

mcq
Grade 12

01) 04

$$02) E = \frac{hc (d_0 - d)}{d_0 d}$$

$$h = \frac{E d_0 d}{c (d_0 - d)}$$

$$= \frac{J m^2}{m s^{-1} m}$$

$$= J s$$

$$J s = kg m^2 s^{-2} \times s$$

$$= kg m^2 s^{-1}$$

$$J m^{-2} = kg m^2 s^{-2} \times m^{-2}$$

$$= kg s^{-2}$$

\therefore (3) b zok.

$$03) v^2 = at + \frac{b}{t+c}$$

$$a = \frac{v^2}{t}$$

$$= \frac{L^2 T^{-2}}{T}$$

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

$$t+c=1$$

$$c=T$$

$$\frac{b}{t+c} = v^2$$

$$b = v^2 t$$

$$= L^2 T^{-2} \times T$$

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

(2)

$$04) \text{ જીવાલ શ્રેણી} = \frac{1}{20} = 0.05 \text{ mm}$$

$$\text{ગરુણાલ} = (20-4) \times 0.05$$

$$= 16 \times 0.05$$

$$= 0.80 \text{ mm}$$

(01)

$$05) 2 + 35 \times 0.01$$

$$2.35 \text{ mm} + 2 \times 0.01$$

$$2.37 \text{ mm}$$

(03)

06) 04

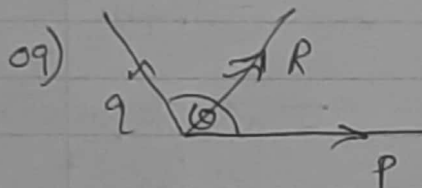
07) 03

08) නාභික රේඛාව = $\frac{කු.ච.}{නාභිකය}$

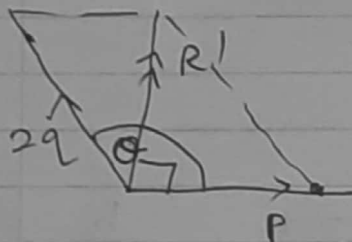
$$= \frac{n}{12h}$$

$$= \frac{1}{12}$$

(01)



$$R^2 = p^2 + q^2 + 2pq \cos \theta \quad \text{--- (1)}$$



$$R'^2 = (2q)^2 - p^2$$

$$= 4q^2 - p^2$$

$$R'^2 = p^2 + (2q)^2 + 2 \times p \times 2q \times \cos \theta$$

$$4q^2 - p^2 = p^2 + 4q^2 + 4pq \cos \theta$$

$$-2p^2 = 4pq \cos \theta$$

$$-p^2 = 2pq \cos \theta$$

① ඔ රේඛාව

$$R^2 = p^2 + q^2 + 2pq \cos \theta$$

$$= p^2 + q^2 - p^2$$

$$= q^2$$

$$\therefore R = q$$

(02)

⑩ (02)

ii) නාභික රේඛාව = $\frac{20+25}{300}$

$$= \frac{5}{300}$$

ඉලික්කර නැත.

19) පොලිස් නිලධාරියාගේ චේතය $V_p = 30 \times \frac{5}{18}$
 $= \frac{25}{3} \text{ m/s}$

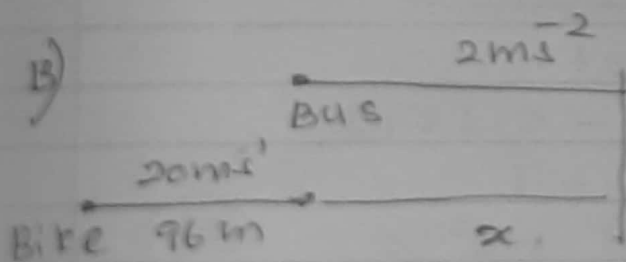
කාරයේ ~~චේතය~~ චේතය $V_T = 192 \times \frac{5}{18} = \frac{160}{3} \text{ m/s}$

පොලිස් රථයට කාණේනර චන්ද්‍රිකේ චේතය $= 150 \text{ m/s}$
 (V_b)

\therefore චන්ද්‍රිකේ චේතය $= 150 + V_p$
 $V_b = 150 + \frac{25}{3}$

$V(b, T) = V_b - V_T$
 $= 150 + \frac{25}{3} - \frac{160}{3}$
 $= 105 \text{ m/s}$

(04)



විෂයය , $s = ut + \frac{1}{2}at^2$
 $x = \frac{1}{2} \times 2 \times t^2 \quad \text{--- ①}$

ඔස්සිනමය $x + 96 = 20t \quad \text{--- ②}$

② - ① , $x + 96 - x = 20t - t^2$
 $96 = 20t - t^2$

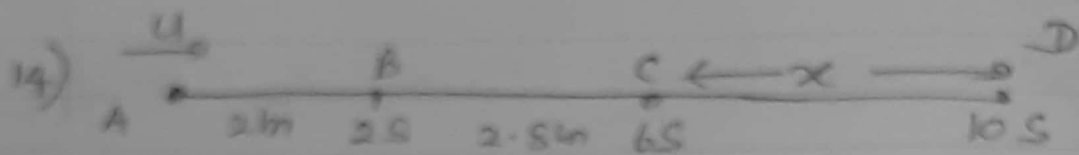
$t^2 - 20t + 96 = 0$

$t - 12t - 8t + 96 = 0$

$t[t - 12] - 8[t - 12] = 0$

$(t - 8)(t - 12) = 0$

$t = 8 / t = 12 \quad \text{② out ①}$



A-B, $s = ut + \frac{1}{2}at^2$
 $2 = 2t + \frac{1}{2} \times a \times 4$

$2 = 2t + 2a$
 $1 = t + a$ — (1)

