

PENYELESAIAN LENGKAP SOALAN PENGIRAAN

PRAKTIS 1

$$17 \text{ A} \quad \text{Kecerunan/Gradient, } = \frac{8-3}{5-0} \\ = 1.0 \text{ m s}^{-2}$$

$$18 \text{ B} \quad v = \frac{1}{2}(1+5)(8) = 24 \text{ m s}^{-1}$$

$$19 \text{ D} \quad E_1 = \frac{1}{2}m(2v)^2 \\ E_1 = 4\left(\frac{1}{2}mv^2\right)$$

$$E_1 = 4E \\ 20 \text{ B} \quad T^2 = 18 \text{ s}^2 \\ T = \sqrt{18} \text{ s}^2 \\ T = 4.24 \text{ s}^2$$

PRAKTIS 2

$$6 \text{ A} \quad 5 \text{ mins} = \frac{1}{12} \text{ jam/hours}$$

$$D = vt$$

$$D = 85\left(\frac{1}{12}\right)$$

$$D = 7.10 \text{ km}$$

$$7 \text{ C} \quad 3^2 + 4^2 = 5^2$$

$$\text{Laju/speed} = \frac{3+4}{5 \text{ s}} = 1.4 \text{ cm s}^{-1}$$

$$\text{Halaju/velocity} = \frac{5}{5 \text{ s}} = 1 \text{ cm s}^{-1}$$

$$8 \text{ D} \quad 10 \text{ min} = \frac{1}{6} \text{ jam/hours}$$

$$a = \frac{v-u}{t}$$

$$a = \frac{10-80}{\frac{1}{6}}$$

$$a = -420 \text{ km j}^{-2}$$

$$9 \text{ D} \quad v = \frac{50 \text{ cm}}{12(0.02) \text{ s}} \\ v = 208.33 \text{ cm s}^{-1}$$

$$14 \text{ C} \quad s = \frac{1}{2}(v+u)(t) \\ s = \frac{1}{2}(160+0)\left(\frac{1}{2}\right) \\ s = 40 \text{ km}$$

$$15 \text{ C} \quad v = u + at \\ v = 0 + 5(5 \times 60) \\ v = 15 \text{ m s}^{-1}$$

$$16 \text{ A} \quad s = ut + \frac{1}{2}at^2 \\ 20 = (10 \times 1000 \div 60 \div 60)(60) + \frac{1}{2}a(60)^2 \\ a = -0.082 \text{ m s}^{-2}$$

$$\text{Nyahpecutan/Deceleration} = 0.082 \text{ m s}^{-2}$$

$$17 \text{ C} \quad v^2 = u^2 + 2as \\ 4^2 = 3^2 + 2(0.5)s \\ s = 7 \text{ m}$$

$$24 \text{ A} \quad v = \frac{d}{t} \\ 2d = 342 \times 2 \\ d = 342 \text{ m}$$

$$25 \text{ D} \quad s = ut + \frac{1}{2}at^2 \\ s = 0 + \frac{1}{2}(8)(15)^2 \\ s = 900 \text{ m}$$

$$26 \text{ D} \quad \text{Luas graf} = \text{Perubahan sesaran} \\ \text{Luas di bawah garis A} = \text{Luas di bawah garis B dari} \\ \text{masa} = 0 \text{ hingga masa} = t \\ \text{Area of the graph} = \text{Change of displacement} \\ \text{Area under the line A} = \text{Area under the line B from} \\ \text{time} = 0 \text{ to time} = t \\ \frac{1}{2}(15)(t) = \frac{1}{2}(t-5+t)(8) \\ 15t = 16t - 40 \\ t = 40 \text{ s}$$

$$28 \text{ B} \quad v = u + gt \\ 0 = 5 + (-2)t \\ t = 2.5 \text{ s} \\ \text{Masa yang diambil untuk kembali ke posisi asal/} \\ \text{Time taken to return to initial position} = 2t \\ = 5 \text{ s}$$

$$35 \text{ D} \quad m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2 \\ m_1v_1 + m_2v_2 = 0.5(8) + 0.2(10) \\ m_1v_1 + m_2v_2 = 6 \text{ kg m s}^{-1}$$

$$36 \text{ B} \quad m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2 \\ m_1u_1 + m_2u_2 = 0 \\ 20(3) = 35v \\ v = 1.7 \text{ m s}^{-1}$$

$$40 \text{ C} \quad F = m\left(\frac{v-u}{t}\right) \\ F = 10\left(\frac{0-2}{3}\right) \\ F = -7 \text{ N}$$

