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1. $P = e\sigma^{l} T^{m} A^{n}$

$\sigma = [M T^{-3} \theta^{-4}]$

ditanyakan:
Tentukan nilai l, m, n!
Nyatakan kembali persamaan diatas dgn memasukkan nilai l, m, n!

$[M][L]^{2}[T]^{-3} = e.([M T^{-3} \theta^{-4}])^{l}.[\theta]^{m}.([L]^{2})^{n}$

$[M][L]^{2}[T]^{-3} = e.[M]^{l}.[T]^{-3l}.[\theta]^{-4+m}.[L]^{2n}$

$[M] : 1 = 1l$

$l = 1/1 = 1$

$[L] : 2 = 2n$

$n = \frac{2}{2} = 1$

$[T] : -3 = -3l$

$l = \frac{-3}{-3} = 1$

$[\theta] : 0 = -4 + m$

$m = 4$

$l = 1 + 1 = 2$

$m = 4$

$n = 1$

$P = e.\sigma^{2}.T^{4}.A^{1}$

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2. $T = (M^{-1} L^3 T^{-2})$

$= M^1 L^3 T^{-2}$

$T = M \frac{\sqrt{3}}{6}$

* Dari dimensi M: $M = 1$

* Dari dimensi T: $1 = -2z$, $z = -\frac{1}{2}$

* Dari dimensi L: $L = 3$

3. Dik: $F1 = 20\,N$

$F2 = 15\,N$ 53°

$F3 = 25\,N$ 37°

$F_{1x} = 20\,N$

$F_{2x} = -15\,N \cdot \cos(53)^\circ$

$= -9{,}027\,N$

$F_{3x} = -25\,N \cdot \cos(37)^\circ$

$= -19{,}966\,N$

$F_{1y} = 0\,N$

$F_{2y} = -15\,N \cdot \sin(53)^\circ$

$= -11{,}979\,N$

$F_{3y} = 25\,N \cdot \sin(37)^\circ$

$= 15{,}045\,N$

$\Sigma F_x = 20 + (-9{,}027) + (-19{,}966) = -8{,}993\,N$

$\Sigma F_y = 0 + (-11{,}979) + 15{,}045 = 3{,}066\,N$

$R = \sqrt{Fx^2 + Fy^2}$ | $= \sqrt{80{,}874 + 9{,}4}$ | $= 9{,}501\,N$

$= \sqrt{(-8{,}993)^2 + (3{,}066)^2}$ | $= \sqrt{90{,}274}$

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4. Diket:

$F1 = 20N$

$F_2 = 15N \quad 60^\circ$

$F3 = 25N$

$f1x = 20N$

$f2x = -15N \cdot \cos(60)^\circ = -7,5\ N$

$F3x = -25N$

$F1y = 0\ N$

$F_{2y} = -15N \cdot \sin(60)^\circ = -12,990\ N$

$F_{3y} = 0N$

$\Sigma\ Fx = 20N + (-7,5)N + (-25)N = -12,5N$

$\Sigma\ Fy = 0N + -12,990N + 0N = -12,990N$

$R = \sqrt{Fx^2 + Fy^2}$

$= \sqrt{(-12,5)^2 + (-12,990)^2}$

$= \sqrt{156,25 + 168,74}$

$= \sqrt{324,99}$

$= 18,027\ N$

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5. a. $F = m.a$
$= 5.2$
$= 10\ N$

b. perkalian skalar = gaya x perpindahan
$= 10 \times$ titik B (40, 50, 15) - titik A (20, 30, 10)
$= 10 \times (20, 20, 5)$
$= 10 \times (20.20.5)$
$= 10 \times ((20.\cos 60°), (20.\cos 60°), (5.\cos 45°))$
$= 10 \times (10, 10, 3{,}54)$
$= (100, 100, 35{,}4)$
$= 235{,}4\ N$

6. a. $P = m \times v$
$= 5kg.10m/s$
$= 50\ kg\ m/s$

b. $L = \vec{r} \times p$

titik A = (10, 17,5)
titik B = (15, 20, 15)

$= \sqrt{(15-10)^2 + (20-17)^2 + (15-5)^2} \times 50$

$= \sqrt{25 + 9 + 100} \times 50$

$= \sqrt{134} \times 50$

$= 50\sqrt{134}$

7. Diket: $a(t) = (5t+3)\ m/s^2$
$v_0 = 15\ m/s$
$x_0 = 5m$

* cari vektor kecepatan

$v = v_0 + \int a.dt$
$= 15 + \int 5t+3\ dt$
$= 15 + \frac{5t^2}{2} + 3t$

$v = \frac{5}{2}t^2 + 3t + 15\ m/s$

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* cari vektor perpindahan

$$x = x_0 + \int v\,dt$$

$$= 5 + \int \frac{5}{2}t^2 + 3t + 15$$

$$= 5 + \frac{5}{3}t^3 + \frac{3}{2}t^2 + 15t$$

$$= \frac{5}{3}t^3 + \frac{3}{2}t^2 + 15t + 5 \text{ m}$$

* cari perpindahan detik ke-1

$$x(1) = \frac{5}{3}(1)^3 + \frac{3}{2}(1)^2 + 15(1) + 5$$

$$= \frac{5}{3} + \frac{3}{2} + 15 + 5$$

$$= \frac{10 + 9 + 90 + 30}{6}$$

$$= \frac{139}{6} \text{ M}$$

* cari perpindahan detik ke-6

$$x(6) = \frac{5}{3}(6)^3 + \frac{3}{2}(6)^2 + 15(6) + 5$$

$$= \frac{5}{\cancel{3}} \cdot \overset{72}{\cancel{216}} + \frac{3}{\cancel{2}} \cdot \overset{18}{\cancel{36}} + 15 \cdot 6 + 5$$

$$= 360 + 54 + 90 + 5$$

$$= 509 \text{ m}$$

* cari kecepatan rata-rata

$$v = \frac{\Delta x}{\Delta t}$$

$$= \frac{x_2 - x_1}{t_2 - t_1}$$

$$= \frac{509 - 139/6}{6 - 1}$$

$$= \frac{\frac{3054 - 139}{6}}{5}$$

$$= \frac{2915}{\frac{6}{5}}$$

$$= \frac{583}{6}$$

$$= 97,1667 \text{ m/s}$$

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diket:

8. $v = 14\ m/s$

$h = 1,2\ m$

$s = 6,857\ m$

$$t = \sqrt{\frac{2h}{g}}$$

$$= \sqrt{\frac{2.1,2}{10}}$$

$$= 0,4898\ s$$

$$s = v \times t$$

$$= 14\ m/s \times 0,4898\ s$$

$$= 6,857\ m$$

9. * $t = \frac{s}{V_0 . \cos\theta}$

$= \frac{12}{V_0 . \cos(37)^\circ}$

$= \frac{12}{(V_0 . 0,8)}$

$= \frac{15\ m}{V_0}$

* $h = V_0 y t - \frac{1}{2} . g . t^2$

$= V_0 . \sin(37)^\circ . t - \frac{1}{2} . 10 . t^2$

$3,5 = V_0 . 0,6 . t - 5 . t^2$

$5 . t^2 - V_0 . 0,6 . t + 3,5 = 0$

* $5 . \left(\frac{15}{V_0}\right)^2 - V_0 . 0,6 \left(\frac{15}{V_0}\right) + 3,5 = 0$

$5 . \frac{225}{V_0^2} - V_0 . \frac{9}{V_0} + 3,5 = 0$

$\frac{1125}{V_0^2} - 5,5 = 0$

$-5,5 = -\frac{1125}{V_0^2}$