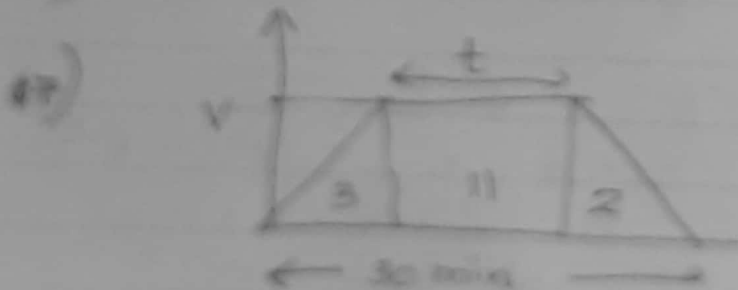
A-C, $s = ut + \frac{1}{2}at^2$
 $4.8 = 4u + \frac{1}{2} \times a \times 36$
 $4.8 = 4u + 18a$
 $0.8 = u + 3a$ — (2)

(2) - (1), $0.8 - 1 = u + 3a - u - a$
 $-0.2 = 2a$
 $a = -0.1 \text{ m/s}^2$

$u = 1 - a = 1 + 0.1 = 1.1 \text{ m/s}$

A-D, $s = ut + \frac{1}{2}at^2$
 $v = u + at$
 $v = 1.1 - 0.1 \times 10$
 $= 1.1 - 1$
 $= 0.1 \text{ m/s}$ // (01)

15) (03)
 16) 0.3



S.d = $\frac{1}{2} \times \left(\frac{1}{2} + t\right) \times v$

$16 = \frac{1}{2} \left[\frac{1}{2} + t\right] v$

$32 = \left[t + \frac{1}{2}\right] v$ — (2)

$11 = vt$ — (1)

(2) \div

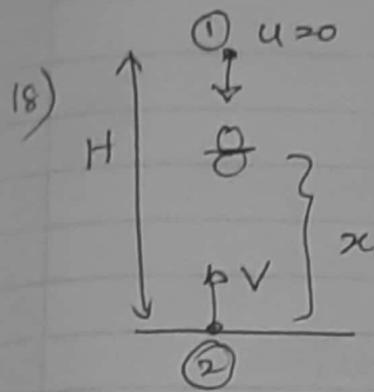
$32 = vt + \frac{1}{2}v$

$32 = 11 + \frac{1}{2}v$

$21 = \frac{1}{2}v$

$v = 42$

(02)



① \downarrow $s = ut + \frac{1}{2}at^2$
 $H - x = \frac{1}{2} \times 10 t^2$ — (1)

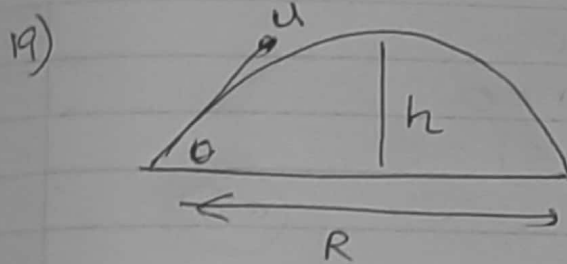
② \uparrow $s = ut + \frac{1}{2}at^2$
 $x = vt - \frac{1}{2} \times 10 t^2$ — (2)

① + ② $H - x + x = vt$

$H = vt$

$t = \frac{H}{v}$

(01)



$h = \frac{u^2 \sin^2 \theta}{2g}$

$R = \frac{2u^2 \sin \theta \cos \theta}{g}$

$h = \frac{\sqrt{3}}{4} R$

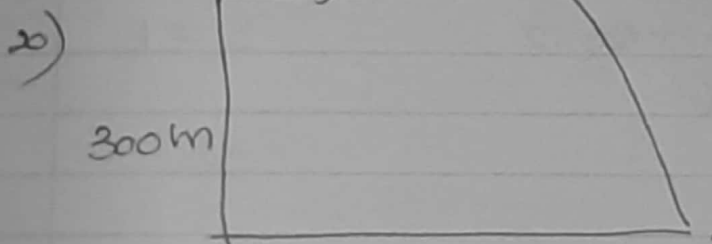
$\frac{u^2 \sin^2 \theta}{2g} = \frac{\sqrt{3}}{4} \times \frac{2u^2 \sin \theta \cos \theta}{g}$

$\frac{\sin \theta}{\cos \theta} = \frac{\sqrt{3}}{2}$

$\tan \theta = \frac{\sqrt{3}}{2}$

$\theta = 60^\circ$

(04)



$\uparrow s = ut + \frac{1}{2}at^2$

$-300 = 70 \sin 30^\circ t - \frac{1}{2} \times 10 t^2$

$-300 = 35t - 5t^2$

$t^2 - 7t - 60 = 0$

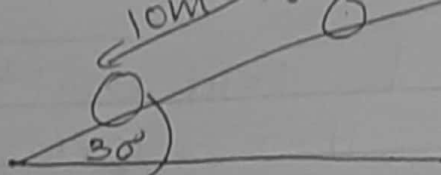
$t^2 - 12t + 5t - 60 = 0$

$t(t - 12) + 5(t - 12) = 0$

$t = 12 \text{ s}$

(02)

