Candidate's No. ……...

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND CULTURE
FORM TWO SECONDARY EDUCATION EXAMINATIONS, 2004

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

Answer ALL questions in this Section by writing the letter of the correct answer beside the question number in your answer book.

1. (i) The branch of science in which the relationship between matter and energy is studied is called:
A. Chemistry
B. Biology
C. Physics
D. Agriculture Science

(ii) Measurement in Physics is:
A. Calculation
B. Beam balance
C. Spring balance
D. The processes of assigning numbers to observations and events.

(iii) A mass of 1 kilogram is pushed by the gravitation force towards the centre of the earth by a force of:
A. 1 Newton
B. 10 Newtons
C. 100 Newtons
D. 1000 Newtons

(iv) The velocity-time graph has a slope which represents:
A. Displacement
B. Acceleration
C. Velocity
D. Spéed

(v) The molecules of water and those of glass will attract each other by a force known as:
A. Adhesion
B. Cohesion
C. Viscosity
D. Osmotic pressure

(vi) If Maganga wants to establish a temperature scale then he should know the following:
A. Fixed point fundamental interval, an equation relating physical quantity and temperature change.
B. Thermometer, ice point and steam point.
C. Water, ice point mercury.
D. Fundamental interval and thermometer.

(vii) Work and energy have the same SI unit of:
A. Calorie
B. Joule
C. Watt
D. Pascal

(viii) The temperature of a body is defined as:
A. The degree of hotness
B. The degree of coldness
C. The degree of hotness and coldness
D. The degree of hotness or coldness

(ix) Heat energy is transferred from the sun to the earth by the process of:
A. Convection
B. Radiation
C. Conduction
D. None of the above

(x) A metal rod has a length of 40cm on a day when the temperature of the room is 22.3 C. What will its length be on a day when the temperature of the room is 30 C and the linear expansivity of the metal is 0.000017 C-1?
A. 40.021 cm
B. 40.0052 cm
C. 0.0052 cm
D. 39.9948 cm

(xi) A substance of mass 2 kg is supplied with heat of 4800 J, and causes its temperature to rise by 4K. The specific heat capacity of the substance is:
A. 0.6 J/kg K
B. 600 J/kg K
C. 38.4 J/kg K
D. 2400 J/kg K

(xii) A wheelbarrow is an example of:
A. First class lever
B. Third class lever
C. Complex machine
D. Second class lever

(xiii) A block and tackle system has six pulleys. What is the velocity ratio of this system?
A. 12
B. 3
C. 6
D. 8

(xiv) An instrument which is used to observe objects around obstacles is called:
A. Plane glass
B. Telescope
C. Periscope
D. Microscope

(xv) When charging a body by rubbing with either fur or silk the particles which are transferred are:
A. Protons and electrons
B. Protons
C. Electrons
D. Nuclei

(xvi) Current electricity can be measured in:
A. Ohms
B. Coulomb
C. Volt
D. Milliampere

(xvii) Two resistors each having a resistance of 3 ohms are connected in parallel; the resulting effective resistance is:
A. 1.5 ohms
B. 2.0 ohms
C. 4.0 ohms
D. 2.5 ohms

(xviii) The process whereby materials recover their original length after removing the loads is known as:
A. Plasticity
B. Deformicity
C. Elastic limit
D. Elasticity

(xix) A piece of metal of volume 10 has a mass of 65.5 kg. The density of metal is:
A. 65.5 kg/m
B. 6.55 kg/m
C. 655 kg/m
D. 0.655 kg/m

(xx) A ray of light is incident normally on a plane mirror. The angle of reflection will be:
A. 45
B. 90
C. 0
D. None of the above.

SECTION B

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

LIST A	**LIST B**
(i) Hydrometer	A. Partial shadow
(ii) Calorimeter	B. Force which drives an electric current through an electrical component

(iii) Linear expansivity	C. Total shadow
(iv) Fundamental quantity	D. To measure water vapour in the atmosphere
(v) Radiation	E. It works under the principle of the atmospheric pressure
(vi) The common pump	F. It converts electric energy into force
(vii) Electromotive force	G. Time
(viii) Penumbra	H. Density
	I. Fractional increase in length per degree rise in temperature
	J. Measures the relative density of liquid
	K. Used in heat measurement
	L. Does not require any material medium

3. (a) Differentiate between mass and weight.

(b) (i) The weight of a body when in water is known as the . . . . . weight.

(ii) The force acting normally per unit area is called . . . . . .

(iii) Thermostat, rivets, bar and gape are applications . . . . . of expansion.

4. Matter is made up of small particles known as:

(i) . . . . . .

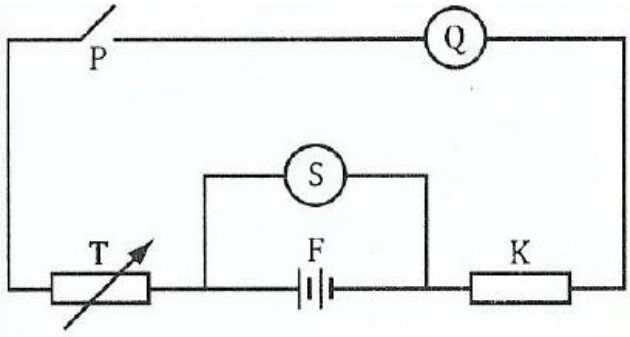
(ii) . . . . . .

(b) Three basic apparatus in a physics laboratory are:

(c) Forces are of several kinds. Mention any three:

5. (a) The two uses of a gold leaf electroscope are: . . . . . .

(b) In verification of Ohm's Law the following circuit was used during the experiment.



i. P: represents . . . . . .

ii. Q: represents . . . . . .

iii. S: represents . . . . . .

iv. T: represents . . . . . .

v. F: represents . . . . . .

vi. K: represents . . . . . .

6. (a) State the Laws of Reflection of Light.

(b) Draw a labelled ray diagram showing the effect of:

(i) a point source of light placed before an opaque object.

(ii) an extended source of light placed before an opaque object.

(c) State characteristics of images formed in plane mirrors.

SECTION C

7. (a) Define linear expansivity of a substance.

(b) Explain why small gaps between two rail bars are left when being installed.

(c) A metal rod 50 cm long at 0 C becomes 50.06 cm long at 100 C. Find the linear expansivity of the metal.

8. (a) What are the effects of pressure on the boiling point of a liquid?

(b) Why do people suffer from nose bleeding at high altitudes?

(c) A column of mercury is 700 mm high and the area of its base is 2.00 cm^2. Find:

(i) the pressure it exerts.

(ii) the force it exerts.

9. (a) What is a machine?

(b) Explain the meaning of:

(i) mechanical advantage

(ii) velocity ratio

(iii) efficiency of a simple machine

(c) An inclined plane is 7 m long and its height is 1 m. If the efficiency of the plane is 70%, find the load which can be moved up the plane by an effort of 150 N parallel to the plane.

10. (a) (i) Draw the cooling and melting curves for naphthalene.

(ii) Differentiate between boiling and melting point.

(b) Define the following terms:

(i) Heat capacity.

(ii) Specific heat capacity.

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

Use: Specific heat capacity of water = 4200 J/kg C.

Specific heat capacity of metal = 40 J/kg C