force**?

(a) 0 (b) 60 J (c) 120 J (d) 180 J

اعداد : أ. مها دفتردار
أ. خديجة سعيد

23. In **question 21**, if the box was initially **stationary**, what is its speed v_f at the end of the displacement?

(a) $v_f = \sqrt{\frac{2W}{m}}$ (b) $v_f = \sqrt{\frac{m}{2W}}$ (c) $v_f = \sqrt{\frac{2m}{W}}$ (d) $v_f = \sqrt{\frac{W}{2m}}$

24. Which of the following bodies has the **smallest kinetic energy** ?

Body	Mass(kg)	Velocity(m/s)
A	**3 m**	**1 V**
B	**3 m**	**2 V**
C	**2 m**	**3 V**
D	**1 m**	**4 V**

(a) body A (b) body B (c) body C (d) body D

25. A block lies on a frictionless floor attached to a spring of **spring constant k=408 N/m, how much work** does the spring force do on the block if it is pulled from $\mathbf{x_1=0}$ to $\mathbf{x_2=10\ mm}$?

(a) – 0.03 J (b) – 0.02 J (c) – 0.04 J (d) – 0.05 J

26. A block of weight **100 N** lifted up **1 m** by a man, **the work done by the gravitational force** on it is:

(a) 100 J (b) – 100 J (c) 10.2 J (d) -10.2 J

27. A block is pulled at a **constant speed of 2 m/s** across a horizontal floor by an applied force of **2 N** directed **60°** above the horizontal. **What is the power acting on the block due to the force**?

(a) 2 Watt (b) 3 Watt (c) 4 Watt (d) 6 Watt

اعداد : أ. مها دفتردار
أ. خديجة سعيد

CHAPTER 9

28. In the **closed** and **isolated** system :

(a) mass = constant
$F_{external}$ = zero

(b) mass = zero
$F_{external}$ =constant

(c) mass = constant
$F_{external}$ =constant

(d) mass = zero
$F_{external}$ = zero

---

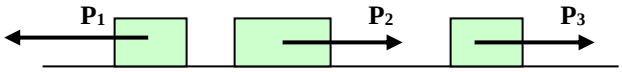
29. **How fast** would a man of mass 80 kg have to run to have the **same linear momentum** as a **1600 kg** car moving at **1.2 km/h**?

(a) 0.24 km/h (b) 2.4 km/h (c) 24 km/h (d) 240 km/h

---

30. A box sliding along x-axis on a frictionless surface, suddenly **explodes** into three pieces.The figure shows the momenta of the three pieces, **find the initial momentum** of the box?

P_1 = 10 kg m/s
P_2 = 2 kg m/s
P_3 = 6 kg m/s



(a) – 18 kg m/s (b) 18 kg m/s (c) 2 kg m/s (d) – 2 kg m/s

---

31. A **2 kg** body moving with velocity **3 m/s** and a **3 kg** body moving with velocity **of 1 m/s** in the opposite direction along the **x-axis**. **Find** the magnitude of the **total linear momentum** of the system of the two bodies?

(a) 3 kg m/s (b) 9 kg m/s (c) 8 kg m/s (d) 2 kg m/s

---

32. A box of mass **m=6 kg** slides with velocity **v= +4 m/s** across a frictionless floor suddenly explodes into two pieces. One piece **m_1=2 kg** moves with velocity **v_1=+8 m/s**. **What is** the **velocity v_2 of the second piece m_2**?

(a) 24 m/s (b) 16 m/s (c) 8 m/s (d) 2 m/s

اعداد : أ. مها دفتردار
أ. خديجة سعيد