21)



$$s = ut + \frac{1}{2}at^2$$

$$10 = \frac{1}{2} \times \frac{10}{2} t^2$$

$$t^2 = 4$$

$$t = 2 \text{ s}$$

(02)

22)

$$h = -16t^2 + 48t + 160$$

$$0 = -16t^2 + 48t + 160$$

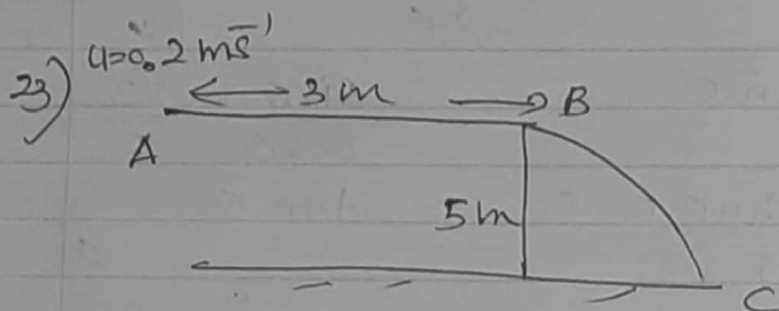
$$t^2 - 3t - 10 = 0$$

$$t^2 - 5t + 2t - 10 = 0$$

$$t(t-5) + 2(t-5) = 0$$

$$t = 5$$

(04)



A - B, $v^2 = u^2 + 2as$

$$v^2 = 4 + 2 \times 2 \times 3$$

$$v^2 = 4 + 12$$

$$v^2 = 16$$

$$v = 4$$

$$v = u + at$$

$$4 = 2 + 2t$$

$$t = 1$$

B - C \downarrow $s = ut + \frac{1}{2}at^2$

$$5 = \frac{1}{2} \times 10 \times t^2$$

$$t^2 = 1$$

$$t = 1$$

$$20 \text{ m/s} = 2 \text{ s}$$

$$R = 4 \text{ m}$$

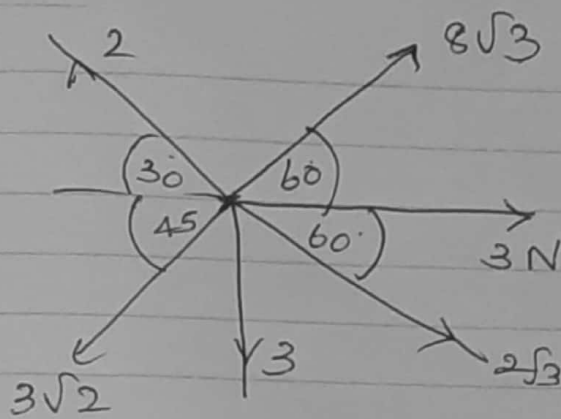
$\rightarrow s = ut$

$$= 4 \times 1$$

$$= 4 \text{ m}$$

(02)

24)



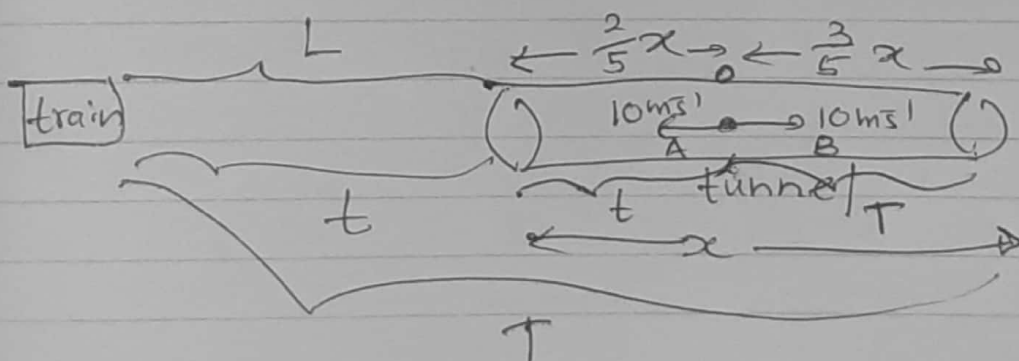
$$\begin{aligned}
 x &= 3 + 8\sqrt{3} \cos 60 - 2 \cos 30 - 3\sqrt{2} \cos 45 + 2\sqrt{3} \cos 60 \\
 &= \cancel{3} + 4\sqrt{3} - \cancel{\sqrt{3}} - \cancel{3} + \sqrt{3} \\
 &= 4\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 \uparrow y &= 8\sqrt{3} \sin 60 + 2 \sin 30 - 3\sqrt{2} \sin 45 - 3 - 2\sqrt{3} \sin 60 \\
 &= \cancel{4\sqrt{3}} - \\
 &= 12 + 1 - 3 - 3 - 3 \\
 &= 4 \text{ N}
 \end{aligned}$$

$$\begin{aligned}
 R^2 &= 16 \times 3 + 16 \\
 &= 48 + 16 \\
 &= 64 \\
 R &= 8 \text{ N}
 \end{aligned}$$

(Q3)

25)



$$\frac{2x}{t} = 10$$

$$\frac{2x}{10} = t$$

$$x = 5t$$

$$\frac{3x}{T} = 10$$

$$x = \frac{10T}{3}$$

$$5t = \frac{10T}{3}$$

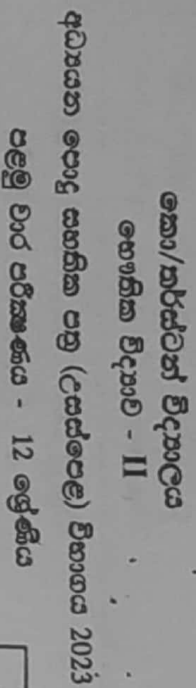
$$15t = 10T$$

$$t = 1.5t$$

$$\frac{2x + 3x}{t + T} = \frac{5x}{t - 1.5t} = \frac{5x \times 2}{t} = \frac{10x}{t}$$