41 C $F = ma$
 $F = 25(2)$
 $F = 50 \text{ N}$

42 A $65 - 5g = 5a$
 $a = \frac{65 - 50}{5}$
 $a = 3 \text{ m s}^{-2}$

43 B $F = 2ma_2$
 $F = 2m\left(\frac{1}{2}a\right)$

45 B $Ft = mv - mu$
 $Ft = 0.05(15) - 0.05(6)$
 $Ft = 0.5 \text{ N s}$

46 C $F = \frac{mv - mu}{t}$
 $F = \frac{0 - 1(5)}{1}$
 $F = -5 \text{ N}$

48 C $W = mg$
 $g = \frac{750}{6}$
 $g = 12.5 \text{ m s}^{-2}$
 $g_{\text{ex}} = 12.5 - 10$
 $= 2.5 \text{ m s}^{-2}$
 $g_{\text{lift}} = -2.5 \text{ m s}^{-2}$

PRAKTIS 3

6 B $F = \frac{Gm_1m_2}{r^2}$
 $F = \frac{6.67 \times 10^{-11} (2.5)(5.97 \times 10^{24})}{(6 \times 10^6)^2}$
 $F = 27.65 \text{ N}$

7 D $F = \frac{Gm_1m_2}{r^2}$
 $F = \frac{6.67 \times 10^{-11} (m_1)(5.97 \times 10^{24})}{(7 \times 10^6)^2}$,
 m_1 merupakan jisim kapal terbang
 m_1 is the mass of the aeroplane
 $m_1 = 92\,906 \text{ kg}$

8 C $F = \frac{Gm_1m_2}{r^2}$
 $F = \frac{6.67 \times 10^{-11} (1.5 \times 10^3)(5.97 \times 10^{24})}{2.2 \times 10^4}$
 $r^2 = 2.71 \times 10^{13}$
 $r = 5.21 \times 10^6 \text{ m}$

11 A $F = \frac{GMm}{r^2}$
 $F = \frac{6.67 \times 10^{-11} (5.97 \times 10^{24})(2.4 \times 10^3)}{(6.47 \times 10^6)^2}$
 $F = 2.4 \times 10^4 \text{ N}$

13 A $F \propto \frac{1}{r^2}$
 $F_{\text{new}} = \frac{1}{3^2} (F)$
 $F_{\text{new}} = \frac{1}{9} (9 \times 10^6)$
 $F_{\text{new}} = 1 \times 10^6 \text{ N}$

14 B $g \propto \frac{M}{r^2}$
 $g_{\text{new}} = \frac{\frac{1}{10}M}{\left(\frac{1}{2}\right)^2}$
 $g_{\text{new}} = 0.4\left(\frac{M}{r^2}\right)$
 $g_{\text{new}} = 0.4g$
 $g_{\text{new}} = 0.4(9.81)$
 $g_{\text{new}} = 3.92$

17 B $g = \frac{GM}{r^2}$
 $g = \frac{6.67 \times 10^{-11}(5.97 \times 10^{24})}{(6.37 \times 10^6)^2 + (300 \times 10^3)^2}$
 $g = 8.95 \text{ m s}^{-2}$

20 B $F = \frac{mv^2}{r}$
 $F = \frac{(10)(2)^2}{1}$
 $F = 40 \text{ N}$

22 A $a = \frac{v^2}{r}$
 $a = \frac{(8.85 \times 10^3)^2}{(545 \times 1^3) + (6.37 \times 10^6)}$
 $a = 11.32 \text{ m s}^{-1}$

23 B $T^2 \propto R^3$
 $\left(\frac{T}{T'}\right)^2 = \left(\frac{R}{4R}\right)^3$
 $\left(\frac{T}{T'}\right)^2 = \frac{1}{64}$
 $\frac{T}{T'} = \frac{1}{8}$
 $T' = 8T$

31 C $T^2 \propto R^3$
 $\left(\frac{T}{T'}\right)^2 = \left(\frac{\frac{1}{2}r_M}{r_M}\right)^3$
 $T = \frac{1}{\sqrt{8}}T_M = 0.35T_M$

