

Penerangan soalan yang melibatkan pengiraan

Explanation of questions that involve calculations

Praktis 1

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

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

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

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

Praktis 2

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

$$D = vt$$

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

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

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

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

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

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

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

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

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

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

$$14 \text{ C } s = \frac{1}{2}(v+u)(t)$$

$$s = \frac{1}{2}(160+0)\left(\frac{1}{2}\right)$$

$$s = 40 \text{ km}$$

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

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

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

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

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

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

$$26 \text{ D } \text{Luas graf} = \text{Perubahan sesaran} \\ \text{Luas di bawah garis A} = \text{Luas di bawah garis B dari} \\ \text{masa} = 0 \text{ hingga masa} = t \\ \text{Area of the graph} = \text{Change of displacement} \\ \text{Area under the line A} = \text{Area under the line B from} \\ \text{time} = 0 \text{ to time} = t$$

$$\frac{1}{2}(15)(t) = \frac{1}{2}(t-5+t)(8)$$

$$15t = 16t - 40$$

$$t = 40 \text{ s}$$

$$28 \text{ B } v = u + gt \\ 0 = 5 + (-2)t \\ t = 2.5 \text{ s}$$

$$\text{Masa yang diambil untuk kembali ke posisi asal/}$$

$$\text{Time taken to return to initial position} = 2t \\ = 5 \text{ s}$$

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

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

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

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

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

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

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

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

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

Praktis 4

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

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

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

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

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

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

$$Q = mc\theta$$

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

$$= 600 \text{ J}$$

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

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

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

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

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

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

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

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

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

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

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

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

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

$$m_1c(95 - \theta) = m_2c(\theta - 38)$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$n = 0.40$$

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

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

$$\sin r = 0.382$$

$$r = 22.5^\circ$$

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

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

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

$$13 \text{ C} \quad \frac{\sin i}{\sin r} = \frac{\text{dalam sebenar/real depth}}{\text{dalam ketara/apparent depth}}$$

$$\frac{\sin 75^\circ}{\sin 46.6^\circ} = \frac{H}{15}$$

$$H = 20 \text{ cm}$$

$$18 \text{ B} \quad n = \frac{1}{\sin r}$$

$$\sin c = \frac{1}{2.42}$$

$$c = 24.4^\circ$$

$$28 \text{ D} \quad \frac{\text{Saiz imej/Image size}}{\text{Saiz objek/Object size}} = \frac{\text{Jarak imej/Image distance, } v}{\text{Jarak objek/Object distance, } u}$$

$$3 = \frac{c}{4 \text{ cm}}$$

$$v = 12 \text{ cm}$$

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

$$2 = \frac{1.2 \text{ m}}{u}$$

$$u = 0.6 \text{ m}$$

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

$$\frac{2.5 \text{ cm}}{7.5 \text{ cm}} = \frac{10 \text{ cm}}{u}$$

$$u = 30 \text{ cm}$$

$$31 \text{ D} \quad \frac{\text{Ketinggian imej/Image height, } h_i}{\text{Ketinggian objek/Object height, } h_o} = \frac{\text{Jarak imej/Image distance, } v}{\text{Jarak objek/Object distance, } u}$$

$$\frac{h_i}{0.5 \text{ cm}} = \frac{15 \text{ cm}}{10 \text{ cm}}$$

$$h_i = 0.75 \text{ m} = 75 \text{ cm}$$

$$32 \text{ D} \quad \frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

$$\frac{1}{u} + \frac{1}{1.5 \times 12} = \frac{1}{12}$$

$$u = 36 \text{ cm}$$

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

$$38 \text{ B} \quad \frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

$$\frac{1}{12} + \frac{1}{15} = \frac{1}{f}$$

$$f = 6.7 \text{ cm}$$

$$40 \text{ B} \quad \text{Pembesaran linear} = \frac{\text{Panjang fokus kanta objektif}}{\text{Panjang fokus kanta mata}}$$

$$= \frac{\text{Kuasa kanta mata}}{\text{Kuasa kanta objektif}}$$

$$\text{Linear magnification} = \frac{\text{Focal length of objective lens}}{\text{Focal length of eyepiece}}$$

$$= \frac{\text{Power of eyepiece}}{\text{Power of objective lens}}$$

$$\text{Pembesaran linear/Linear magnification} = \frac{50}{4}$$

$$= 12.5$$

Teleskop membentuk imej maya, jadi pembesaran linear/Telescope forms virtual images, so linear magnification = -12.5

$$44 \text{ C} \quad \frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

$$\frac{1}{15} + \frac{1}{v} = \frac{1}{10}$$

$$v = 30 \text{ cm}$$

Pentaksiran Sumatif

$$2 \text{ C} \quad \text{Momentum, } p = mv$$

$$= 2 \text{ 500 kg } 22 \text{ m s}^{-1}$$

$$= 55 \text{ 000 kg m s}^{-1}$$

$$= 55 \text{ 000 N s}$$

$$4 \text{ A} \quad \rho = 3.72 \frac{\text{g}}{\text{cm}^3}$$

$$= 3.72 \frac{\text{g}}{\text{cm}^3} \times \left(\frac{1 \text{ kg}}{1 \text{ 000 g}} \right) \times \left(\frac{100 \text{ cm}}{1 \text{ m}} \right)^3$$