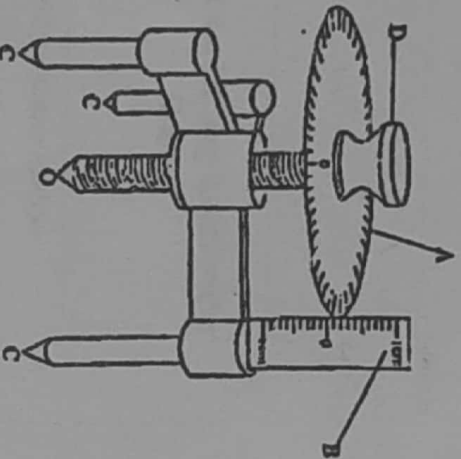
$$50 \text{ m/s} = 10 \times 5t$$

(Q5)



01.

A - കോലം
ഉഷ്ണതരം



- ii) රුපියලේ දක්වා ඇති ගෝලීයතාවයේ කොටස් හඳුන්වන්න.

විෂයය දැනට ඇති ගෝලීයතාවය කොටස් හඳුන්වන්න.

A - ආකෘති Circular Scheme 1

B. σ_{DIN} σ_{SORM} (Scale)

C. Inf. 21902 (leg) (04)

D-.....
 22/04/57
 (Screened)

- ii) මෙහි සිරස් පරිමාණයේ කුඩාම මිනුම කුමක් ද ?

1 mm

- iii) වෘත්තාකාර පරිමාණයේ ඇති කොටස් ගණන කොපමණ ද?

100 (01)

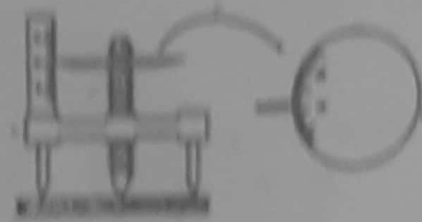
- iv) ගෝලමානයේ අන්තරාලය හා කුඩාම මිනුම සොයන්න.

2) $\frac{1}{2} \log 10$

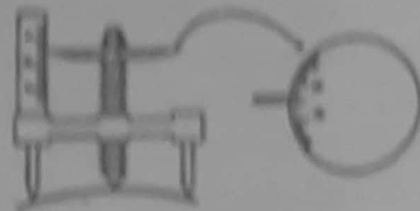
- b) ஐதரோ கிளோரைடு

- v) ආරම්භයේදී ගෝලමානය සමහර විදුරු තහවුරුවක් මත සීරු මාරු කළයුතුය. මෙය සිදු කරන ආකාරය පැහැදිලි කරන්න.

[illegible]



0.15 mg/kg



with a resolution

$$h = 0.15 = 0.11 + 0.04 \text{ m} \quad (2)$$

$$R = \frac{30^2}{6 \times 3.04} = \frac{900}{18.24} = 49.34 \text{ mm}$$

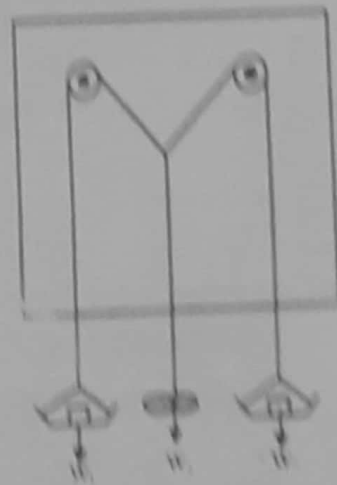
১৭
 ১৭/৫ ১৭/৬ ১৭/৭ ১৭/৮ ১৭/৯ ১৭/১০ ১৭/১১ ১৭/১২ ১৭/১৩ ১৭/১৪ ১৭/১৫ ১৭/১৬ ১৭/১৭ ১৭/১৮ ১৭/১৯ ১৭/২০ ১৭/২১ ১৭/২২ ১৭/২৩ ১৭/২৪ ১৭/২৫ ১৭/২৬ ১৭/২৭ ১৭/২৮ ১৭/২৯ ১৭/৩০ ১৭/৩১ ১৭/৩২ ১৭/৩৩ ১৭/৩৪ ১৭/৩৫ ১৭/৩৬ ১৭/৩৭ ১৭/৩৮ ১৭/৩৯ ১৭/৪০ ১৭/৪১ ১৭/৪২ ১৭/৪৩ ১৭/৪৪ ১৭/৪৫ ১৭/৪৬ ১৭/৪৭ ১৭/৪৮ ১৭/৪৯ ১৭/৫০ ১৭/৫১ ১৭/৫২ ১৭/৫৩ ১৭/৫৪ ১৭/৫৫ ১৭/৫৬ ১৭/৫৭ ১৭/৫৮ ১৭/৫৯ ১৭/৬০ ১৭/৬১ ১৭/৬২ ১৭/৬৩ ১৭/৬৪ ১৭/৬৫ ১৭/৬৬ ১৭/৬৭ ১৭/৬৮ ১৭/৬৯ ১৭/৭০ ১৭/৭১ ১৭/৭২ ১৭/৭৩ ১৭/৭৪ ১৭/৭৫ ১৭/৭৬ ১৭/৭৭ ১৭/৭৮ ১৭/৭৯ ১৭/৮০ ১৭/৮১ ১৭/৮২ ১৭/৮৩ ১৭/৮৪ ১৭/৮৫ ১৭/৮৬ ১৭/৮৭ ১৭/৮৮ ১৭/৮৯ ১৭/৯০ ১৭/৯১ ১৭/৯২ ১৭/৯৩ ১৭/৯৪ ১৭/৯৫ ১৭/৯৬ ১৭/৯৭ ১৭/৯৮ ১৭/৯৯ ১৭/১০০

