TERM 2 2022 OPENER EXAM FORM 3

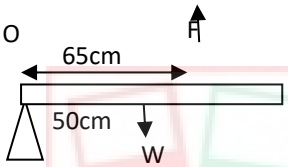
PHYSICS PAPER 1 FORM 3 MARKING SCHEME

1. Main scale reading = 8.0 mm

Thimble scale reading = $\frac{6 \times 0.01}{} = 0.06$mm

Reading= 8.06 mm -0.04= 8.02mm

2. -----expands and contracts uniformly
   ------does not wet the glass
   -------easily visible ----------good thermal contact
3. When a body is freely suspended it rests with its centre of gravity vertically below the point of suspension.

4. 

Clockwise moments = W x 0.5 m

Anticlockwise moment = F x 0.65m

W x 0.5 = F x 0.65

$\frac{200 \times 10}{1000}$ 0.5 = F x 0.6

$\frac{1}{0.6}$ = F x $\frac{0.6}{0.6}$

F = $\frac{10}{6}$ = 1.67N

5. Gravitation potential energy is possessed by bodies due to their position i.e bodies that are able to fall down. Elastic potential energy is possessed by compressed or stretched springs.

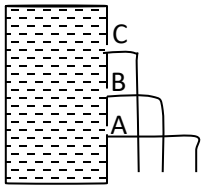
6. **Apparatus**

A tin, small nail , water.

Procedure

Using the nail (pin make three holes A,B and C of the same diameter along a vertical line on the side of the tin.Fill the thin with water as show below.

Observe the jets of water from the holes A,B and C



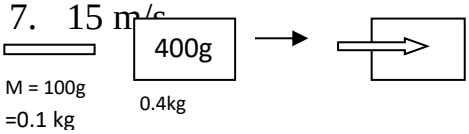
Observation

The lower hole A throws water farthest, followed by B and lastly C

Conclusion

Pressure of water at A. is greater than pressure at B and pressure at B is greater than at C.

7. 15 m/s



$M_1V_1 + M_2V_2 = M_1V_1$

$0.1 \times 15 + 0.4 \times 0 = 0.5V$

$\frac{1.5}{0.5} = \frac{0.5}{0.5}$ $\quad V = 3m/s$

8. - in Brownian motion

- A slid dissolves in a solvent

- A piece of chalk can be ground into small particles;

9. Conduction is a process through which heat is transferred in a solid.

Convection is a process through which heat is transferred in fluids.

10. 12kg per min h = 2cm

Power workday x distance

Time

= force x distance = 40 x 20 = 40w

Time 60

11. Q – the velocity of water in the pipe at Q is very high hence the pressure becomes low.

12. $F_r=\mu R$ $F_r=100N, R=400N$

$\mu=\frac{100}{400}=0.25$

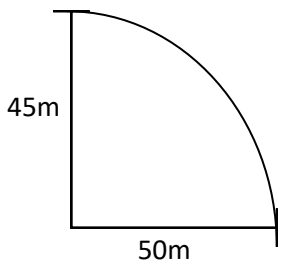
section b

13. a) (i) A-B - stationary body

(ii) B – C to moves with increasing velocity

(iii) C-D ---constant velocity in opposite direction

b)



R = Ut

h = ½ gt2

45 = ½ x 10 x t

$t^2 = \frac{45}{5} = 9$

t = 3s

(ii) R = ut

$\frac{50}{3} = \frac{0 \times 3}{3}$

$U = \frac{50}{3} = 16.67$ m/s

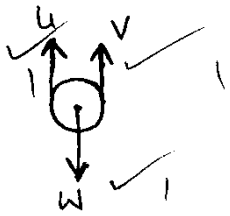
(iii) V = u + at

= gt

= 10 x 3

=30m/s

C)



14. (i) Vol. = $\frac{4}{3}\pi r^3$ ✓

$= \frac{4}{3} \times \frac{22}{7} \times \left(\frac{0.05}{2}\right)^3$

= 6.5476 x 10^{-5} cm^3=6.5476x$10^{-11}$$m^3$

(ii) A = πr^2

$= \frac{22}{7} \times \left(\frac{15}{2}\right)^2$

$= 176.786cm^2 = 1.76786 \times 10^{-2} m^2$

(iii) Vol. $= \pi r^2$

$h = \frac{6.5476 \times 10^{-5}}{176.786}$

$= 3.7037 \times 10^{-7}$ cm $= 3.7037 \times 10^{-9}$m

(c) - Oil drop is perfectly spherical

- Size of oil molecule is same as thickness of patch.
- Patch is one molecule thick.

15. (a) Velocity ratio is ratio of effort distance to the load distance.

Or $V.R = \frac{distance\ moved\ by\ effort}{distance\ moved\ by\ the\ load}$

(b) (i) $V.R = \frac{1}{Sin\ 30^o}$ or effort distance $= \frac{5}{Sin\ \theta}$

$= 2$ $= 10$

$V.R = \frac{10}{5}$

$= 2$

(ii) I Efficiency $= \frac{M.A}{V.R} \times 100\%$

Or

$75 = \frac{M.A}{2} \times 100$ formula or substitution

$M.A = \frac{2 \times 75}{100}$

$= 1.5$

II $M.A = \frac{L}{E}$

$$1.5 = \frac{800}{E}$$

$$E = \frac{800}{1.5}$$

$$= 533.33N$$

(c) (i)This is due to inertia, the object tends to continue in uniform motion in a straight

line.

(ii) $S = \frac{1}{2}gt^2$, S = 0.2 + 3.2 = 3.4m

$$3.4 = \frac{1}{2} \times 10t^2$$

$t^2 = 0.68$

t = 0.8246S

16. a) The ball has the same horizontal velocity as the truck

b) momentum is the product of mass and velocity of a body. SI unit=kgm/s

c) i) $M_1V_1 + M_2V_2 = (M_1 + M_2)V$

$30000 \times 20 + 0 = (30000 + 1000)V$

$V = \frac{600000}{40000} = 15ms^{-1}$

ii) S = vt

$= 15 \times 15 = 225m$

iii) Ft = m (v - u)

$f = m\frac{(v-u)}{t}$

$= \frac{30000(15-20)}{0.5}$

= 300000N

b) This is due to the passengers reaction force on the boat which acts backwards.

c) i) To increase area on which force cuts to reduce pressure due to impulsive force.

ii) To prolong the period of time the force acts to reduce the impulsive force

a) For an helical spring or any elastic material, the extension is directly proportional to the stretching force producing it provided the elastic limit is not exceeded.

b) i)

Load	0.00	1.00	2.00	4.00	5.00	6.00	
L	10.00	11.50	13.50	16.00	18.00	24.00	
E	0.00	1.50	3.50	6.00	8.00	14.00	$\surd 1$

ii) Suitable axes labelled
All points correct
Suitable line

iii) Springs constant $K = \frac{\Delta F}{\Delta e}$
Use students graph
Correct units

iv) Energy stored when the length is stretched by 16 cm
Area under the graph $\surd 1$
Or $E = \frac{1}{2} ke^2$
Use k from graph and e = 16 cm.
K must be correct.
Correct substitution
Answer correct unit