

# LARI SUBCOUNTY JOINT EXAMINATION

## PHYSICS PAPER 1

232/1

JULY AUGUST 2019

MARKING SCHEME

1. B, ✓1. There is no heat loss through ✓1 evaporation.
2. a) It's the force that makes a free liquid surface behave like a stretched elastic skin ✓1
- b) Bubble flattens to a film ✓1 and move up in the funnel in order to make its surface area as small as possible due to surface tension ✓1
3. a) distance is length between two points while displacement is length between two points in a specific direction ✓1

b)  $T = \frac{1}{100} = 0.01s$

$$U = \frac{12cm}{0.02s} = 600cm/s$$

$$V = \frac{32cm}{0.02s} = 1600cm/s \checkmark 1$$

$$\frac{1600-600}{0.06s} = \frac{1000cm/s}{0.06s}$$

$$\frac{10m/s}{0.06s} = 166.67m/s \checkmark 1$$

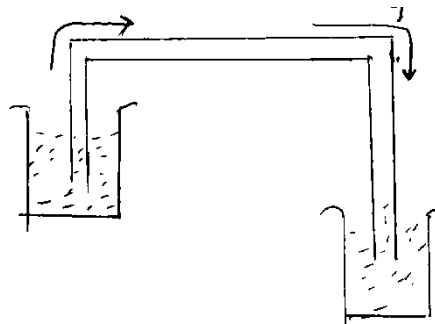
4. The water inside is still at  $4^{\circ}C$  ✓1
5. The pith ball rises to the mouth of the bottle ✓1. This is because the pressure on the mouth is reduced and the high pressure inside the bottle makes the pith ball rise ✓1

6.  $F = \frac{mv^2}{r} + mg \checkmark 1 = 9.5 = \frac{150}{1000} \times \frac{v^2}{30/100 \checkmark 1} + \frac{150}{1000} \times 10$

$$v^2 = \frac{8.0 \times 1000 \times 30}{150 \times 100} = 16$$

$$V = 4.00m/s \checkmark 1$$

7.



The flow stops because there is no atmospheric pressure to provide pressure difference ✓1

8.  $a = \frac{v-u}{t} = \frac{0-30}{0.05}$

OR

$$Ft = mv$$

$$= \frac{-30}{0.05}$$

$$= -600m/s^2$$

$$F = \frac{mv}{t}$$

$$= \frac{0.02 \times 30}{0.05} = -12N$$

$$F = ma$$

$$= \frac{20}{1000} \times -600 \checkmark$$

$$= -12N$$

Retarding force = 12N ✓

9. Metals are good conductors of heat conducting the heat away from the body making it feel cold while wood is a poor conductor of heat
10. Balloon will expand, therefore Upthrust on the balloon increases, ✓ thus clockwise moments increases more than anti clockwise moments ✓.
11. Having a thinner capillary tube ✓

12. a) P.E → K.E → P.E → K.E ✓ ✓ 1

- b) - Making effort arm longer than load arm.  
 - Reducing friction at pivot.

c) i) When Crank wheel makes 1 revolution, real sprocket and wheel makes  $\frac{44}{22} = 2$  revolutions ✓ 1

$$\left. \begin{array}{l} \text{Effort distance} = 2\pi(16.5) \\ \text{Load distance} = 2\pi(33) \times 2 \end{array} \right\} \checkmark 1$$

$$V.R = \frac{\text{Effort distance}}{\text{load distance}}$$

$$= \frac{2\pi(16.5)}{2\pi(33) \times 2} = 0.25 \checkmark 1$$

ii) Efficiency =  $\frac{M.A}{V.R} \times 100\% \checkmark 1$

$$= \frac{0.15}{0.25} \times 100\% \checkmark 1 = 60\% \checkmark 1$$

- d) - Work done in moving parts of the machine.  
 - Work done against friction

13. a)

Boiling	Evaporation
- Takes place throughout the liquid	- Occurs on the surface of liquid.
- Increase in pressure increases B.P	- Increase in pressure reduces evaporation
- Occurs at fixed temperature	- Occurs at all temperature

b) i)  $80^{\circ}C \checkmark 1$

ii)  $Q = pt \checkmark 1$

$$= 50 \times (450 - 150) \checkmark 1$$

$$= 15000J \checkmark 1$$

iii)  $Q = mL_f \checkmark 1$

$$L_f = \frac{15000}{0.01} \checkmark 1$$

$$= 1500000 JKg^{-1} \checkmark 1$$

$$\Rightarrow E = IVt; E = IV \times 4 \times 60; \Leftrightarrow 240 IV = E; I = \frac{E}{240V} \text{ and } 2I = \frac{2E}{240V}$$