1) கருவி எழுத்து மாற்றம் (அகர மாற்றம்) 2

2) கருவி எழுத்து மாற்றம் (அகர மாற்றம்)

தென் வங்காளம், நெல் பூங்கா மாநிலம்

ਮਾ. ਪੰ. ੧੭੩, ਮਾ. ਪੰ. ੧੭੪, ਮਾ. ਪੰ. ੧੭੫



Grade 12

2023/05/26

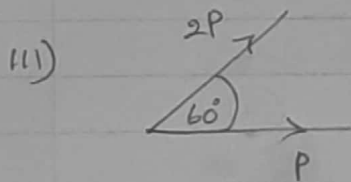
Marking Scheme.

01) A) (i) $R^2 = p^2 + q^2 + 2pq \cos \theta$ — (01)

ii) a) $\theta = 0^\circ$, $R^2 = p^2 + q^2 + 2pq \cos 0$
 $= p^2 + q^2 + 2pq$ — (01)
 $= (p+q)^2$
 $R = p+q$ — (01)

b) $\theta = 90^\circ$, $R^2 = p^2 + q^2 + 2pq \cos 90^\circ$ — (01)
 $R^2 = p^2 + q^2$ — (01)

c) $\theta = 180^\circ$, $R^2 = p^2 + q^2 + 2pq \cos 180^\circ$
 $= p^2 + q^2 - 2pq$ — (01)
 $= (p-q)^2$
 $R = p-q$ — (01)

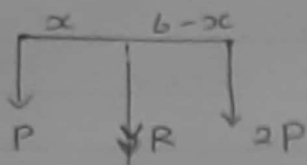


$$R^2 = p^2 + q^2 + 2pq \cos \theta$$
$$R^2 = p^2 + 4p^2 + 2p \times (2p) \cos 60^\circ$$
$$= 5p^2 + 4p^2 \times \frac{1}{2}$$
$$= 5p^2 + 2p^2$$
$$= 7p^2$$
$$R = \sqrt{7}p$$
 — (01)

$$\tan \alpha = \frac{2p \sin 60^\circ}{p + 2p \cos 60^\circ}$$
$$= \frac{2p \times \frac{\sqrt{3}}{2}}{p + 2p \times \frac{1}{2}} = \frac{\sqrt{3}p}{2p}$$

$$\alpha = \tan^{-1}\left(\frac{\sqrt{3}}{2}\right)$$
 — (01)

iv)



$$\frac{P}{2P} = \frac{6-x}{x} \quad \text{--- (01)}$$

$$\frac{1}{2} = \frac{6-x}{x}$$

$$x = 12 - 2x$$

$$x = 4 \text{ cm} \quad \text{--- (01)}$$

v)

$$\vec{x} = 7 + 2\sqrt{3} \cos 30^\circ + 4 \cos 60^\circ - 8 \cos 60^\circ - 4\sqrt{3} \cos 30^\circ \quad \text{--- (01)}$$

$$= 7 + 3 + 2 - 4 - 6$$

$$= 12 - 10$$

$$= 2 \quad \text{--- (01)}$$

$$\vec{y} = 2\sqrt{3} \sin 30^\circ + 4 \sin 60^\circ + 8 \sin 60^\circ - 4\sqrt{3} \sin 30^\circ \quad \text{--- (01)}$$

$$= \sqrt{3} + 4 \times \frac{\sqrt{3}}{2} + \frac{8\sqrt{3}}{2} - \frac{4\sqrt{3}}{2}$$

