LANJET EVALUATION 2022
PHYSICS PP1 (MS) 232 / 1

QN 1. $V = \frac{m}{\rho} = \frac{13.6}{1.25} = 10.88cm^3$. ✓1

New reading = 20.5+ 10.88 = $31.38cm^3$✓1

QN 2. Resultant force F = Reaction – weight ✓ 1

F +W =R

$R = ma + mg$ ✓1 $= m(a + g)$

= 60 kg ($10ms^{-2}$ + $3ms^{-2}$) = 780N✓ 1

QN 3. a) – be incompressible✓

- Not corrosive✓
- Have low freezing point and high boiling point

b) The force applied on the foot pedal exerts pressure on the master cylinder ✓ 1.The pressure is Transmitted by the brake fluid to the slave cylinder✓ 1. This causes the slave cylinder to open the brake shoe and hence the brake lining presses the drum✓ 1. The rotation of the wheel is thus resisted.

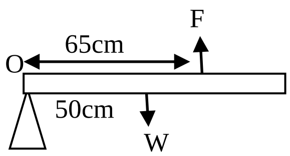
QN 4. a) V.R = 6 ✓ 1

b) M.A = $\frac{800}{272}$ = 2.941 ✓ 1

E = $\frac{M.A}{V.R}$ x 100% = $\frac{2.941}{6}$ x100✓ 1 = 49.017 %✓ 1

QN 5. The motion of the particles increase ✓ 1

QN 6.



Clockwise moments = W x 0.5 m

Anticlockwise moment = F x 0.65m

W x 0.5 = F x 0.65

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

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

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

QN7. – Its density reduces ✓ 1

- Because during expansion the volume increases and its mass remains constant. ✓

QN 8 - A✓ 1

- In B some heat will be required to melt the ice hence the temperature will be slightly lower.✓

QN9. 7.5 N $\longrightarrow$ 5cm

? $\longrightarrow$ 8cm

$\frac{7.5}{5} \times 8 = 12.0$ N✓ 1

Work done = ½ ×force × extension ✓ 1

$= \frac{1}{2} \times 12 \times \frac{8}{100} = 0.48$ J✓ 1

QN 10. Pressure applied at one point of a liquid is transmitted equally to all other parts of enclosed liquid ✓ 1

QN 11. K.E = ½ MV^2

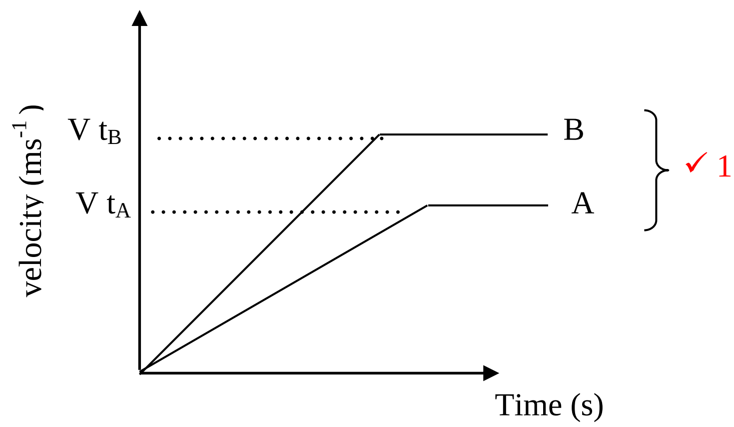
$= \frac{1}{2} \times 920 \times 30^2$✓ 1 = 414000J ✓ 1

QN12. Because the horizontal force acting on the bullet is zero. ✓ 1

SECTION B (55 MARKS)