$$\Rightarrow E = \frac{2E}{240V} \times V \times t \quad \checkmark_1$$

$$t = 120 \text{ seconds} = 2 \text{ minutes} \quad \checkmark_1$$

14. a) i)  $F_1d_1 = F_2d_2$

$$40(0.25 - u) = 30 \times 20 \checkmark_1$$

$$10 - 40u = 600$$

$$40u = -590$$

$$U = \frac{-590}{40} \checkmark_1$$

$$= -14.75N \checkmark_1$$

$$\therefore u = 14.75 \text{ (acting upwards)}$$

ii)  $U = \text{wgt of liquid displaced}$

$$14.75 = mg$$

$$= v \times \rho \times g$$

$$\text{Vol of liquid displaced} = \text{vol of block}$$

$$= \frac{M_b}{\rho_b}$$

$$= \frac{25}{1000} \times 200 = 0.00125 \checkmark_1$$

iii)  $14.75 = 0.00125 \times \rho \times 10$

$$\Rightarrow \rho = \frac{14.75}{0.00125 \times 10} \checkmark_1$$

$$= 1180 \text{ kg m}^{-3} \checkmark_1$$

b(i) I-Serves as a pointer to the volume on scale

-A drying agent for the gas  $\checkmark_1$

II -To make the temperature of the bath uniform.  $\checkmark_1$

(ii) Heat the bath and record the temperature and height at suitable temperature interval.  $\checkmark_1$   
plot a graph of volume against temperature.  $\checkmark_1$  The graph is a straight line indicating proportional change in volume and temperature

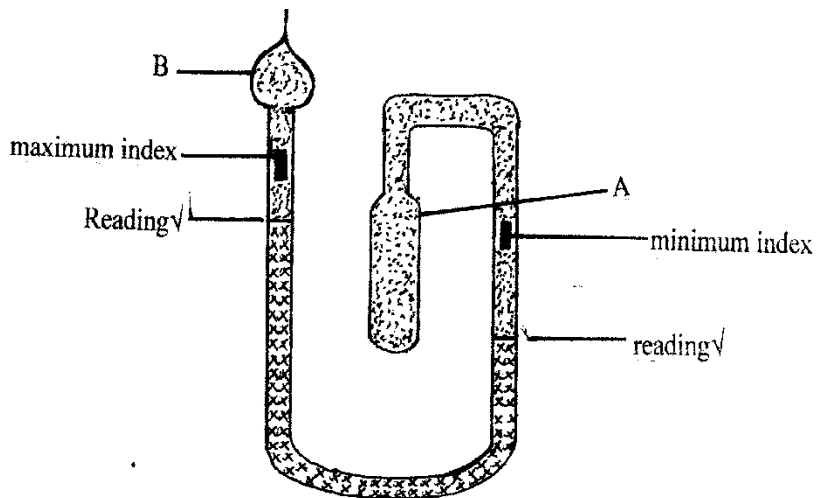
15. a) Alcohol ✓

b) So that the thermometric liquid does not vapourise ✓

c) When the temperature rises, bulb A expands pushing the mercury down on that side which in turn pushes the index up on the other side so that maximum temperature is recorded ✓

When temperature goes down the vapour pressure in bulb B pushed the alcohol above the mercury down which in turn pushes the mercury down. ✓ The index is left at the maximum point it had reached. The index on the other side is now pushed up and will be left at the highest point (minimum) when the situation reverses ✓

d) To bring down the index to the level of mercury after reading maximum and minimum temperatures ✓.



e) Range temperature =  $92 - 12 = 80^{\circ}\text{C}$

$$80^{\circ}\text{C} \text{ ——— } 100^{\circ}\text{C}$$

$$x \text{ ——— } 20^{\circ}\text{C}$$

$$x = \frac{80 \times 20}{100} \quad \checkmark \quad 16^{\circ}\text{C}$$

$$\therefore 16 + 12 = 28^{\circ}\text{C}$$

16. a) OA : object is accelerating

AB: object is accelerating gently and non-uniformly

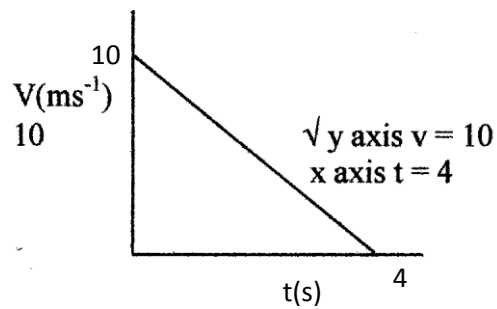
BC: Object moving at constant speed

b) i) (I)  $u = 10\text{m/s}$                        $v = u + at$   
 $a = -2.5\text{m/s}^2$                        $= 10 - 2.5 \times 1.5 \checkmark$   
 $t = 1.5\text{sec}$                                $= 6.25\text{m/s} \checkmark$

(II)  $s = ut + \frac{1}{2}at^2$   
 $= 10(1.5) - \frac{1}{2}(2.5)(1.5)^2 \checkmark$   
 $= 12.1875 \checkmark$   
 $= 12.19$

(III)  $v = 0$                                        $v = u + at$   
 $0 = 10 - 2.5t \checkmark$   
 $t = \frac{10}{2.5} = 4 \checkmark$

ii)



$V(\text{ms}^{-1})^{10}$

iii) Distance = Area of triangle  $\checkmark$

$\frac{1}{2} \times 4 \times 10$

$20\text{m} \checkmark$