$$= \sqrt{3} + 2\sqrt{3} + 4\sqrt{3} - 2\sqrt{3}$$

$$= 5\sqrt{3} \quad \text{--- (01)}$$

$$R^2 = 2^2 + (5\sqrt{3})^2$$

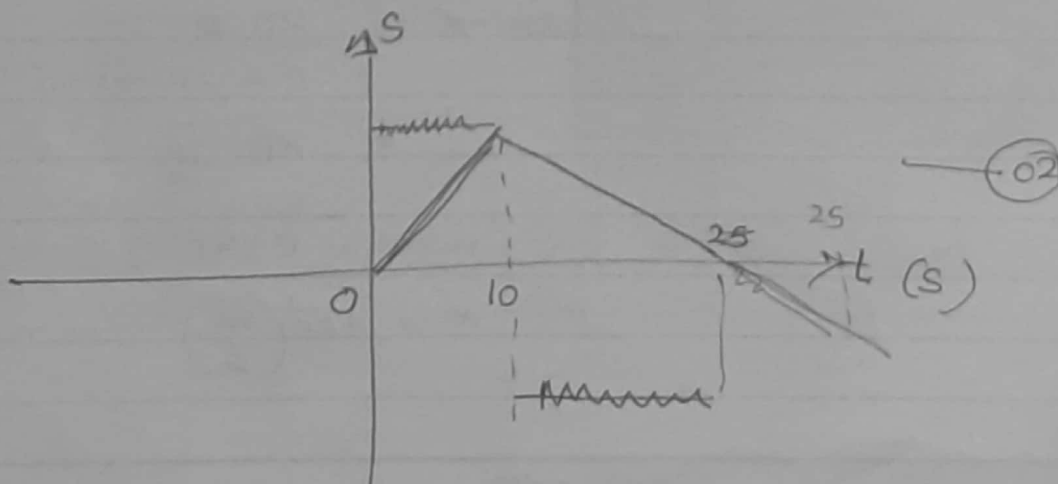
$$= 4 + 75$$

$$R = \sqrt{79} \quad \text{--- (01)}$$

$$\tan \alpha = \frac{5\sqrt{3}}{2}$$

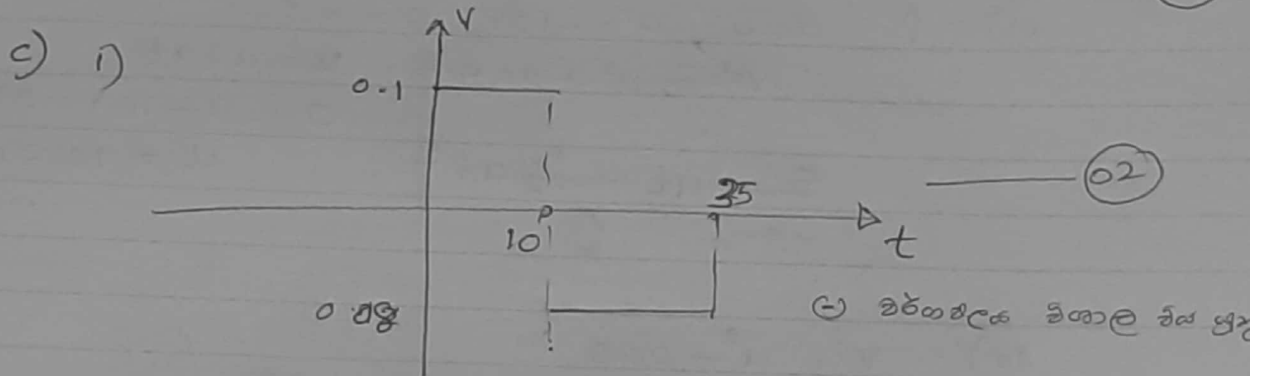
$$\alpha = \tan^{-1} \left[\frac{5\sqrt{3}}{2} \right] \quad \text{--- (01)}$$

B) a)



b) ආරම්භක ත්වරණය = $\frac{100 \times 10^{-2}}{10} = 10^{-1} = 0.1 \text{ m/s}^2$ (01)

අවසාන ත්වරණය = $\frac{200 \times 10^{-2}}{25} = \frac{8 \times 10^{-2}}{25} = 0.08 \text{ m/s}^2$ (01)



ii) $s = 300 \text{ cm}$ (01)

iii) සාමාන්‍ය වේගය = $\frac{300 \times 10^{-2}}{35} = \frac{60 \times 10^{-2}}{7} = 8.57 \times 10^{-2} \text{ m/s}$ (01)

iv) සාමාන්‍ය ත්වරණය = $\frac{100 \times 10^{-2}}{35} = \frac{20 \times 10^{-2}}{7}$ (01)

i) $v^2 = u + at$
 $0 = 0.08 - a \times 2$
 $2a = 0.08$
 $a = 0.04 \text{ m/s}^2$ (01)

$s = ut + \frac{1}{2}at^2$
 $s = \frac{1}{2} \times 0.04 \times 4$
 $= 0.08 \text{ m}$ (01)

02) a)



b) i) 10 m s^{-2} — (02)

ii) 3 m — (02)

iii) $\uparrow u = u, a = -10, s = -3$

$$v^2 = u^2 + 2as$$

$$v = u + at$$

$$0 = u - 10 \times 1.02$$

$$s = ut + \frac{1}{2}at^2$$

$$u = 10.2 \text{ m s}^{-1}$$

$$-3 =$$

— (01)

