NAME:…….ADM:…….CLASS:……

MARKING SCHEMES
232/1
End termPHYSICS
PAPER 1
2 HOURS
FORM 3

INSTRUCTIONS TO THE CANDIDATES

- **Write your name, adm number and dates on the spaces provided above clearly**
- **The papers consist of section and b as follows. Section a = 25mks, section b 75mks**
- **All questions must be answered on the spaces left/provided after each.**
- **All working must be clearly shown and numerical answers given in correct SI units.**
- **Mathematical tables and silent electronic calculators may be used.**

SECTION A (25 MARKS)

1. State any two forces that acts between two objects not in contact. (2mks)

- **Gravitional force**
- **Magnetic force**
- **Electronic force**

2. State two physical characteristics that change when a metal cube is heated. (2mks)

- **Volume**
- **Density**

3. The diagram below shows jets from two holes at the side of a tank filled with water. Explain why Jet A is longer than B (2mks)

- **Has smaller cross-sectional area than B**

4. State the law of conservation of linear momentum (1mk)

- **Total momentum before collition is equal to total momentum after collition.**

5. State physical quantities whose SI units are shown below. (2mks)

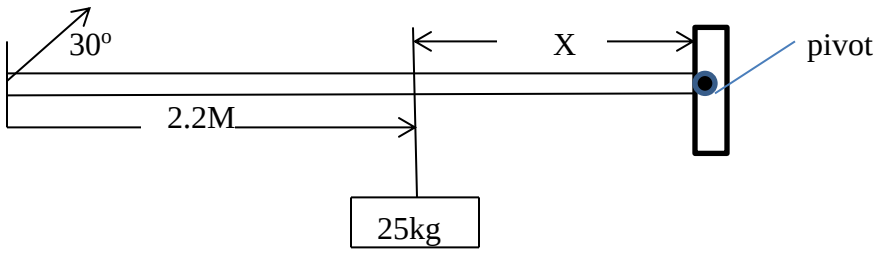
   NM- **momentum of force**

   Kgm/s- **momentum**

   M^3/s- **flow rate**

   J/kg K- **specific heat capacity**

6. The system below was used to balance a mass of 25kg fixed at a distance of Xm from the pivot. Find the value of X to 2.d.p. (3mks)

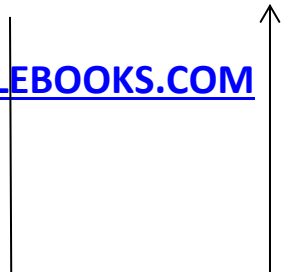


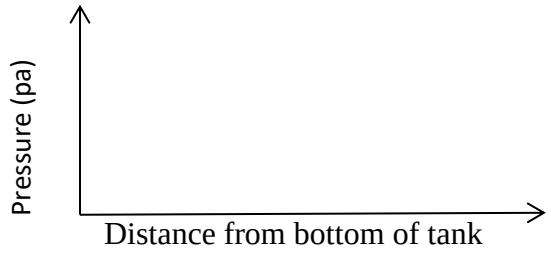
- **Sum of clockwise = sum of anticlockwise**
  Moment moment
- **40 sin 30o(2.2x) = 2.5 x 10x x (1mk)**
- **44=230x**
- **X=44/230 = 0.19M**
-

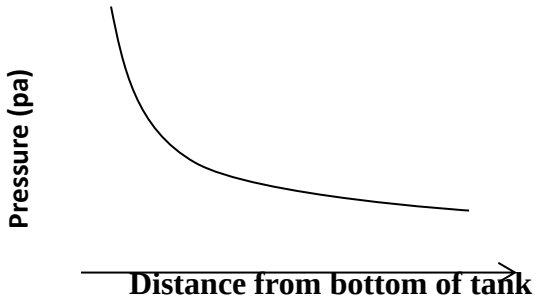
7. State two circumstances under which an object floats on a liquid. (3mks)

- **Object is less dense than the liquid.**
- **Object displaces liquid equal to its weight**
- **Object placed carefully and slowly on the surface (may be accepted)**

8. In the graph below sketch the graph of pressure experienced by a ball moving from the bottom of a tank of water towards the surface.







9. Two springs A and B. have the same length and same diameter. When the same object was suspended from the bottom of each spring separately, there was a difference in their extensions. State two factors that may have caused the difference extensions (3mks)

- **Differentiate number of turns per unit length**
- **Nature of material used to make spring**
- **Thickness/area of cross section of material**

10. A road surface offers friction of 32,000N, to a vehicle of mass 2500kg running on it. Find the coefficient of kinetic friction of the road. Explain if the value obtained will change when it rain. (3mks)

- **Fr = NkR=NkMg = 1.28**
- **Nk=Fr/mg = 32000 Nk will descrease since**
  2500x 10 fraction reduces

11. In a laboratory experiment, it was realized that two different gases of equal volume diffused across a chamber at different rates. What may have caused the difference? (3mks)

- **Differences in density**
- **Differences in temperature**
- **Difference in pressure**

12. State one physical change that affects the speed of sound in air. 1mks

- **Temperature. Sound travels faster in hot air than in cold air**
- **Humidity velocity of sound in air increase with humidity wind.**

