232/1
PHYSICS
MARKING SCHEME
PAPER 1
TIME: 2 HOURS

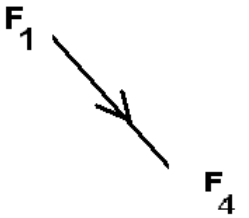
SECTION A 25 MKS

1. M.S = 3.30 cm
   V.S = $\frac{0.00}{3.30\ cm}$ ✓1
2. The pressure at the base is reduced✓1.
   - This is because pressure in fluid is directly propotional to the depth of the fluid✓ (1mk)
3. To reduce / minimize heat loss through radiation.
4. Increase in temperature causes an increase in volume of air in the balloon (Balloon volume increases)✓1
   - Upthrust on the balloon is increase✓1
5. t = V/A ; ✓1 t = Thickness
   V = Volume
   $2.0 \times 10^{-7} = 6.25 \times 10^{-5}$ A= Area

   $A = \frac{6.28x10^{-5}}{2.0x10^{-7}}$ ✓1

   $R = \sqrt{\frac{6.28\ x10^{-5}}{2.0x10^{-7}\ x\ \pi}}$

   9.999 cm 10 cm; ✓1
6. This is to increase time for collision✓1 this reduces the rate of change of momentum hence the impulsive force is reduced✓1
7. Container A✓1
   - The rate of evaporation is increased/ more latent heat is drawn in A than in B✓1.
8. Displacement = 10 cm East / 10 cm 090^0 / 10 cm at 60^0 to the verticle✓1.
9. Extension of lower spring = 6 cm✓1 and therefore total extension.
   = 3 + 6
   = 9 cm✓1
10. Maximum temperature measured on a clinical thermometer is less than that of a boiling water / the thermometer will burst / crack✓1
11. Acceleration is a vector quantity✓1
    Change in direction causes acceleration✓1
12. A student draw a line with an arrow from F_1 to F_4



✓1

Condition: No arrow / Direction no mark

13. This is when upthrust is equal or same to weight✓1

14. Total pressure on diver = 11 + 22 = 33 of water.
Using Boyle's law
$P_1V_1 = p_2 V_2$✓1
$33 \times 68 = 11 \times V_2$ ✓1
$V_2 = \frac{33 \times 68}{11}$
$= 204\ cm^3$ ✓1

15. The pressure inside is more / greater than the pressure outside. (Pressure imbalances) ✓1

SECTION B (55MKS)

16. a) Charles's law – For a fixed mass of a gas volume is directly proportional to absolute temperature at constant pressure✓1

b) i) Record the initial volume and temperature of the trapped air;✓1
- As you heat continuously stir and record corresponding values, of volumes and temperatures at suitable intervals (Temperature / time intervals) ✓1
- Plot a graph of volume versus / against absolute temperature; ✓1
- A straight line is obtained which when extrapolated cuts the temperature axis at – 273^0c (OK) ✓1

ii) To dry the air✓1
- Traps the air
- Acts as an index / pointer.

iii) For the trapped air to be heated uniformly✓1

c) Collision between gas molecules and walls of the container✓1.

d) i) $M = \frac{Fr}{N}$

$0.5 = \frac{Fr}{0.2}$ ✓ either

$Fr = 0.5 \times 0.2 = 0.1$ N✓1

ii) $Fr = \frac{MV^2}{r}$ Either $fr = mw^2r$

$Fr = 0.02 \times w^2 \times 0.1$

$0.1 = 0.02 \times w^2 \times 0.1$ ✓1either

$W^2 = \frac{1}{0.02}$

$\therefore W = \sqrt{\frac{1}{0.02}}$

$W = \sqrt{50}$

$W = \sqrt[5]{2}$ rad S^{-1}

$= (8.55$ rad $S^{-1})$ ✓1

17. a) i) (gravitational force – It has mass✓1

ii) Tension force – Since the string. Is stretched / unrelaxed / Taut✓1

b) i) Air resistance absent – since the block is not moving relative to the surrounding / block is stationary/ block at rest✓1

ii_ Normal reaction – absent- block is not supported by any surface✓1.

c) The time it takes to travel a distance of 200m (2 marks)

S=ut +1/2at2

200=0xt +1/2 x1 xt^2.

t=x =$\frac{\sqrt{400}}{}$...

t=20s

i) the frictional force between the block and the table (2marks)

R=200/1000=2N

F=2-0.6=1.4N

d. $V^2 = u^2 + 2as$

$65^2 = O^0 + 2 \times 3 \times 5$

$65 = 65^2$

S = 704m✓1 ✓1

18. a) Heat energy required to change a unit mass of a substance from liquid state to vapour without change in temperature✓1

b) i) $Q1 = ml_r$

$\frac{3}{1000} x\ 2.26 x10^6$ ✓1

$= 6.78 \times 10^3$ J ✓1

ii) $Q_3 = m_c C_c \Delta cl_c + M_w C_w Dl_w$ ✓1

$= 80 \times 0.9 (T - 10) + 200 X 4.2 (T - 10)$ ✓1

$Q_3 = 912 T - 7680$✓1

iv) Heat gained = Heat lost✓1

$3 (2260 + 1260 - 12.6T) = 912T - 7680$✓1

$T = 17.002^0$ c✓1

c) $Vit = McD\theta$ ✓1

$2.1 \times 10000 \times t = 1.5 \times 4200\ \ 80$✓1

T = 240 secs✓1

19. a) Pascals principle.

Pressure applied at a point in an enclosed non – viscous and incompressible fluid is transmitted equally throughout the fluid..

b) i) $P = F/A$

$= \frac{50}{0.0002}$ } Either ✓1

= 250,000 pa✓1

ii) Volume displaced = Volume received

in X in Y

$\pi r^2 \times d = \pi R^2 \times D$

$\frac{d}{D} = \frac{\pi R^2}{\pi r^2}$ } Either ✓1

$\frac{Effort\ arm}{Load\ arm} = \frac{R^2}{r^2}$ ✓1

$V\left(\frac{R}{R}\right)^2$

V.R = $\left(\frac{R}{5}\right)^2$ ✓1

iii) V.R = $\frac{100}{20}$ ✓1

= 5 ✓1

c) n = $\frac{M.A}{V.R} x100$ % ✓1

Slope = 0.1✓1 (Getting slope) 2mks)

∴ MA = $\frac{1}{\text{Slope}}$ ✓1

= 10 ✓1

20. a) Archimedes Principle:-

When a body / object is partially or wholly immersed in a fluid it expenses upthrust equal to the weight of the fluid displaced.✓1

b) i) 30g✓1

ii) V = $m/g = \frac{30}{1} = 30cm^3$ ✓1

iii) Volume of stem above water.

V = 0.90 x 4

= 3.6 cm^3✓ 1

iv) Total volume

30 +3.6 = 33.6 ✓1

v) Length of stem above the surface volume of liquid displaced

= $m/e = \frac{30}{1.5} = 20cm^3$

Volume of stem above = 33.6 – 20 = 13.6 cm^3

Length of stem above liquid = $\frac{13.6}{0.9}$

= 15.11 cm^3✓ 1