QN 13. (a) i)- A, has higher viscosity. ✓ 1

- Because in fluid A a lower terminal velocity is registered due to the higher resistance of the fluid molecules to the movement of the sphere through it. ✓ 1 ii)



b) (i) $A_1 V_1 = A_2 V_2$ ✓ 1

$100 \times 2 = 60\ V_2$ ✓

$V_2 = \frac{200}{60} = 3.33$ m/s ✓ 1

(ii) - Liquid is non –viscous ✓ 1

- Liquid is incompressible ✓ 1

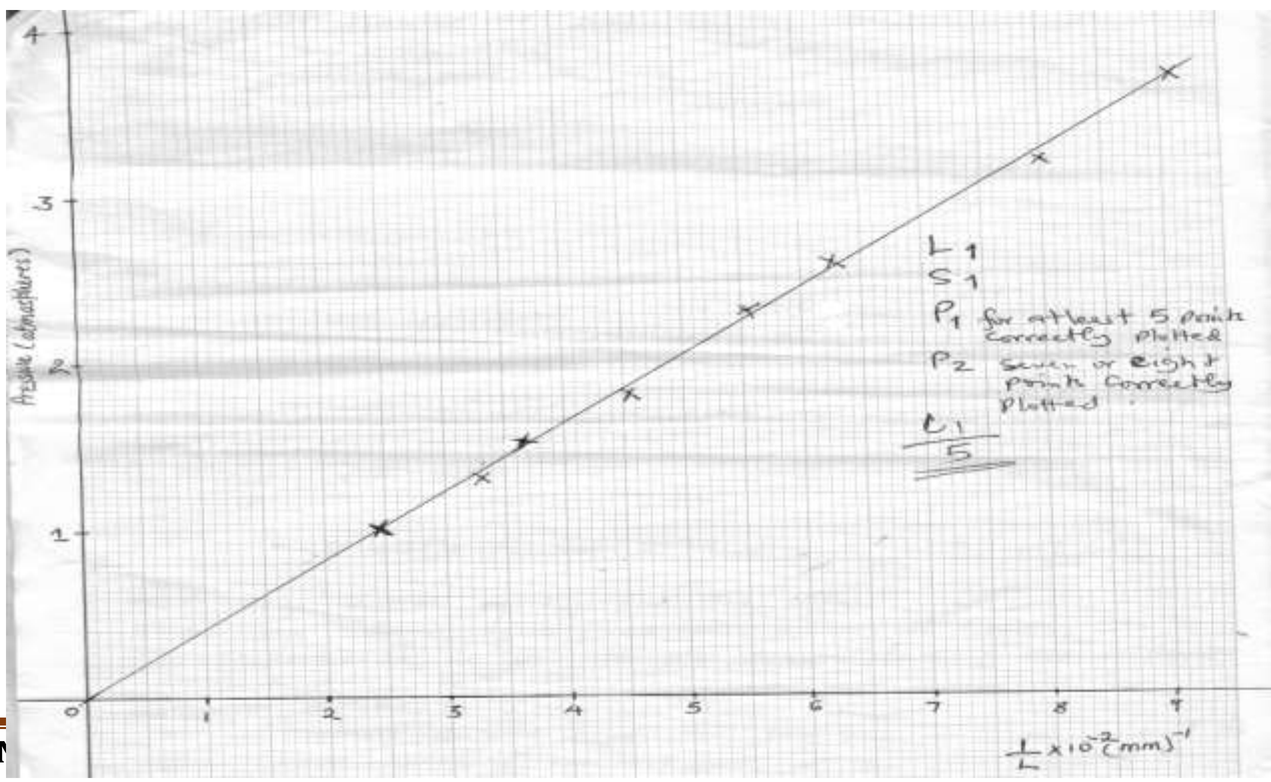
(iii) - As the ball rises, the atmospheric pressure on the ball reduces. ✓ 1

- At higher altitude the pressure outside is relatively lower, thus the pressure inside the balloon exceeds the one outside causing it to become fully inflated. ✓ 1

QN 14. a) The pressure of a fixed mass of a gas is inversely proportional to its volume, provided the temperature is kept constant. ✓ 1

b) (i)

$\frac{1}{L} \times 10^{-2}$ (mm) -	✓ ½ 2.44	✓ ½ 3.33	✓ ½ 3.64	✓ ½ 4.55	✓ ½ 5.56	✓ ½ 6.25	✓ ½ 8.00	✓ ½ 9.10



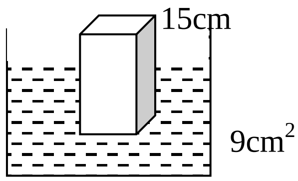
(ii) Check graph paper

(iii) Pressure of the air column when the length, L of air is zero

P= 0 atmospheres ✓ 1

QN 15. (a) When a body is partially or totally immersed in a fluid, it experiences an upthrust equal to the weight of fluids displaced.

