Candidate's Examination No. ……..

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATIONAL TRAINING
FORM TWO SECONDARY EDUCATION EXAMINATION, 2011

0031 **PHYSICS**
TIME: 2½ HOURS

INSTRUCTIONS

1. This paper consists of sections A, B and C.
2. Answer **ALL** questions.
3. **ALL** answers should be written in the spaces provided.
4. Read the instructions given in each section carefully
5. Write your examination number at the top right corner of every page.
6. **ALL** writing must be in blue or black ink **EXCEPT** drawings which must be in pencil.
7. Cellphones and calculators are not allowed in the examination room.
8. You may use the following constants in your calculations:
   Density of water = 1 g/cm^3 or 1000 kg/m^3
   Acceleration due to gravity: g = 10 m/s^2
   Density of mercury = 13.6 g/cm^3 or 13600 kg/m^3

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

SECTION A (20 MARKS)

1. Write the letter of the correct answer in the box provided.

(i) The following are fundamental quantities in mechanics except.
- A. length
- B. mass
- C. time
- D. weight.

(ii) Which of the following groups represent forces?
- A. Acceleration, energy and light
- B. Energy, heat and upthrust
- C. Friction, gravity and upthrust
- D. Gravity, light and velocity.

(iii) Sustainable energy sources are:
- A. biogas, kinetic energy and petrol
- B. biogas, tidal energy and water energy
- C. firewood, petrol and tidal energy
- D. kerosine, nuclear energy and water energy.

(iv) The best test for a magnetized material is:
- A. attraction
- B. friction
- C. heating
- D. repulsion.

(v) The type of light beam produced by the sun is
- A. converging
- B. diverging
- C. parallel
- D. radial.

(vi) What makes the last drop of tap water remain hanging for sometime at the outlet of the tap soon after closing the tap?
- A. Capillarity
- B. Osmosis
- C. Surface tension
- D. Viscosity.

(vii) A vernier caliper reads 6.23 cm. The reading in millimeters on the vernier scale is:
- A. 0.03
- B. 0.3
- C. 2.3
- D. 6.2

(viii) A clinical thermometer differs from other thermometers because it

A. can be used to measure the temperature of ice
B. can be used to measure the temperature of melting iron
C. has a constriction
D. is very small.

(ix) A potential difference of 12 V is applied across a resistor of 120 Ω, the current in the circuit is

A. 0.1 A
B. 10 A
C. 132 A
D. 440 A

(x) A plane mirror always forms:

A. inverted virtual image
B. magnified lateral image
C. real lateral image
D. virtual lateral image.

(xi) The volume of a piece of metal with a mass of 150 g and density of 0.03 g/cm^3 is:

A. 5 x 10^{-3} cm^3
B. 5 x 10^1 cm^3
C. 5 x 10^2 cm^3
D. 5 x 10^3 cm^3

(xii) A liquid at 100°C is as hot as:

A. 200°F
B. 212°F
C. 219°F
D. 260°F

(xiii) Work and energy have the same SI unit called:

A. calorie
B. joule
C. pascal
D. watt.

(xiv) When charging bodies by friction, the particles which are transferred are:

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

(xv) First Aid is an immediate assistance or care given to a sick person or an accident victim before getting

A. help from nearby people
B. professional medical help
C. relatives and friends' assistance
D. traditional medical care.

(xvi) The area under the velocity-time graph represents:

A. acceleration
B. distance covered
C. speed
D. velocity.

(xvii) A machine has a velocity ratio of 15. If an effort of 10 N is applied to lift a load of 50 N, its efficiency is approximately equal to:

A. 20%
B. 33%
C. 50%
D. 75%

(xviii) When reading the volume of water in a burrete, one needs to look at the:

A. highest point of the meniscus
B. lowest point of the meniscus
C. mid point of the highest meniscus
D. mid point of the lowest meniscus.

(xix) The property of a material to recover its original shape and size on removal of a stretching force is called:

A. compression
B. elasticity
C. elastic limit
D. plasticity.

(xx) When buying sugar from a shop you pay for its:

A. density
B. mass
C. volume
D. weight.

SECTION B (40 MARKS)

2. Match each item in List A with a response in List B by writing its letter below the number of the corresponding item in the table provided.

LIST A	LIST B
(i) Angle between geographic axis and magnetic axis (ii) Anomalous expansion of water (iii) converts sound to electrical energy (iv) Earth between sun and moon (v) Material between plates of a capacitor (vi) Measures liquid pressure (vii) Measures the density of liquids (viii) Submarines, canoes, ships and balloons.	(a) Angle of declination (b) Angle of elevation (c) Between 0°C and 4°C (d) Capacitors (e) Dielectric (f) Eclipse of the sun (g) Floating objects (h) Gas pressure (i) Hydrometer (j) Lunar eclipse (k) Lunar eclipse (l) Manometer (m) Microphone (n) Transformer

ANSWERS

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

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

(a) In magnetism, points where the net magnetic field is zero are called

_____

_____

(b) The number of images (n) formed between mirrors placed at θ°, is given by the formula n =

(c) (i) Sea-wave energy is a result of _____

(ii) Geothermal energy is _____

4. (a) Define the term "electrostatics"

_____

_____

_____

(b) Draw a diagram of the gold leaf electroscope and label the following: brass cap, insulator, earthed metal case, gold leaf, brass plate and brass rod.

5. (a) Define the term "simple machine".

_____

_____

(b) Write down the velocity ratio of the following simple machines:

(i) Inclined plane _____

(ii) A pulley system _____

(c) Why must a liquid and not a gas be used as fluid in a hydraulic machine? Give two reasons.

(i) _____

(ii) _____

6. (a) State Ohm's law.

_____

_____

(b) A cell of 8 V is connected in series with a resistor of 3 Ω. What is the value of the current through the resistor?

SECTION C (40 MARKS)

7. (a) Define the term "centre of gravity".

(b) A uniform half-metre rule is freely pivoted at 15 cm mark and it balances horizontally when a body of mass of 40 g is hung from a 2 cm mark.

(i) Draw a clear labeled diagram to illustrate the forces on a half-metre rule.

(ii) Calculate the mass of the rule.

8. An object starts from rest and moves with a velocity of 20 m/s for ? seconds. It maintains this speed for 20 seconds before applying brakes and comes to rest after 10 seconds.

(a) Sketch the velocity-time graph for this motion.

(b) From the graph drawn in part (a) above, find:

(i) Acceleration

(ii) Deceleration

(c) Calculate the total distance covered for the whole motion.

9. (a) What is energy?

(b) State the principle of conservation of energy.

(c) A motor exerts a horizontal force of 200 N in pulling a box 10 m across a level floor. How much work did the motor do?

10. (a) State Archimedes' principle.

(b) A body weighs 10 N in air and 8 N when completely immersed in a liquid of density 0.8 g/cm^3. Find:

(i) The volume of the liquid displaced.

(ii) The density of the body.