36 D $v^2 = \frac{GM}{r}$
 $v^2 = \frac{6.67 \times 10^{-11}(5.97 \times 10^{24})}{(6.37 \times 10^6)^2 + (150 \times 10^3)^2}$
 $v = 6.1 \times 10^7 \text{ m s}^{-1}$

$$36 \text{ C} \quad v^2 \propto \frac{M}{r}$$

$$\frac{v^2}{vr^2} = \frac{\frac{M}{r}}{\frac{100M}{4r}}$$

$$\frac{8^2}{vr^2} = \frac{4}{100}$$

$$v'^2 = 40 \text{ km s}^{-1}$$

PRAKTIS 4

$$12 \text{ B} \quad T = 80 \times \frac{5.5 \text{ cm}}{16 \text{ cm}}$$

$$T = 27.5^\circ\text{C}$$

$$17 \text{ C} \quad Q = c\theta$$

$$c = \frac{80}{2}$$

$$c = 40 \text{ J }^\circ\text{C}^{-1}$$

$$18 \text{ B} \quad c = \frac{1000}{5} = 200 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$$

$$Q = mc\theta$$

$$Q = 1(200)(3)$$

$$= 600 \text{ J}$$

$$24 \text{ B} \quad Q = Pt$$

$$Q = 20(10 \times 60)$$

$$Q = 12\,000 \text{ J}$$

$$25 \text{ B} \quad Q = mc\theta$$

$$Q = 0.5(330)(80 - 25)$$

$$Q = 9\,075 \text{ J}$$

$$27 \text{ C} \quad Q = mc\theta$$

$$c = \frac{5\,000(15)}{1(10)}$$

$$c = 7\,500 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$$

$$28 \text{ B} \quad Q = mc\theta$$

$$c = \frac{3\,500(0.5 \times 60)}{1.5(25)}$$

$$c = 2\,800 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$$

$$29 \text{ C} \quad Q_1 = Q_2$$

$$m_1 c(95 - \theta) = m_2 c(\theta - 38)$$

$$0.3(95 - \theta) = 0.1(\theta - 38)$$

$$\theta = 80.75^\circ\text{C}$$

$$31 \text{ B} \quad Q = mc\theta$$

$$c = \frac{100(14 - 0)}{0.3(60 - 20)}$$

$$c = 117 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$$

$$45 \text{ B} \quad Q = ml$$

$$1\,800t = 0.4(2.26 \times 10^6)$$

$$t = 502 \text{ s}$$

$$t = 8.4 \text{ min}$$

$$47 \text{ D} \quad Q = ml + mc\theta$$

$$Q = 1.5(3 \times 10^5) + 1.5(2\,100)(0 - (-10))$$

$$+ 1.5(4\,200)(90)$$

$$Q = 1\,049 \times 10^3 \text{ J}$$

$$Q = 1\,049 \text{ kJ}$$

$$51 \text{ B} \quad \frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$\frac{1}{22.4 + 273} = \frac{P_2}{80 + 273}$$

$$P_2 = 1.19 \text{ atm}$$

PRAKTIS 5

$$7 \text{ B} \quad v = f\lambda$$

$$v = (0.05)(450)$$

$$v = 22.5 \text{ m s}^{-1}$$

$$8 \text{ A} \quad v = \frac{\lambda}{T}$$

$$T = \frac{4}{30}$$

$$T = 0.13 \text{ s}$$

$$13 \text{ C} \quad L = \frac{3}{2}\lambda$$

$$\lambda = \frac{3}{2}(75)$$

$$\lambda = 50 \text{ cm}$$

$$34 \text{ A} \quad x = \frac{\lambda D}{a}$$

$$x = \frac{(500 \times 10^{-9})(3)}{0.5 \times 10^{-3}}$$

$$x = 0.003 \text{ m} = 0.3 \text{ cm}$$

PRAKTIS 6

$$7 \text{ A} \quad n = \frac{\sin i}{\sin r}$$

$$n = \frac{\sin 15^\circ}{\sin 40^\circ}$$

$$n = 0.40$$

$$10 \text{ A} \quad \frac{\sin i}{\sin r} = 1.50$$

$$\frac{\sin(90^\circ - 65^\circ)}{\sin r} = 1.50$$

$$\sin r = 0.382$$

$$r = 22.5^\circ$$

$$11 \text{ A} \quad n = \frac{\text{dalam sebenar/real depth}}{\text{dalam ketara/apparent depth}}$$

$$1.33 = \frac{0.25}{h}$$

$$h = 0.19 \text{ m}$$

13 C $\frac{\sin i}{\sin r} = \frac{\text{dalam sebenar/real depth}}{\text{dalam ketara/apparent depth}}$
 $\frac{\sin 75^\circ}{\sin 46.6^\circ} = \frac{H}{15}$
 $H = 20 \text{ cm}$