iv) $v^2 = u^2 + 2as$

$$0 = (10.2)^2 - 2 \times 10 \times h \quad \text{— (01)}$$

$$20h = (10.2)^2$$

$$h = \frac{(10.2)^2}{20} \quad \text{— (01)}$$

පොළවේ සිට ඇති උස $= \frac{(10.2)^2}{20} + 3$

$$= 5.202 + 3$$

$$= 8.202 \text{ m} \quad \text{— (01)}$$

b) i) $u = 5, v = 12, t = 5, s$

$$s = \left(\frac{u+v}{2} \right) t \quad \text{— (01)}$$

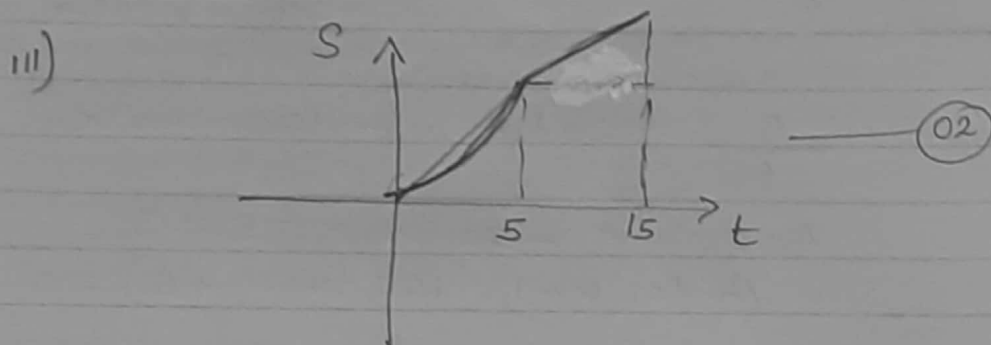
$$= \left(\frac{5+12}{2} \right) 5$$

$$= \frac{17 \times 5}{2}$$

$$= \frac{85}{2}$$

$$= 42.5 \text{ m} \quad \text{— (01)}$$

$$\begin{aligned}
 \text{ii) } 20 \text{ } 20 &= 42.5 + 12 \times 10 \quad \text{--- (01)} \\
 &= 42.5 + 120 \quad \text{--- (01)} \\
 &= 162.5 \text{ m}
 \end{aligned}$$



$$\begin{aligned}
 \text{iv) } \downarrow \quad u &= 0, \quad S = 70, \quad a = 10, \quad t = ? \\
 S &= ut + \frac{1}{2}at^2 \quad \text{--- (01)} \\
 70 &= \frac{1}{2} \times 10 \times t^2 \\
 t^2 &= 14 \\
 t &= \sqrt{14} \quad S = \quad \text{--- (01)}
 \end{aligned}$$

$$\begin{aligned}
 \text{v) } \rightarrow S &= ut \\
 &= 12 \times \sqrt{14} \quad = 12\sqrt{14} \text{ m} \quad \text{--- (01)} \\
 &= 24 \text{ m}
 \end{aligned}$$

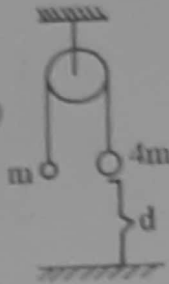
$$\begin{aligned}
 \text{c) i) } \uparrow \quad v^2 &= u^2 + 2as \quad \text{--- (01)} \\
 0^2 &= (u \sin \alpha)^2 - 2g \times 1 \\
 u^2 \sin^2 \alpha &= 2g \\
 u^2 &= \frac{2g}{\sin^2 \alpha} \quad \text{--- (01)}
 \end{aligned}$$

$$\begin{aligned}
 \text{ii) } \rightarrow S &= ut \\
 20 &= u \cos \alpha t \quad \text{--- (1) --- (01)}
 \end{aligned}$$

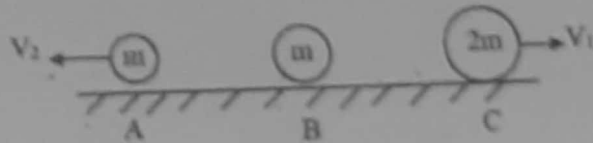
$$\begin{aligned}
 \uparrow \quad S &= ut + \frac{1}{2}at^2 \\
 -\frac{5}{4} &= u \sin \alpha t - \frac{1}{2}gt^2 \quad \text{--- (01)}
 \end{aligned}$$

$$-\frac{5}{4} = u \sin \alpha \times \frac{20}{u \cos \alpha} - \frac{1}{2}g \times \left(\frac{20}{u \cos \alpha}\right)^2$$

05. i) මීටරින් නිමව් හදන්න කරන්න. (06)
- ii) m සහ 4m ස්වල්පයට පවතින තෙල් 2 ක් ගැලපේ පරිදි පිහිටුවා ඇත. පද්ධතිය නිශ්චල තත්ත්වයේ සිට මුදා හැරිය විට පසුව පිදුම්පත වලිතයේදී 4m ස්වල්පය d දුරක් තෙත් තොළොවේ ගැලේ.
- a) පද්ධතියේ තෙත්, නිවැරදි (02)
- b) තත්ත්වයේ ආතතිය (02)
- c) තොළොවේ වැනි ප්‍රවේගය (4m ස්වල්පය) (02)
- d) ඒ හදනා කෙටික කාලය කොපමණ (02)

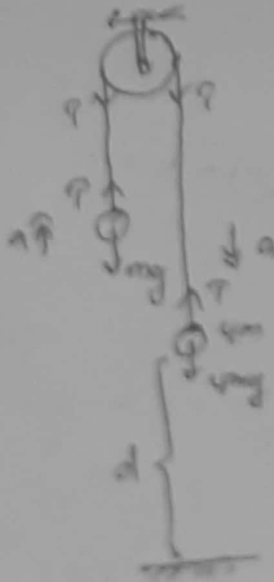


- iii) 20m උසක සිට සිරස්ව බිම තෙලන තෙල්ලාකාර වස්තුවක් ගැටීම නිසා ප්‍රවේගය අඩක් දක්වා අඩු වී තොලා කඩී. දෙවන වර තොළොවේ ගැටී තොලා පවතින ජොනොනෙම් එයට සිරස්ව 5m ඉහළින් නිශ්චලව අංගුවක් මුදා හරී. අංගු දෙක ගැලපෙන අවස්ථාවට ප්‍රත්යෝක්ෂ ජොනොනෙම් සිට කෙටික කාලයක් ගැලපෙන ලක්ෂ්‍යයට බිම සිට උසක් කොපමණ. දෙවන වර තොළොව ගැටීම දක්වා ප්‍රවේග - කාල ප්‍රස්ථාරයේ දළ සටහන් අඳින්න.
- iv) a) වේගය ගණනය කළේම නිමව්පි ලියන්න.
- b) ගැලපේ පරිදි සිරස් පෘෂ්ඨයක තෙල් 3 ක් කඩා A තෙල්ලයට 3ms^{-1} ප්‍රවේගයක් ලබා දේ. ගැටුම් සියල්ල ප්‍රත්‍යෝක්ෂ අවස්ථා වලිතයේදී C තෙල්ලයේ ප්‍රවේගයක් A තෙල්ලයේ ප්‍රවේගයක් කොපමණ.
- [V_1 , V_2 කොපමණ]



i). නිමව් 03 (06)

ii).