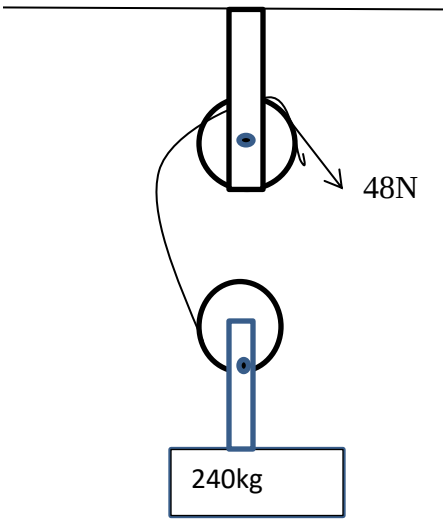
SECTION B. (75MKS)

13. ((a) Outline the order of energy transformations when lighting a match box (3mks)

- Chemical energy K Energy Sound energy / heat energy

(match box) Moving match box _____ Light energy

(b) The system below was used to lift a load of mass 240kg in a warehouse using a force of 48N.



Find

(i) V..R (2mks)

- **Number of ropes supporting load = 2**

(ii) Efficiency

(3mks)

- **Ma=load = 240 x 10=50**
  Effort 48

14. (a) Explain how unusual expansion of water favours aquatic life. (4mks)

- **- ice expands from 0-4oC, hence density decreases**
- **This enables ice to float on water forming thick layers # the ice movement loss of heat from water.**
- **As temp increase with depth, favourable condition for aquatic animals and pleats is created.**

(b) The number of particles per mm^3 of substances A, B and C are given in the table below.

substance	No of particles per mm^3
A	3.0×10^7
B	4.5×10^{28}
C	$6.8.x\ 10^{12}$

(i) Identify the states of matter of the substances (3mks)

A Gas
B solid
C liquids

(ii) Explain how the number of particles of B will change when heated. (3mks)

- **Number of particles will decrease as they acquire more energy causing them to break away from their positions hence occupy more space.**

15. State the factors that determine pressure exerted by a wooden block resting on a table surface. (3mks)

- **Area in contact with the table surface**
- **Weight/mass of the wooden block.**

16. (a)A bullet of mass 20g travelling at a velocity of 600m/s hits a suspended wooden block of mass 400g. The bullet gets stuck inside the wooden block and the two bodies move together in one direction. If the string holding the wooden block is not cut; Find

(i) The common velocity of the bullet and wooden block. (3mks)

Common velocity
$M_1v_1 + m_2v_2=(m_1+m_2)v_2$
$0.02+600= (0.02+0.4)v_2$
$V_2=\frac{(0.02\times600)}{0.42}$
=28.6m/s

(ii) Maximum height the two bodies reach (3mks)

- **maximum height=**
- **$mgh=1/2\ MV^2$**
- **$h=\frac{v^2}{g}=\frac{(28.6^2)}{10}$ 81.8M**

h= 81.8m

(iii) The time taken by the two bodies to reach maximum height (3mks)

- **T=v/g**
- **=28.6/10**
- **=2.86s**

17. (a) (i) State two characteristics of turbulent flow. (3mks)

- **Particles of different layers flow at different velocities.**
- **Fluid flow at relatively high velocity**
- **Fluid flow at relatively high velocity**
- **It is characterized by eddies**

(iii) Give three examples of Bernoulli's effect in air. (3mks)

- **Aerofoil of aeroplanes**
- **Lifting of roof tops of houses**
- **Trees at the sides of roads bend towards the road**

(b)(i) A liquid flows in a pipe of cross sectional area $60cm^2$ has a constriction of cross sectional area of $18cm^2$ of one point. The velocity of the liquid at the construction is $5m/s^{-1}$. Find
(i) The velocity of liquid in the wider section (3mks)
$A_1V_1=A_2V_2$
$60x\ V1=\frac{18\ x5=1.5m/s}{60}$
V1= 1.5m/s

(ii) The volume of liquid in litres that passes through the construction in one hour. (3mks)

- **Volume= AVT**
- **$18 \times 10^{-4} \times 5=32.4m^2$**
- **32,400litres**

18. A stone is projected vertically upwards from the top of a building at a velocity of 20m/s. If the stone returned $5^{1/2}$ seconds to reach the bottom of the building. Find;
(i) After how long did the stone start the down ward journey (3mks)

Time, t= V/g
=20/10
2s

(ii) Height of the building. (3mks)
Height of the building
T=5.5 – (2x2) = 1.5s
$S=VT + ½\ gt^2$
$20x1.5 + 1/2x10 \times 1.5^2$
=41.25m

(iii) Velocity with which the stone hits at the bottom of the building (3mks)
Velocity= U+gt

19.a) Ad = V — 1 ✓ form
2000d = 0.4 — 1 ✓ substitution
d = $\frac{0.4}{2000}$
= 2×10^{-4}mm
= 2×10^{-7}m — 1 ✓ answer

b (i) Hydraulic lift 1mk
(iii) Hydraulic brake system 1mk