**MWAKICAN JOINT EXAMINATION (MJET) - 2017**

**FORM ONE PHYSICS MARKING SCHEME**

1. **V = 26 – 16 = 10cm3 ;**

**d = m = 125 = 12.5g/cm3 ;**

 **V 10**

1. **5 or 5 x 0.000001 = 0.000005kg**

 **1,000,000**

1. **When the flask cools initially, it contracts; reducing in volume and forcing the water to rise. When the low temperature reaches the water inside, the water cools and contracts; reducing in volume and the water level falls steadily.**
2. **Pressure applied at one part of a liquid is transmitted equally to all parts of the enclosed liquid.**
3. **The wheels increase the area in contact with the ground and hence reduce the pressure exerted by the truck.**
4. **p = hdg;**

 **=0. 75 x 13600 x 10**

 **= 102,000pa or 102,000N/m2**

1. **The adhesive force between water and glass molecules is stronger than the cohesive force between water molecules;**

**The cohesive force between mercury molecules is stronger than the adhesive force between glass and mercury molecules;**

1. **a)** **Volume of bottle = Volume of water =** $\frac{m}{d}$ **=** $\frac{28-16}{1}$ **= 12cm3**

**b) Density = Mass**

 **Volume**

 **= 31 – 16**

 **12**

 **= 15**

 **12**

 **= 1.25g/cm3**

1. **a) m =** $\frac{w}{g}$

 **=** $\frac{320}{10}$ **= 32kg**

**b) g =** $\frac{w}{m}$

 **=** $\frac{192}{32}$ **= 6N/kg**

1. **-Expand and contract uniformly.**

**-have a wide range of temperature**

* **Do not stick to the inside of the tube/does not wet the tube**
* **Can be easily seen/visible**
* **Does not vaporize and distil onto the upper parts of the tube.**

**Any two**

1. **-73 + 273 = 200K**
2. **(a) The force which causes the surface of a liquid to behave like a stretched elastic skin.**

**(b) Presence of Impurities**

 **Change in Temperature**

1. **a) i) To show movement of air molecules**

 **ii) To focus the light into the smoke cell**

 **iii) To magnify the smoke particles**

**b) i) Bright specks/smoke particles are seen moving randomly in all directions**

 **ii) Smoke particles are being hit/knocked/bombarded by the invisible air molecules which are in constant random motion.**

 **iii) The Brownian motion of the particles increase**

**c) In solids, the molecules vibrate to and fro in their fixed positions; In gases molecules are**

 **free and move randomly in all directions.**

1. **a) Pressure is the force acting perpendicularly per unit area;**

**b) i) m = d x v**

 **= 2.5 x 20 x 10 x 5**

 **= 2,500g or 2.5kg**

 **ii)**

 **F= mg = 2.5 x 10 = 25N**

 **A = 0.1 x 0.05 = 0.005m2**

 **p =** $\frac{F}{A}$

 **=** $\frac{25}{0.005}$

 = **5,000N/m2**

**c) i) p =** $\frac{F}{A}$

 **=** $\frac{20}{0.02}$ **= 1,000N/m2**

 **ii) F = P x A**

 **= 1000 X 0.4**

 **= 400N**

 **OR**

 **F2 =** $\frac{F1A2}{A1}$ **=** $\frac{20 X 0.4}{0.02}$

 = **400N**

1. **a) Temperature is the degree of coldness or hotness of a body**

**b) – Does not wet glass**

 **- It is a better heat conductor**

 **- It is opaque and easily seen**

 **- Does not vaporize onto the upper parts of the tube**

 **- Thread has no tendency to break**

 **Any three correct**

**c) To break the mercury thread when the temperature is falling enabling the temperature to be read**

**d) It would break since water boils at 100oC whereas it measures up to a maximum of about 43oC**

**e) Length of 100oC = 5.5 – 0.5 = 5cm ;**

 **Length within 100oC = 3 – 0.5 = 2.5cm**

 **Temperature =** $\frac{100 x 2.5}{5}$ **;**

 **= 50oC**

1. **a) - causes breakage of pipes when it freezes in them;**
* **causes marine accidents due to icebergs**

 **b)**



 **Correct labeling**

 **Correct X-scale**

 **Minimum volume at 4oC**

 **c) - Riveting metal plates**

 **- Joining wheel and axle**

 **- Bimetallic thermometer**

 **- Thermostat**

 **- Any other suitable application**

 **Any two correct**

 **d) ice being less dense than water floats on the water. It insulate the water below against heat losses to the cold air above**

1. **(a) A scalar quantity is a quantity that has magnitude only and no direction**

 **E.g. mass, time, distance, speed.**

 **A vector quantity is a quantity that has both magnitude and direction.**

 **e.g. displacement, velocity, force, acceleration.**

**(b) MASS WEIGHT**

* **Quantity of matter in a body Pull of gravity on a body**
* **Measured in kilograms Measured in Newtons**
* **Constant Changes from place to place**
* **Measured using abeam balance Measured using a spring balance**
* **A scalar quantity A vector quantity**

**C) The end rubbed with soap reduces the surface tension on that end. The matchstick moves towards the end with greater surface tension.**

**d) F=5-2**

 **=3N**