Candidate's No. ……...

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND CULTURE
FORM TWO SECONDARY EDUCATION EXAMINATIONS, 2003

0031 **PHYSICS**
TIME: 2 HOURS

INSTRUCTIONS

1. This paper consists of sections A, B and C.
2. Answer ALL questions in ALL sections.
3. Section C should be answered on separate sheets of paper provided. In your calculations you are required to show clearly all the steps of your work in a systematic manner.
4. Whenever necessary use the following constants:
   Density of water = 1 g/cm^3 or 1000 kg/m^3
   Acceleration due to gravity g = 10 m/s^2
   S.T.P. means T = 273 K, P = 760 mmHg.
   The specific heat capacity of water = 4200 J/kgK
5. Cell phones are not allowed in the examination room.

FOR EXAMINERS USE ONLY		
QUESTION NUMBER	**SCORE**	**INITIALS OF EXAMINER**
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
TOTAL		

This paper consists of 8 printed pages.

SECTION A (20 MARKS)

This section consists of twenty (20) multiple choice questions. Answer ALL questions in this section by writing the letter of the correct answer in the box provided:

1. (i) The shortest length which can be measured by a metre rule is:

A. 0.1 mm
B. 1.0 mm
C. 10 mm
D. 100 mm

(ii) Which of the following is a unit of force:

A. Kg m/s
B. Kg ms
C. Kg m/s^2
D. Kg ms^2

(iii) The meniscus of mercury in a glass vessel curves upwards because:

A. The cohesion of molecules of mercury is stronger than the adhesion of molecules of glass and mercury
B. The adhesion of molecules of mercury is stronger than the cohesion of molecules of mercury.
C. Mercury experiences a downward force equal to its weight.
D. Mercury is denser than glass.

(iv) The minimum pressure exerted by a rectangular wooden block of 1 kg measuring 4 m x 3 m x 2 m on the bench is:

A. 0.17 Pascals
B. 1.25 Pascals
C. 1.67 Pascals
D. 0.83 Pascals

(v) The normal body temperature of human beings is:

A. 13.8°F
B. 66.4°F
C. 98.4°F
D. 38°F

(vi) The image formed by a plane mirror is always:

A. Smaller than the object
B. Virtual
C. Larger than the object
D. Real

(vii) The process of removing magnetism from a given material is called:

A. Magnetization
B. Induction method
C. Demagnetization
D. Electrification

(viii) A body which gains excess electrons becomes:

A. Negatively charged
B. Positively charged
C. Electrified
D. Both A and B are correct

(ix) A potential difference of 24 volts is applied across a resistor of resistance 12 ohms. The current flowing in the circuit is:

A. 0.5 A
B. 1.5 A
C. 2.0 A
D. 2.5 A

(x) Which of the following is not a form of energy:

A. Light
B. Friction
C. Magnetism
D. Electrons

(xi) The efficiency of a machine is defined as:

A. Work done in load
Work done by effort
B. Mechanical Advantage
Velocity ratio
C. Velocity ratio
Mechanical Advantage
D. Work done by effort
Work done by load

(xii) A person in a bus which starts to move forward tends to fall backwards. This is because he/she is obeying:

A. The Principle of moment
B. Newton's third law of motion
C. Newton's second law of motion
D. Newton's first law of motion.

(xiii) Steam at 100°C has more burning effect than water at 100°C because:

A. The latent heat of vaporization is higher than the specific heat capacity of water at 100°C.
B. Steam is less dense than water.
C. The molecules of water in steam have more kinetic energy than those of water at 100°C.
D. Steam is at a higher temperature than water at 100°C.

(xiv) The ratio of the density of the substance to the density of water is:

A. Mass per unit volume
B. Relative density
C. Upthrust
D. Density of a substance.

(xv) When a body floats in water:

A. It displaces its own volume of water.
B. The mass of the water displaced by the body is equal to its own mass
C. It weighs the same as in air
D. The downthrust is more than the upthrust.

(xvi) The surface tension of liquid is due to:

A. Molecules on its surface.
B. Elastic skin which covers the surface of the liquid.
C. Cohesive forces between its surface molecules.
D. Adhesive force between different molecules.

(xvii) Solids expand when heated because:

A. The molecules expand.
B. Increased molecular motion pushes the molecules further apart.
C. Heat takes up space between the molecule.
D. The molecules soften and begin to flow.

(xviii) For a rigid body, there is one point at which the resultant force appears to act. This point is known as:

A. Neutral point
B. Balancing point
C. Centre of gravity
D. Central position of a body.

(xix) The area under the velocity-time graph for a uniformly accelerated motion of a body represents:

A. Acceleration of a body
B. Retardation of a body
C. Distance travelled by a body
D. None of the above.

(xx) If one cell in a three torch cell is placed in the opposite direction:

A. The torch will not give light
B. The torch will give very bright light
C. The torch will give very dim light
D. THe torch will give normal light.

SECTION B (40 MARKS)

2. Match the following items by writing the letter of the correct meaning from list B against the number of the item in list A.

