THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATIONAL TRAINING
FORM TWO SECONDARY EDUCATION EXAMINATION, 2010

0031 **PHYSICS**

Time: 2 Hours

Instructions

1. This paper consists of sections A, B and C.
2. Answer **ALL** questions
3. Read carefully the instructions given in each section.
4. Write your examination number on every page.
5. Cellphones and calculators are not allowed in the examination room.

SECTION A

1. Answer all questions in this section by writing the letter of the correct answer beside the question number.

(i) Which of the following is a unit of length:
A. joule
B. metre
C. newton
D. watt

(ii) The reading accuracy of a steel ruler is:
A. 0.0025mm
B. 0.01mm
C. 0.02mm
D. 0.5mm

(iii) Ohm is the SI unit of:
A. conductance
B. electric current
C. potential difference
D. upthrust and weight

(iv) One of the following is not a pair of forces:
A. attraction and repulsion
B. gravity and diffusion
C. torsion and gravity
D. upthrust and weight

(v) A car starts from rest and accelerates uniformly at a rate of $6m/s^2$. What is its velocity 7 seconds later?
A. 0.42m/s
B. 4.2m/s
C. 42m/s
D. 420m/s

(vi) A boy weighing 45kg climbs up a stair case to height of 7 m in 5 seconds. The amount of work done by the boy:
A. 70J
B. 105J
C. 450J
D. 315J

(vii) A chemical engineer who wants to know the degree of hotness of the liquid to be used in the chemical process should measure its:
A. density
B. heat
C. temperature
D. volume

(viii) One of the following is a method of electrification:
A. charging by induction
B. charging by insulation
C. charging by conduction
D. charging by convection

(ix) A victim of electric shock is helped by:
A. artificial respiration
B. being rushed to the hospital
C. drinking enough water
D. having bed rest

(x) A current of 0.2A flows through a resistor of 20Ω. The p.d. across the resistor is:
A. 0.4V
B. 4V
C. 40V
D. 100V

(xi) As the balloon goes up, the weight of air displaced becomes less and less. This means that the upthrust:
A. is increased
B. is reduced
C. is exactly equal to its weight
D. remains constant

(xii) The action of the gun and the bullet fired supports:
A. Law of conservation of momentum
B. Newton's first law of motion
C. Newton's second law of motion
D. Newton's third law of motion

(xiii) When a bus is moving with constant velocity, its acceleration is:
A. constant
B. minimum
C. maximum
D. zero

(xiv) The process which helps the rise of kerosene in the wick of a lamp is called:
A. capillarity
B. expansivity
C. surface tension
D. viscosity

(xv) A body weights 3.0N in air. When it is completely immersed in a liquid it weighs 2.2N, the upthrust experienced by the body is:

A. 0.4N
B. 0.6N
C. 0.8N
D. 1.0N

(xvi) A stone is found to have 50 kg by mass at Moshi. When sent to Dar es Salaam its mass will be:

A. 50kg
B. 60kg
C. 100kg
D. 150kg

(xvii) Pressure in a liquid contained in a vessel depends on the:

A. density of the container
B. depth of the container
C. mass of the liquid
D. surface area

(xviii) Charging an object by friction results in the transfer of particles called:

A. atoms
B. electrons
C. neutrons
D. protons

(xix) Juma wanted to measure the volume of a stone with an irregular shape. Which of the following pairs of instruments would you recommend that he use?

A. Measuring cylinder and metre rule
B. Measuring cylinder and overflow can
C. Metre rule and overflow can
D. Metre rule and beaker

(xx) Penumbra refers to:

A. light shadow
B. moon
C. partial shadow
D. total shadow

SECTION B

2. Match the items in **List A** with responses in **List B** by writing the letter of the correct response beside the item number.

List A		List B	
(i)	First class lever	A	Adhesion force
(ii)	Force of attraction between the earth and a body	B	A pair of scissors
		C	Cohesion force
(iii)	Force of attraction between molecules of different substances	D	Collision force
		E	Force of gravity
(iv)	Has no unit	F	Hydrometer
(v)	Magnetic lines of force	G	Impulse
(vi)	Measures density of liquids	H	Magnetic effect on a material
(vii)	Measured in Newton/second	I	Magnetic moment
(viii)	Second class lever	J	Neutral point in a magnetic field
		K	Penumbra
		L	Relative Density
		M	Umbra

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

3. Complete each of the following statements by writing the correct answer in the spaces provided:

   a) Mass, length and _____ are the three fundamental quantities of measurment in Physics.

   b) Mention two applications of density in daily life:

   _____

   _____

   c) The formation of a shadow is evidence that light travels in _____.

4. The mass of an empty density bottle was 50g. When filled with a certain liquid of volume $20cm^3$ its mass became 75g. Find the:

   a) Density of the liquid

   b) Relative density of the liquid

5. a) Define the term “power”.

   _____

b) A man whose mass is 75 kg walked up 12 steps of 20 cm each in 5 seconds. Find the power that was developed.

6. a) State the two Laws of Reflection.

_____

_____

b) Draw a diagram showing a plane reflecting surface, reflected ray, incident ray, the normal, angle of incidence and angle of reflection.

c) What is the relationship between angle of incidence and angle of reflection?

_____

SECTION C

7. a) A car accelerates uniformly from rest to a speed of 15 km/hr in 10 seconds. Find:
   (i) The acceleration in m/s^2.

   (ii) The distance covered during this period in metres.

   b) The maximum retardation with which the breaks of a locomotive can reduce its speed is $1.8m/s^2$. Calculate the time in which the locomotive can be brought to rest.

8. Two cells each with an e.m.f. of 1.5 V and internal resistance of 2Ω are connected in (a) series (b) parallel. Find the current in each case when the cells are connected to 1Ω resistor.

9. a) What is atmospheric pressure?

   _____

   b) If the pressure is 650mm of mercury, express this value in SI units.

10. a) Sketch the electrical symbol for each of the following devices:
   (i) Ammeter

   (ii) Cell

   (iii) Switch

   (iv) Variable Resistor

b) Sketch different diagrams and indicate the direction of the electric field formed by positive (+) and negative (-) charges in cases of:

(i) Attraction

(ii) Repulsion