MARKING GUIDE S2

Q1. (1mark for each correct answer)

A) e)

B) d)

C) c)

D) b)

Q2. (1mark for each correct answer)

a) Mass

b) Length

c) Power

d) Force

e) Speed

Q3. (1mark for each correct answer)

a) True

b) False

c) True

d) False

Q4.

a) v_1= 10m/s

v_2= 30m/s

$v_{av} = \frac{v1+v2}{2} = \frac{10+20}{2} = 15m/s$

b) $a = \frac{v2-v1}{t} = \frac{30-10}{2} = 5m/s^2$

$d=u.t + \frac{1}{2}at^2 = (10 \times 2) + \frac{1}{2} \times 5 \times 2^2 = 20 + 10 = 30m$

Q5. a)

Vector quantity	Scalar quantity
Is a quantity with both magnitude size and direction	Is a quantity with magnitude size only
Example: Force, acceleration	Example: Mass, time

b) Non-uniform velocity: it is a type of velocity which keeps changing over time.

c) u=10m/s

v=34m/s

a=3m/s^2

t= $\frac{v-u}{a} = \frac{34-10}{3} = 8s$

Q6. a) Archimedes' principle states that "when an object is wholly or partially immersed in a liquid, it experiences an upthrust force that is equal and opposite to the weight of liquid displaced by the immersed object"

b) (i) 8N

(ii) 6N

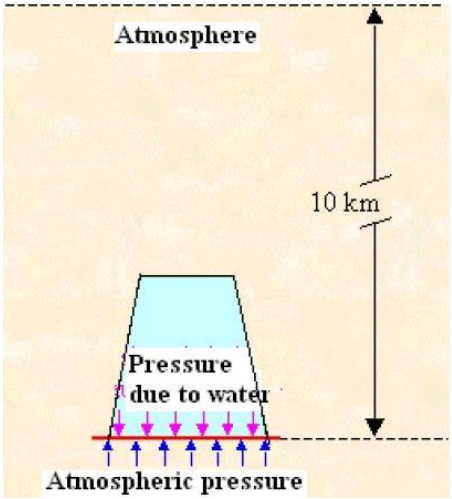
(iii) 5N

Q7.

(a) A barometer

(*b*) Use a crashing can experience or any other experiment.

Inverting a glass of water



Prove of existence of atmospheric pressure by inverting a glass of water covered by a sheet of paper. When the glass was turned downwards, water remained inside. Atmospheric pressure keeps the paper into contact with the upturned glass, thus keeping the water in the glass.
(c) P = ρ.g.h = 1 000 X 10 X 10 = 100 000 Pa
Q8.
a) Law of floatation: for any floating object, it displaces an amount of fluid whose weight is its own weight.
b) Density of sea water is greater than the density of river water; it experiences an high upthrust force in sea water than in river water.

Q9.a)

Force	Pressure
It is a pull or push acting on an object as result of its interaction with another object	It is a force acting normally per unit of area of where it acts
Its SI unit is NEWTON	Its SI unit is Pascal
It is a vector quantity	It is a scalar quantity

b) The pressure applied to a confined fluid is transmitted undiminished in every direction throughout the fluid

Q10.a) Viscosity is a measure of the fluid's resistance to flow

b) Soap reduces the surface tension of water, making it easier for the water to spread and wet surfaces.

Q11.

a) (i) Velocity /speed (1mark)
(ii) Force (1mark)

b) (1mark for each correct answer)

Numbers	Significant figures
102.500	6sf
0.00300	3sf
307000	3sf

Q12. (1mark for each correct mark)

a) accelerating

b) constant speed

c) decelerating

d) at rest

e) accelerating

Q13. (1mark for each correct answer)

(i)→ (c)

(ii)→ (b)

(iii)→ (a)

Q14.

$A=lw=(21.3)\ (9.80)=208.74cm^2=209cm^2$**(**1mark)

$\Delta A=A(\frac{\Delta L}{L}+\frac{\Delta W}{W})=4.0086cm^2$ (2marks)

$A=lw=(21.3\pm0.2)(9.80\pm0.10)=(209\pm4)cm^2$ ***(1mark)***

Q15. (1mark for each correct answer)

1→ (C)

2→ (a)

3→ (d)

4→ (e)

5→ (b)

Q16(a) Potential energy may be defined as the energy possessed by an objects or bodies due to their position (**1 mark)** or state of strain or the position of their parts. Potential energy is energy deriving from position. Potential energy is referred to as stored energy because it can be looked at as energy which will be used when time comes for it to be used while Kinetic energy is the form of energy possessed by moving bodies **(1mark)**. Kinetic energy of a body is dependent up on both the body's mass and speed.