LIST A	LIST B
(i) Force	(a) Power
(ii) Electrophorus	(b) Easy flow of a liquid
(iii) Voltmeter	(c) Existence of atmospheric pressure
(iv) Alcohol	(d) Thermometric liquid used to measure very low temperatures
(v) Crushing can experiment	(e) Rate of change of momentum
(vi) Viscosity	(f) Change detector
(vii) Latent heat	(g) Energy
(viii) Rate at which energy is consumed	(h) Change of momentum with time
	(i) Measures electric current
	(j) Thermometric liquid for measuring high temperatures
	(k) The force of friction which exists between the layers of a liquid or gas.
	(l) Heat required to change a substance from one state to another without change in temperature
	(m) Tumbler experiment
	(n) Produce electric charges
	(o) Measures potential difference
	(p) Heat required to change a unit mass of a substance from one state to another without change in temperature.

NUMBER OF LIST A	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)

Answer the questions 3 - 6 by filling in the correct answers in the spaces provided

3. (a) Two applications of a Gold leaf electroscope are:

(i) _____
(ii) _____

(b) In everyday life capillarity plays a role in the

(i) _____
(ii) _____

(c) The three processes of heat transfer are:

(i) _____
(ii) _____
(iii) _____

(d) The number of images formed by mirrors at 90° are

4. (a) Two types of mechanical energy are:

(i) _____
(ii) _____

(b) A block and tackle containing 3 fixed and 2 movable pulleys is used to lift a load of 1200 N to a storey 15 m from the ground. if the work done in overcoming friction in the system is 6000 J. Calculate the

(i) Work done by the effort
(ii) Efficiency of the machine
(iii) Effort applied.

5. (a) The fundamental law of electrostatic charges states:

(i) _____
(ii) _____

(b) Substances which allow electricity to flow through them are called _____ while those which do not allow the flow of electricity are called _____.

(c) The Volt is a practical unit for both _____ and _____.

6. (a) A body covers a distance of 480 m in 6 sec. Its speed is _____.

(b) When a solid is heated the following may occur

(i) _____
(ii) _____
(iii) _____

(c) A man weighing 800 N takes a minute to run upstairs. In so doing he ascends a vertical height of 3 m. His power is _____

SECTION C (40 MARKS)

Answer ALL questions in this section on the separate sheets of paper provided.

7. (a) Differentiate between the real weight and apparent weight of an object as applied in Physics.

(b) A solid weighs 64 N in air and 48 N when totally immersed in a liquid of denisty 0.8 g/cm^3.

Calculate:

(i) The upthrust on the solid.

(ii) The volume of the solid.

(iii) The density of the solid.

8. (a) State the 2nd and 3rd Newton's laws of motion.

(b) A 90 Kg bus starts from rest and accelerates uniformly at 5 m/s^2 for 10 seconds. Calculate

(i) The velocity of the bus in the 8th second.

(ii) The momentum of the bus in the 5th second.

(iii) The force of the bus.

9. (a) (i) What is the difference between heat and temperature?

(ii) Define specific heat capacity of a body.

(b) A piece of metal with a mass of 200 g at a temperature of 100°C is quickly transferred into 50 g of water at 20°C. Find the final temperature of the system.

(specific heat capacity of metal = 400 J/kg°C)

(c) If the amount of heat required to melt 800 g of ice at 0°C is 267,520 Joules, determine the specific latent heat of fusion of ice.

10. Diagram 1 below, depicts one of the instruments used in making measurements.

(a) What is its name?

(b) Name the parts shown

(c) The instrument is used to measure _____ and _____ of objects.

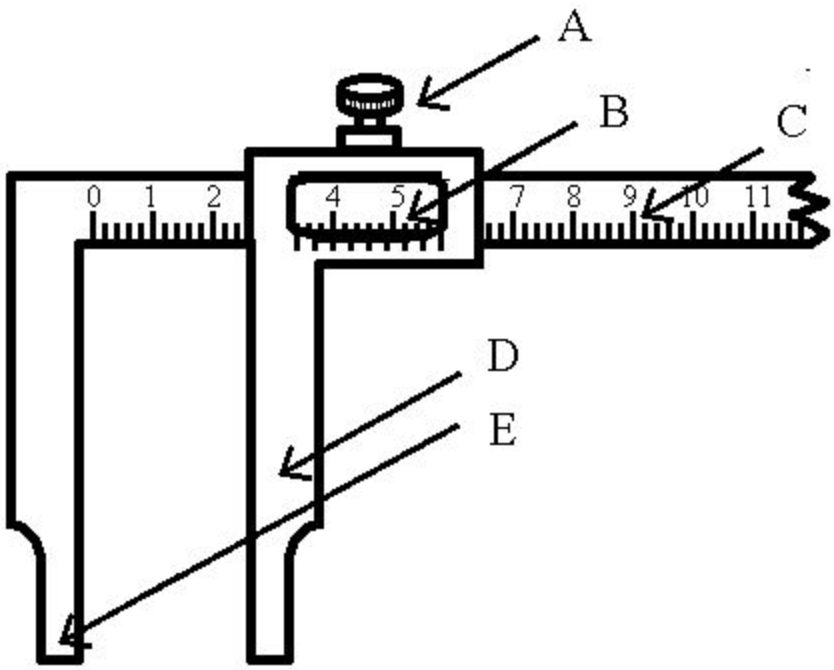


Diagram 1