$$= 3 \text{ 720 kg m}^{-3}$$

$$= 3.72 \text{ 10 kg m}^{-3}$$

$$7 \text{ A} \quad u = 3 \text{ m s}^{-1}$$

$$g = -9.81 \text{ m s}^{-2}$$

$$v^2 = u^2 + 2gs$$

$$0^2 = 3^2 + 2(-9.81)s$$

$$s = \frac{3^2}{2(9.81)}$$

$$= 0.4587 \text{ m}$$

$$= 45.87 \text{ cm}$$

$$12 \text{ C} \quad m_1 = 0.08 \text{ kg} \quad m_2 = 2.0 \text{ kg}$$

$$v_1 = 100 \text{ m s}^{-1} \quad v_2 = ?$$

$$m_1 u_1 + m_2 u_2 = m_1 v_1 + m_2 v_2$$

$$0 = m_1 v_1 + m_2 v_2$$

$$m_1 v_1 = m_2 v_2$$

$$0.08(100) = -2v_2$$

$$v_2 = -4 \text{ m s}^{-1}$$

$$17 \text{ C} \quad \frac{T_1^2}{T_2^2} = \frac{r_1^3}{r_2^3}$$

$$\frac{20^2}{T_2^2} = \frac{(4r)^3}{r^3}$$

$$T_2 = 2.5 \text{ weeks}$$

19 D $\lambda = \frac{ax}{D}$
 $x = \frac{\lambda D}{a}$
 $\lambda = 7.0 \times 10^{-7} \text{ m}$
 $a = 0.5 \times 10^{-3} \text{ m}$
 $D = 3 \text{ m}$
 $x = \frac{7.0 \times 10^{-7}(3)}{0.5 \times 10^{-3}}$
 $= 4.2 \times 10^{-3} \text{ m}$

21 A $F = \frac{Gm_1m_2}{r^2} \quad r = R + h$
 $= \frac{(6.67 \times 10^{-11})(5.97 \times 10^{24})(11\,000)}{(6.37 \times 10^6 + 547 \times 10^3)^2}$
 $= 9.155 \times 10^4 \text{ N}$

24 C $n = 150 \quad i = 90^\circ - 30^\circ = 60^\circ$
 $n = \frac{\sin i}{\sin r}$
 $\sin r = \frac{\sin i}{n}$
 $= \frac{\sin 60}{1.50}$
 $r = 35^\circ$

26 B $L = f_o + f_e$
 $= 10 + 80 \text{ cm}$
 $= 90 \text{ cm}$

28 D $m = 1$ (cermin satah/plane mirror)
 $m = \frac{v}{u}$
 $m_A = \frac{v_A}{u_A}$
 $1 = \frac{v_A}{4}$
 $v_A = 4 \text{ m}$
 $\therefore 7 \text{ m} + 4 \text{ m} = 11 \text{ m}$

29 B $\frac{1}{f} = \frac{1}{u} + \frac{1}{v}$
 $-\frac{1}{15} = \frac{1}{30} + \frac{1}{v}$

$$v = -10 \text{ cm (imej maya/virtual image)}$$

$$m = \frac{v}{u}$$

$$= \frac{10}{15}$$

$$= 0.67$$

31 D $V = \pi r^2 L$
 $P_1 V_1 = P_2 V_2$
 $P_1 \pi r^2 L_1 = P_2 \pi r^2 L_2$
 $P_1 L_1 = P_2 L_2$
 $1(40) = P_2(40 - 17)$
 $P_2 = 1.74 \text{ atm}$

32 D $P_1 V_1 = P_2 V_2$
 $320(15) = 76 V_2$
 $V_2 = 63.15 \text{ cm}^3$

33 B $1 \text{ kg air pada } 25^\circ \text{C} \xrightarrow{Q_1 = mc\theta} 1 \text{ kg air pada } 100^\circ \text{C}$
 $\xrightarrow{Q_2 = ml} 1 \text{ kg wap air pada } 100^\circ \text{C}$
 $1 \text{ kg water at } 25^\circ \text{C} \xrightarrow{Q_1 = mc\theta} 1 \text{ kg water at } 100^\circ \text{C}$
 $\xrightarrow{Q_2 = ml} 1 \text{ kg vapour at } 100^\circ \text{C}$

$$Q = Q_1 + Q_2$$

$$= mc\Delta\theta + ml$$

$$= m(c\Delta\theta + l)$$

$$= 1[(4\,200)(100 - 25) + 2.26 \times 10^6]$$

$$= 2.6 \times 10^6 \text{ J}$$

36 A $Pt = ml_f$
 $P = \frac{ml_f}{t}$
 $= \frac{(20 \times 10^{-3})(3.36 \times 10^5)}{(2 \times 60)}$
 $= 56 \text{ W}$
 $= 56 \text{ J s}^{-1}$

39 A $2d = vt$
 $2(765) = 340t$
 $t = 4.5 \text{ s}$