18 B $n = \frac{1}{\sin r}$
 $\sin c = \frac{1}{2.42}$
 $c = 24.4^\circ$

28 D $\frac{\text{Saiz imej/Image size}}{\text{Saiz objek/Object size}} = \frac{\text{Jarak imej/Image distance, } v}{\text{Jarak objek/Object distance, } u}$
 $3 = \frac{c}{4 \text{ cm}}$
 $v = 12 \text{ cm}$

29 A $\frac{\text{Ketinggian imej/Image height, } h_i}{\text{Ketinggian objek/Object height, } h_o} = \frac{\text{Jarak imej/Image distance, } v}{\text{Jarak objek/Object distance, } u}$
 $2 = \frac{1.2 \text{ m}}{u}$
 $u = 0.6 \text{ m}$

30 D $\frac{\text{Ketinggian imej/Image height, } h_i}{\text{Ketinggian objek/Object height, } h_o} = \frac{\text{Jarak imej/Image distance, } v}{\text{Jarak objek/Object distance, } u}$
 $\frac{2.5 \text{ cm}}{7.5 \text{ cm}} = \frac{10 \text{ cm}}{u}$
 $u = 30 \text{ cm}$

31 D $\frac{\text{Ketinggian imej/Image height, } h_i}{\text{Ketinggian objek/Object height, } h_o} = \frac{\text{Jarak imej/Image distance, } v}{\text{Jarak objek/Object distance, } u}$
 $\frac{h_i}{0.5 \text{ cm}} = \frac{15 \text{ cm}}{10 \text{ cm}}$
 $h_i = 0.75 \text{ m} = 75 \text{ cm}$

32 D $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$
 $\frac{1}{u} + \frac{1}{1.5 \times 12} = \frac{1}{12}$
 $u = 36 \text{ cm}$

36 D $\text{Kuasa/Power} = \frac{1}{10 \text{ cm}} = \frac{1}{0.1 \text{ m}} = 10 \text{ D}$

38 B $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$
 $\frac{1}{12} + \frac{1}{15} = \frac{1}{f}$
 $f = 6.7 \text{ cm}$

40 B $\text{Pembesaran linear} = \frac{\text{Panjang fokus kanta objektif}}{\text{Panjang fokus kanta mata}}$
 $= \frac{\text{Kuasa kanta mata}}{\text{Kuasa kanta objektif}}$
 $\text{Linear magnification} = \frac{\text{Focal length of objective lens}}{\text{Focal length of eyepiece}}$
 $= \frac{\text{Power of eyepiece}}{\text{Power of objective lens}}$
 $\text{Pembesaran linear/Linear magnification} = \frac{50}{4}$
 $= 12.5$
 Teleskop membentuk imej maya, jadi pembesaran linear/Telescope forms virtual images, so linear magnification = -12.5

44 C $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$
 $\frac{1}{15} + \frac{1}{v} = \frac{1}{10}$
 $v = 30 \text{ cm}$

PENTAKSIRAN SUMATIF

5 C $a = \frac{v - u}{t}$
 $= \frac{10 - 40}{5}$
 $= \frac{-30}{5}$
 $= -6 \text{ m s}^{-2}$
 Tanda negatif menunjukkan nyahpecutan.
 Negative sign shows a deceleration.