$$4m \downarrow F = 4ma$$

$$4mg - T = 4ma \quad (1)$$

$$m \downarrow F = ma$$

$$T - mg = ma \quad (2)$$

$$4m \downarrow V^2 = 4^2 + 2as$$

$$V^2 = 2 \times 6d$$

$$= 12d$$

$$V = \sqrt{12d} = 2\sqrt{3d} \quad (01)$$

$$4mg \downarrow V = 4 + 9d \quad (01)$$

$$2\sqrt{3d} = 6d$$

$$d = \frac{2\sqrt{3d}}{6} = \sqrt{\frac{d}{3}} \quad (01)$$

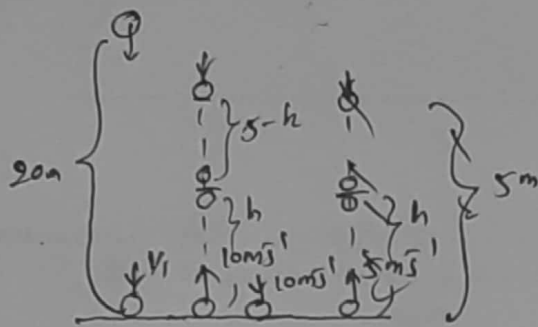
$$(1) + (2)$$

$$3mg = 5ma$$

$$a = \frac{3g}{5} = 6\text{ms}^{-2} \quad (01)$$

$$(2) \downarrow T - mg = 6m$$

$$T = 16m \quad (01)$$



$$0 = 5^2 - 2 \times 10 \times h$$

$$h = \frac{25}{20}$$

$$\frac{1}{2} v^2 = u^2 + 2as \quad (01)$$

$$v_1^2 = 2 \times 10 \times 20$$

$$= 400$$

$$v_1 = 20 \text{ m/s} \quad (01)$$

$$s = ut + \frac{1}{2} at^2$$

$$h = 10t - 5t^2 \quad (1) \quad (01)$$

$$\frac{1}{2} s = ut + \frac{1}{2} at^2$$

$$5 - h = 5t^2 \quad (2) \quad (01)$$

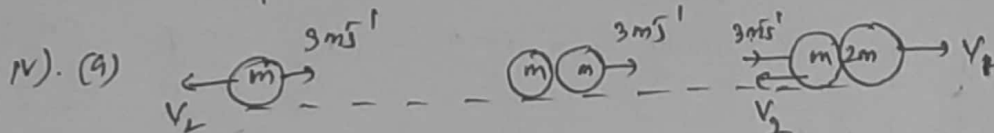
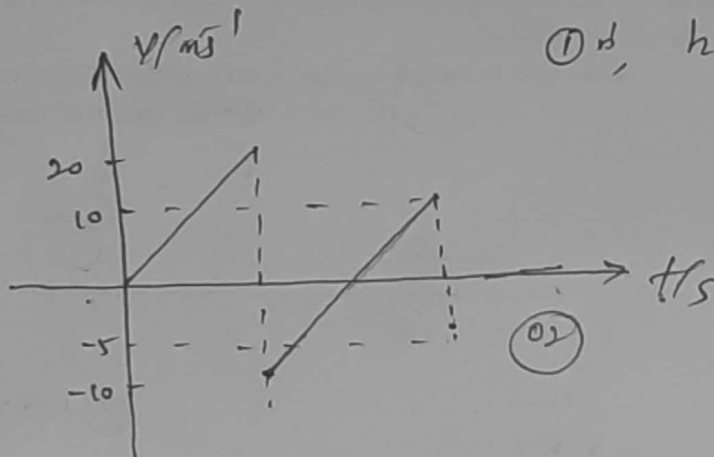
$$(1) + (2), \quad 5 = 5t + 10t$$

$$t = 1/2 \text{ s} \quad (01)$$

$$(1), \quad h = 10 \times \frac{1}{2} - 5 \left(\frac{1}{2}\right)^2$$

$$= 0.5 - 0.625 = -0.125$$

$$(01)$$



20cm
m.c. or a.p.

$$m \times 3 = 2m \times v_1 - m \times v_2$$

$$3 = 2v_1 - v_2 \quad (1)$$

$$(01)$$

is a.p. or a.p.

$$\frac{1}{2} m \times 3^2 = \frac{1}{2} m \times v_1^2 + \frac{1}{2} \times 2m \times v_2^2 \quad (02)$$

$$9 = v_1^2 + 2v_2^2$$

$$9 = (2v_1 - 3)^2 + 2v_2^2$$

$$9 = 4v_1^2 - 12v_1 + 9 + 2v_2^2$$

$$0 = 4v_1^2 - 12v_1$$

$$v_1 = 3 \text{ m/s} \quad (02)$$

$$(1), \quad 3 = 2 \times 2 - v_2$$

$$v_2 = 1 \text{ m/s} \quad (02)$$