(b)i)Potential energy–Kinetic energy–Sound energy–heating energy(2marks)

ii) Potential energy: **(2marks)**

$E_p=mgh=0.1\times10\times3=3J$

iii)Loss of Potential energy=gain in Kinetic energy

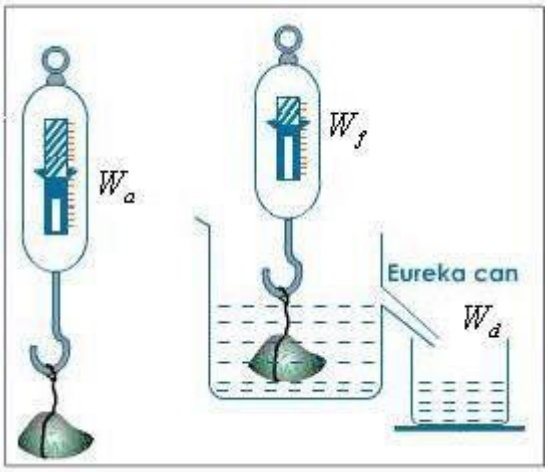
when h=0

Loss of potential energy: $\Delta E_p=mgh-mg\times0=3J$

$E_k=3J$ **(2marks)** iv) Non, because it has energy.**(1mark)**

Q17.

- Place a Eureka can (over-flow vessel)on a table and place a beaker under its spout as shown in figure below.**(1mark)**
- Pour water into the can till the water starts overflowing through the spout.**(1mark)**
- When the water stops dripping replace the beaker by another one of Known weight: **(1mark)** W_b
- Suspend a stone with the help of a string from the hook of a spring balance and record the weight of thestone:W_a**(1mark)**



1markfordiagram

- Now, gradually lower the body into the Eureka can containing water andrecord its new weight in water when it is fully immersed in water: W_f **(1mark)**
- When no more water drips from the spout, weigh the beaker containing water: W_{bw}**(1mark)**

- Weight of water displaced=$W_d = W_{bw} - W_b$ **(1mark)**

- Apparent loss of weight of the stone=$B = W_a - W_f$ **(1mark)**

- You will notice that $W_d = B = \rho_f g V_d$

Thus, the apparent loss of weight of the body, or the upthrust on the body equals the weight of the water displaced i.e when a body is totally or partially immersed in a fluid it experiences an upthrust equal to the weight of the fluid displaced. ***(1mark)***

$A = lw = (21.3 \pm 0.2)(9.80 \pm 0.10) = (209 \pm 4)\text{cm}^2$ ***(1mark)***

18. (a) i) Power developed or rate of doing work is obtained by dividing work done by time taken i.e.

$W = \frac{W \times h}{t}$ (1mark)

$W = \frac{w \times d}{t}$

1. Measure your own mass using a bathroom scale and calculate your weight. **(**1mark)
2. Have a friend use a stop watch to measure the time you take to run up a flight of stairs.**(**1mark)
3. Count the number of steps, measure the height of each, and calculate the total height climbed.**(**1mark)
4. Calculate the work done in climbing the stairs (work= force× distance).**(**1 mark)
5. Finally, calculate the work done per second (i.e., the power at which you were working when climbing the stairs).

(b) The energy used is mechanical energy from muscles. **(**1mark)

(c)The minimum force required to lift a bag of50 kg, is the weight of the bag i.e.

ω=*mg*=50×10=500*N (1mark)*

The actual work *W=Fd*=500×2=1000*J (2marks)*

(iii) P== $\frac{w}{t} = \frac{1000}{5} = 200w$ *(1mark)*

Q20.

Symbol	Name of Physical quantity	SIUnity
P	Pressure**(0.5 marks)**	Pa**(0.5marks)**
V	Volume**(0.5marks)**	m^3**(0.5marks)**
N	Amount of matter(**0.5marks)**	mol**(0.5marks**)
R	Molar gas constant**(0.5marks)**	J/molK(**0.5marks)**
T	Thermodynamic temperature(**0.5marks)**	K**(0.5marks)**

b)

V_2=$\frac{T2\times T1}{T2} = \frac{360\times 600}{350}$=617ml

c)

P_2= $\frac{P1\times T1}{T2} = \frac{330\times 200000}{300}$ =2200000Pa