10 C $a = \frac{v - u}{t}$
 $= \frac{20 - 0}{0.1}$
 $= \frac{20}{0.1}$
 $= 200 \text{ m s}^{-2}$
 $F = ma$
 $= 0.5(200)$
 $= 100 \text{ N}$

13 C $v^2 = u^2 + 2as$
 $0^2 = (26.7)^2 + 2(-9.81)s$
 $19.62s = 712.89$
 $s = \frac{712.89}{19.62}$
 $= 36.3 \text{ m}$

$$\begin{aligned}
 16 \text{ A } F &= G \frac{Mm}{r^2} \\
 &= \frac{(6.67 \times 10^{-11})(5.97 \times 10^{24})(1.00 \times 10^4)}{(4.20 \times 10^7)^2} \\
 &= \frac{3.98 \times 10^{18}}{1.764 \times 10^{15}} \\
 F &= 2.26 \times 10^3 \text{ N}
 \end{aligned}$$

$$\begin{aligned}
 19 \text{ A } F &= \frac{mv^2}{r} \\
 &= \frac{(0.5)(50^2)}{400} \\
 &= \frac{1\,250}{400} \\
 F &= 3.125 \text{ N}
 \end{aligned}$$

$$\begin{aligned}
 21 \text{ B } v_{\text{esc}} &= \sqrt{\frac{2GM}{R}} \\
 &= \sqrt{\frac{2(6.67 \times 10^{-11})(7.35 \times 10^{22})}{1.74 \times 10^6}} \\
 &= \sqrt{\frac{9.8019 \times 10^{12}}{1.74 \times 10^6}} \\
 &= \sqrt{5.632 \times 10^6} \\
 &= 2.37 \times 10^3 \text{ m s}^{-1}
 \end{aligned}$$

$$\begin{aligned}
 24 \text{ A } Q &= mc\theta \\
 Q_{\text{water}} &= Q_{\text{Aluminium}} \\
 (mc\theta)_{\text{water}} &= (mc\theta)_{\text{Aluminium}} \\
 (0.25)(900)(95 - \theta_f) &= (0.30)(4\,200)(\theta_f - 20) \\
 21\,375 - 225\theta_f &= 1\,260\theta_f + 25\,200 \\
 46\,575 &= 1\,485\theta_f \\
 \theta_f &= \frac{46\,575}{1\,485} \\
 &= 31.4^\circ \text{C}
 \end{aligned}$$

26 C Hukum Charles/Charles' Law

$$\begin{aligned}
 \frac{V_1}{T_1} &= \frac{V_2}{T_2} \\
 T_1 &= \frac{V_1}{V_2} \times T_2 \\
 &= \frac{30}{38}(100 + 273) \\
 &= 0.789 \times 273 \\
 T_1 &= 294.5 \text{ K} \\
 &= 21.47^\circ \text{C}
 \end{aligned}$$

$$\begin{aligned}
 29 \text{ A } v &= f\lambda \\
 \frac{v_1}{\lambda_1} &= \frac{v_2}{\lambda_2} \\
 v_1 &= v_2 \times \frac{\lambda_1}{\lambda_2} \\
 &= 6.0 \times \frac{1.5}{4.0} \\
 &= 2.3 \text{ cm s}^{-1}
 \end{aligned}$$

$$\begin{aligned}
 32 \text{ B } \lambda &= \frac{ax}{D} \\
 x &= \frac{\lambda D}{a} \\
 &= \frac{(4.0 \times 10^{-7})(2.0)}{2.5 \times 10^{-4}} \\
 &= 3.2 \times 10^{-3} \text{ m}
 \end{aligned}$$

$$\begin{aligned}
 34 \text{ B } n_1 \sin \theta_1 &= n_2 \sin \theta_2 \\
 1.33 \sin 35^\circ &= 1.00 \sin \theta_2 \\
 \sin \theta_2 &= 1.33 \times 0.5736 \\
 \theta_2 &= \sin^{-1}(0.763) \\
 &= 49.9^\circ
 \end{aligned}$$

$$\begin{aligned}
 35 \text{ B } \sin c &= \frac{n_2}{n_1} \\
 &= \frac{1.00}{1.52} \\
 \sin c &= 0.6579 \\
 c &= 41.1^\circ
 \end{aligned}$$

$$\begin{aligned}
 38 \text{ D } \frac{1}{f} &= \frac{1}{v} + \frac{1}{u} \\
 \frac{1}{15} &= \frac{1}{10} + \frac{1}{u} \\
 \frac{1}{u} &= \frac{1}{15} - \frac{1}{10} \\
 \frac{1}{u} &= -\frac{1}{30} \\
 u &= -30 \text{ cm}
 \end{aligned}$$

Tanda negatif bermaksud objek itu berada pada sisi yang sama dengan imej.
The negative sign means the object is on the same side as the image.