**PHYSICS**

**Paper 1**

**2 hours**

**Marking scheme**

**Trial 2 2019**

**SECTION A (25 MARKS )**

1. *Length (1mk) 13.2cxm*

*Length/ 6 rounds (1mk)*

*13.2/6*

*=2.2cm 1mk*

1. Q=MCDQ

 Heat lost=Heat gained5 x c x 40 =- m x 25 x 4

 M= 5 x 40

 25

 = 8Kg

1. V= 2 x 10 -4 = 0.25cm

 800

1 drop = 0.0025cm3

D= V/A = 0.00025

 54

 = 5.0 x 10-5cm

1. *250y+100(y-5)= 600(10-y)*

 *250y+ 100y- 500= 6000-600y*

*600y+350y = 6000+500*

*Y= 6.842m*

1. *300= 0.5gt2*

*t= 7.746sec*

*R=ut = 400×7.746= 3098.4m*

1. Conduction
2. *To make it sink , ice is less dense that water and therefore float on water*
3. Speed is rate of change of distance with time, it has no direction while velocity is the rate of change of displacement with time it’s a vector quantity
4. *Up thrust and friction force*
5. This is because the glass is heated first water drops to occupy the space created as a result of this expansion. Water expands more than the glass and therefore water level rises further
6. *This is because by carrying it on his back this would raise his centre of gravity and therefore he can easily fall. Carrying it on the carrier would lower the Cog and thus be stable*

**Section B (55 Marks)**

1. . a i) automatically switching on and off of the heater element

ii) when the heat increases beyond the required temperature brass expands more than the iron; the strip curves downwards breaking the contact; when the temperature lowers the strip contracts completing the circuit and the process continues;

b)i heat capacity- quantity of heat required to raise the temperature of a substance by 1k

specific heat capacity- quantity of heat required to raise the temperature of a unit mass of a substance by 1k.

 ii) Q= pt;

 3 x 4200 x 50 = 2.5 x 1000 x t;

 T= 252s;

1. (a) A glass capillary contains enclosed air by a thread of mercury 15cm long when the tube is horizontal, the length of the enclosed air column 24cm as shown.

24cm

15cm

1. What is the length of the enclosed air column when the tube is vertical with the open end uppermost if the atmosphere pressure is 750mmHg? (2mks)

***P1V1=P2V2***

***24×750= (750+15)V2***

 ***V2= =23.53cm***

1. Explain why the mercury does not run out when the tube is vertical with the closed end uppermost. (1mk)

***The mercury does not run out because the upwards atmospheric pressure in the mercury column is greater than the downward pressure due to the enclosed air and its own mass.***

b) Explain why an air bubble increase in volume as it rises from the bottom of a lake to the surface. (1mk)

 ***At the bottom of the lake, the bubble is under the pressure of water column + the atmospheric pressure on the surface of water. As the bottle rises the depth of the water column decreases as so does the pressure decreases in pressure results in increase in where since PV=a constant (Boyle’s law)***

c) When an inflated balloon is placed in a refrigerator it is noted that its volume reduces, use the kinetic theory of gases to explain this observation. (2mks)

***Low temperature reduces the kinetic energy of molecules which lead to lower rate of collision which results to reduction of pressure.***

d) A certain mass of hydrogen gas occupies a volume of 1.6 at a pressure of 1.5 × Pa and a temperature of 220c. Determine the volume when the temperature is 00c at a pressure of 0.8×105 Pa. (3mks)

 **=**

 **=**

 **V2= 2.776cm3**

 e) i)State the pressure law (1mk)

***Pressure of a fixed mass of a gas is directly proportional to its absolute temperature provided volume is kept constant***

ii)On the axis provided, sketch a graph of pressure against temperature on the celcius scale. On the same axis sketch another graph for a gas of a larger volume. (2mks)

Pressure (Pa)

Temperature (oc)

L2

L1

-273

1. (a) (i) - Transferring the force that is required to do certain work. ✓1

 - Changing the direction of a force to more convenient direction ✓1

 - Increasing the rate at which work is done. ✓1 (Any two)

 (ii) - Friction between the moving parts of the machine. ✓1

 - Weight of the moving parts ofthe machine. ✓1

(b) (i) Wheel and axle. ✓1

 (ii) V.R = ✓1

 In one complete turn of the wheel, the axle also makes one turn. So effort distance = 2 while load distance is 21

 Therefore V.R = ✓1

 V.R =

 (iii) V.R = = 9✓1

 η=

 95% = ⇒mA=9 = 8.55✓1

 But mA = ⇒E = = ✓1

 = 327.485N

(c) As the load increases, effects of friction and weight of the movable parts of the machine become negligible. ✓1

1. (a) V=2πrf;

 = 2 x 22 x 1.5 x 3;

 7

 = 28 . 286m/s;

ii) T= Mr2 - mg;

 r

 =0.45 x 28.292 - 0.45 x 10;

 1.5

 = 235 .60 N;

b) mark on the diagram- horizontal projection to the left

 c) i) ω=∆Ɵ

 ∆t;

 = 4/10

 0.01;

 = 0 . 4

 0.01

 = 40 rad/s;

ii) T=1/f;

 ω=2πf

 40 =2πf; f=6.36Hz

 T=0.1571s;

17) (i) B

 (ii) Potential energy = kinetic energy

 🗸¹

  🗸¹

 V = 1.4142 m/s 🗸¹

1. Momentum before collision = momentum after collision. 🗸¹

0.02 × 1000 + 12 × 0 = (12 + 0.02) V 🗸¹

20 = 12.02V

V = 1.664m/s 🗸¹

 (c) (i) u = 0

 S = 200m

 a = 1

 s = ut + a t² 🗸¹

 200 = Ot + 🗸¹

 t = 20S 🗸¹

 (ii) Resultant force F = m.a

 = 0.2 × 1 🗸

 = 0.2N

 Friction force = 0.6 – 0.2

 = 0.4N 🗸¹