Jeddah University

PHYSICES (110)

Final Exam
(1439)

Mahmoud Al-Zamil 0508601922

(1) S → m/s (B) ✓

---

(2) (B) speed not basic

---

(3) $|B| = \sqrt{x^2 + y^2}$

$|B| = \sqrt{(-6)^2 + (9)^2} = 10.8$ m

(C)

---

(4) $A = i + 2j + 2k$

$B = 2i - j + 6k$

$A \cdot B = 2 - 2 + 12 = 12$ (A) ✓

---

(5) $|A| = \sqrt{1+1} = \sqrt{2}$

$\theta = \cos^{-1}\left(\frac{z}{|A|}\right)$

$\theta = \cos^{-1}\left(\frac{1}{\sqrt{2}}\right)$ $\theta = 45°$ (A)

⑥ $t = 12\ s$

$v_0 = 0\ m/s$ $a = ?$

$v = 48\ m/s$

$$v = v_0 + at$$

$48 = 0 + 12a$

$a = \frac{48}{12} = 4\ m/s^2$ Ⓒ

---

⑦ constant speed سرعة ثابتة

$a = 0$

Ⓓ

---

⑧ $\Delta r = r_2 - r_1$

$= 3i + 4j + 3k - (2i + 2j + 4k)$

$= i + 2j - k$ Ⓓ

---

⑨ $v_0 = 8\ m/s$

$\theta = 45°$

$R_{max} = \frac{v_0^2}{g}$ $R_{max} = \frac{(8)^2}{9.8} = 6.53$

Ⓒ

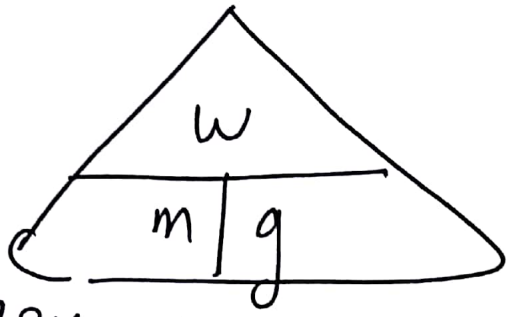
(10) (a) $V \perp a$ circular motion

---

(11) (c) $F_{net} = m \times a$ Newton's 2nd law

---

(12)



$w = mg$

$w = 80 \times 9.8 = 784$ N (c)

---

(13) (c) $F_f \propto N$ Normal force.

---

(14) $k = \frac{1}{2}mv^2$

$25 = \frac{1}{2} \times 6 \times v^2$

$v = 2.9$ m/s (d)

---

(15) $P = \frac{w}{t}$ $P = \frac{60}{5} = 12$ watt (c)

(16) $U_g = mgh$ $U_g = 5 \times 9.8 \times 20$

$= 980$ J

(C)

---

(17) $h = 10 - 5 = 5$ m

$v = \sqrt{2gh}$

$v = \sqrt{2 \times 9.8 \times 5}$ $v = 9.89$ m/s

(B)

---

(18) $m = 70$ kg $v = 45$ m/s

$p = mv$ $p = 70 \times 45$

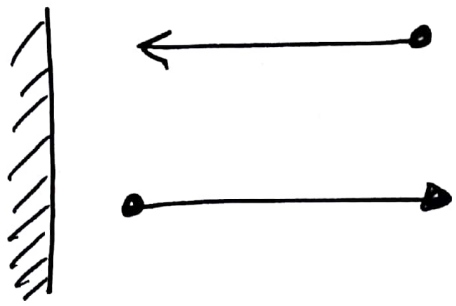
$= 3150$ kg·m/s

(C)

---

(19)

(19)



$m = 0.4$ kg

$v_i = -30$ m/s

$v_f = 20$ m/s

$$J = m(v_f - v_i)$$

$J = 0.4(20 + 30) = +20$ kg·m/s

(B) ← Right

---

(20) $J = m(v_f - v_i)$

$v_i = -35$ m/s

$v_f = 12$ m/s

$t = 60 \times 10^{-3}$ s

$F \times \Delta t = m(v_f - v_i)$

$F \times 60 \times 10^{-3} = 200(12 + 35)$

$F = 157$ N (a) ←

---

(21) (B) P and K are conserved

---

(22) $m_1 = 4\ kg$ $v_1 = 1.8\ m/s$ $v_1' = 0.6$

$m_2 = 6\ kg$ $v_2 = 0.2\ m/s$ $v_2' = 1.4$

ليست التصادم

not completely inelastic

$$K_i = \frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2'$$

$$= \frac{1}{2} \times 4 \times 1.8^2 + \frac{1}{2} \times 6 \times 0.2^2 = 6.6\ J$$

$$K_f = \frac{1}{2} m_1 v_1' + \frac{1}{2} m_2 v_2'$$

$$= \frac{1}{2} \times 4 \times 0.6^2 + \frac{1}{2} \times 6 \times 1.4^2 = 6.6\ J$$

$\Sigma K_i = \Sigma K_f$ (a) ←

---

(23)

m	X	y
$m_1 = 2$	0	0
$m_2 = 9$	1	2
$m_3 = 6$	5	1

$$X = \frac{2\times 0 + 9\times 1 + 6\times 5}{2+9+6} = 2.29 \text{ m}$$

$$y = \frac{2\times 0 + 9\times 2 + 6\times 1}{2+9+6} = 1.41 \text{ m}$$

$$= (2.29, 1.41) \text{ m}$$ (d)

---

(25) $\theta = \theta^{\circ} \times \frac{2\pi}{360}$

$$\theta = 120 \times \frac{2\pi}{360} = \frac{2\pi}{3} \text{ rad}$$

---

(26) $\boxed{\theta = 2t^3}$

$t = 5 \quad \theta = 2(5)^3 = 250 \text{ rad}$

(B)

---

(27)

$$\omega = \frac{\theta_2 - \theta_1}{t_2 - t_1}$$

$t_1 = 2$ $\quad \theta_1 = 2(2)^3 = 16$ rad

$t_2 = 7$ $\quad \theta_2 = 2(7)^2 = 686$ rad

$$\omega = \frac{\theta_2 - \theta_1}{t_2 - t_1} = \frac{686 - 16}{7 - 2}$$

$\omega = 134$ rad/s

(B)

---

(28) $v = 1$ cm/s $\quad \omega = 7.2$ rev/min

$$\omega = 7.2 \times \frac{2\pi}{60} = 0.785 \text{ rad/s}$$

$$r = \frac{v}{\omega} = \frac{1}{0.785}$$

$r = 1.274$ cm

radius $= 2r = 2 \times 1.274$

$= 2.55$ cm

(a)

[illegible] $F = 900\ N$ $\ell = 0.80\ m$

$\theta = 19°$

(i) $\tau = F\ell\cos(\theta)$

$= 900 \times 0.80 \cos(19)$

$= 681\ N \cdot m$

(ii) Direction is ⊙ out of the page

([illegible])

---

(4) $m = 0.25\ kg$ $t = 5\ s$

$r = 3\ m$

$v = 6t^2$

$t = 5$ $v = 6 \times (5)^2 = 150\ m/s$

$L = mvr$

$L = 0.25 \times 150 \times 3 = 112.5\ kg \cdot m^2/s$

(9)