(b)



(i) δ= m/v Density of block

M = δ x v mass of block volume = 9 x 15 = $135cm^3$

= 1.25 x 135 = 168.75g = 0.16875kg

(ii) Reading - weight of oil displaced

Mass of oil displace = 135 x0.8= 108 g = 0.108kg

Weight of oil displaced = 0.108 x 10 = 1.08N

Weight = in oil = weight in air – up thrust

= 1.6 875 – 1.08 = 0.6075 N

(iii) Up thrust = weight of oil displaced

Mass of oil displaced = 67.5 x 0.8 = 54g = 0.054kg

Weight of oil displaced = 0.04 x 10 = 0.54N

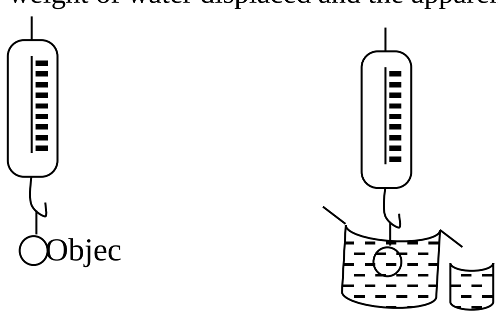
Reading of balance = 1.6875 – 0.54 N

=1.1475N

(c) Tie an object with a string and suspend it on a s[ring balance

Use a Eureka can to check the amount of water displaced y an object when fully immersed in water.

Compare the weight of water displaced and the apparent loss in weight (weight in air – weight in water).



QN 16. a) The quantity of heat required to change the state of a given mass of substance without change in Temperature. ✓ 1

b) (i) Because of the hanging weights, the wire exerts pressure on the ice beneath✓ 1 it and therefore makes it melt at a temperature lower that its melting point. ✓ 1. Once the ice has melted, the water formed flows over the wire and immediately solidifies since it is no longer under pressure✓ 1

As it solidifies, the latent heat of fusion is released and conducted by the copper wire to melt the ice below the wire ✓ 1. The process continues until the wire cuts through leaving the block intact✓ 1.

(ii) The cotton thread would not cut through the ice at all ✓1. This is because cotton is a poor conductor of heat✓ 1 hence it would not conduct the latent heat of fusion released by the Solidifying ice to melt the ice below.

c) (i) Heat lost by hot water = Heat gained by cold water

$M_h C \Delta \ominus = McC \Delta \ominus_2$ ✓ 1

$3(\ominus - 20) = 9\,(20-10)$ ✓ 1

$\ominus - 20 = 30$

$\ominus = 50^0$ C✓ 1

d) $P = \frac{V^2}{R}$ ✓ 1 $R = \frac{V^2}{P} = \frac{240 \times 240V}{90\ w}$ ✓ 1

$= 640\ \Omega$ ✓ 1

QN 17 (a) (i) Tension in the spring supporting the object. ✓1

(ii) There is change in the direction of instantaneous velocity at various points along the circular path. ✓1

(b) (i) The spring balance reading increases. ✓1

(ii).The object moves tangentially to the circular path at that point where it cuts. ✓1

(c) Reading of spring balance = Centripetal force

$= \frac{MV^2}{V}$ ✓1

$81 = \frac{0.5 \times V^2}{0.5}$ ✓1

$V^2 = 81$

$V = 9ms^{-1}$ ✓1

(d) (i) The factors are:

Friction force
Radius
Mass of the object

} Any 2 (2mks)

(ii) Oil reduces friction ✓1 force since friction provides centripetal force the frequency for sliding of is lowered. ✓1