

GOLDEN ELITE EXAMINTIONS 2020

232/1

PHYSICS

THEORY

PAPER 1

2 HOURS

MARKING SCHEME

SECTION A

1. Main scale reading 7.50mm
 Thimble scale $\frac{20 \times 0.01}{7.70} = 0.20$
 7.70mm

2. State pressure law state that the pressure of a fixed mass of a gas is directly proportional to it's absolute temperature provided volume is kept constant.

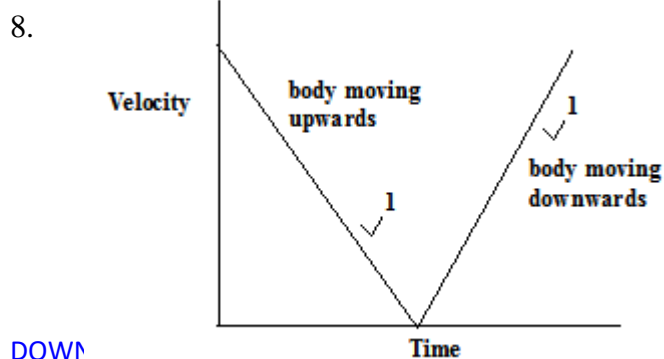
3. i) Position of the C.O.G.
 ii) Base area of support

4. Clock wise moment = anticlockwise moment
 $40 \times d = 10 (2 - d)$
 $40d = 20 - 10d$
 $40d + 10d = 20$
 $d = \frac{20}{50}$
 = 0.4m

5. $A_1 V_1 = A_2 V_2$
 $A_1 \times 0.1 = 2.2\text{m/s} \times 0.05$
 $A_1 = \frac{2.2\text{m/s} \times 0.05}{0.1}$
 = 1.1m²

6. To measure temperature using a thermometer - mercury inside expands and contracts

7. - Pressure
 - Impurities



9. Radiation does not require material medium for it to transfer heat. Conduction you need a material medium.

10. $V.R = 2$
 $\frac{80}{100} = \frac{M.A}{2}$
 $M.A = 1.6$
 $M.A = \frac{L}{E}$
 $1.6 = \frac{50}{E} \Rightarrow E = \frac{50}{1.6}$
 $E = 31.25N$

11. Density = $\frac{\text{Mass}}{\text{Volume}}$
 $= \frac{120g}{50 \times 4 \text{ cm}^3}$
 $= \frac{120g}{200\text{cm}^3} = 0.6g/\text{cm}^3$

12. Product of mass of a body and velocity ($P = m \times v$)

13. This is the distance between two successive threads of a screw.

14. a) i) $VAB = \frac{\text{distance}}{\text{time}}$
 $= \frac{0.5}{0.01s} = 50m/s^2$

ii) $VCD = \frac{\text{distance}}{\text{time}}$
 $= \frac{5.0cm}{0.01s} = 500m/s^2$

iii) acceleration = $\frac{v - u}{t}$
 $= \frac{500m/s - 50m/s}{5 \times 0.02S}$
 $= 4500m/s^2$

b) i) Work done = Area under the graph
 $= (\frac{1}{2} \times 900J \times 4m) + (900 \times 4) + (\frac{1}{2} \times 900 \times 4)$
 $= 1800J + 3600J + 1800J$
 $= 7200J$

ii) Power = force x velocity
 $= 900J \times 0.6m/s$

$$= 540 \text{ Watts}$$

15. a) Heat lost by the metal = heat gained by cold water
 $0.1\text{kg} \times C \times (100 - 23.4)\text{K} = 0.8\text{kg} \times 4200 \times (23.4 - 20)\text{K}$
 $C = \frac{0.8 \times 4200 \times (23.4 - 20)}{0.1 \times (100 - 23.4)}$
 $C = 1491.38\text{JKg}^{-1}\text{K}^{-1}$

- b) i) 80°C
 ii) Impurities
 Pressure
 Solid only - EF
 Liquid only - BC
 Solid and liquid - DE

16. a) The rate of change in momentum is directly proportional to the force causing it and it takes place in the direction of the force.

b) i) $V^2 = u^2 + 2as$
 $V^2 = 0 + 2 \times 10 \times 75$
 $V = 3.87\text{m/s}$

ii) $F = ma$
 $= 900 \times 10$
 $= 9000\text{J}$ (total for four tires)
 Braking force for each tires = $9000\text{J}/4 = 2250\text{J}$

iii) The breaking distance will increase because wet road offers less frictional force which is required for breaking.

c) Spring balance B rollers reduce friction between the surfaces.

17. a) Atmospheric pressure decreases with altitude, pressure inside the body overcomes atmospheric pressure causing weak veins to burst.

b) $P = Pgh$
 $= 6 \times 100 \times 10$
 $= 600\text{N/m}^2$

c) $F = P \times A$
 $= 0.015\text{m}^2 \times 4.5 \times 10 \text{ pa}$
 $= 675\text{N}$

d) Work done = Force x distance
 $= 550\text{N} \times 4\text{M}$
 $= 2200\text{J}$

18. a) i) When the oil is dropped on the water surface, it lowers its surface tension, this causes the powder to move away this forming a patch

ii) To make the oil patch visible

b) i)
$$V = \frac{4}{3}\pi r^3$$
$$= \frac{4}{3} \times \frac{22}{7} \times \left(\frac{0.7}{2}\right)^3$$
$$= 4.19\text{mm}^3$$

ii)
$$\text{Area} = \pi r^2$$
$$\left(\frac{73.5}{2}\right)^2 \times \frac{22}{7}$$
$$= 1155\text{mm}^2$$

iii)
$$\text{Thickness (t)} = \frac{\text{Volume of oil drop}}{\text{Area of the patch}}$$
$$= \frac{4.19\text{mm}^3}{1155\text{mm}^2}$$
$$= 3.6 \times 10^{-3}\text{mm}$$