THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATIONAL TRAINING
FORM TWO SECONDARY EDUCATION EXAMINATION, 2009

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.
6. Whenever necessary use the following constants:

   Acceleration due to gravity = $10 m/s^2$

SECTION A

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

(i) A physicist is generally interested in studying the relationship between:
A. composition and decomposition of matter
B. matter and energy
C. Physics and Chemistry
D. Physics and energy

(ii) The measurement of mass using a beam balance uses the principle of:
A. conservation of matter
B. conservation of momentum
C. gravitational pull of the Earth
D. moments

(iii) A soldier firing a bullet from a gun experiences a jerking effect as the bullet leaves the gun. This phenomenon is explained by:
A. Newton's first law of motion
B. Newton's second law of motion
C. Newton's third law of motion
D. Principle of conservation of linear momentum

(iv) Materials which allow light to pass and you can see through are called:
A. glass
B. opaque
C. translucent
D. transparent

(v) In order to balance a rigid body on a point, you must first determine its:
A. balancing point
B. central position of the body
C. centre of gravity
D. neutral point

(vi) If one cell in a perfect three-cell torch is placed in the opposite direction, then switching on the torch will:
A. give normal light
B. give bright light
C. give dim light
D. not give light

(vii) The following instruments are used to measure length EXCEPT:
A. hydrometer
B. metre rule
C. micrometer screw guage
D. vernier callipers

(viii) Presence of friction in a machine:
A. causes proper functioning of the machine
B. increases efficiency of the machine
C. increases life time of the machine
D. reduces efficiency of the machine

(ix) You feel more pain if someone with pointed high heel shoes steps on your foot than when the same person with flat shoes steps on you because:
A. the flat shoes are not as heavy as the pointed ones
B. the leather of the shoes has big weight
C. pressure exerted is greater with flat shoes
D. pressure exerted is greater with pointed high heel shoes

(x) Gradient of the distance-time graph of a uniformly accelerated motion in a specific direction represents:
A. acceleration
B. deceleration
C. speed
D. velocity

(xi) Evaporation of a liquid does not depend on:
A. the amount of liquid available
B. surface area
C. temperature
D. wind

(xii) According to Archimedes' Principle, upthrust is equal to the:
A. apparent weight
B. volume of fluid displaced
C. weight of fluid displaced
D. weight of the displaced object

(xiii) Suppose you wanted to make strong permanent magnets, which of the following materials would you select:
A. Cobalt and Iron
B. Copper and Cobalt
C. Copper and Nickel
D. Nickel and Cobalt

(xiv) White clothes are preferentially worn in sunny regions to black clothes because they:
A. absorb heat
B. diffuse heat
C. reflect heat

D. transmit heat

(xv) Smell from a rotten dog along the road spreads to the neighbouring houses through a process known as:
A. capillarity
B. diffusion
C. osmosis
D. viscosity

(xvi) Work and energy have the same SI unit called:
A. calorie
B. joule
C. pascal
D. watt

(xvii) If you comb your dried hair with a plastic or nylon comb, you might observe the comb attracting some small particles. What instrument would you use to determine whether the comb acquired some electric charge:
A. ammeter
B. electrophorus
C. gold-leaf electroscope
D. voltmeter

(xviii) The effort that would be needed to operate a 1200N load with a mchine that has a mechanical advantage of 3 is:
A. 400N
B. 600N
C. 800N
D. 3600N

(xix) The temperature of hot water was measured using a Fahrenheit thermometer and was found to be 176°F. What was its equivalent on the Celsius scale?
A. 80°C
B. 116°C
C. 259°C
D. 348°C

(xx) Bimettalic strips bend when heated beacause metals:
A. become softer when heated
B. expand in opposite direction
C. have different expansivities
D. have same expansivities

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)	Apparent loss in weight	A	Cohesive force
(ii)	Attractive force between molecules of the same substance	B	Lubricants
		C	Mechanical Advantage
(iii)	Load over effort	D	Melting point
(iv)	Oil and grease	E	Solar eclipse
(v)	Tangential force on liquid surface	F	Sublimation
(vi)	Temperature at which solid changes to liquid	G	Surface tension
		H	Upthrust
(vii)	The moon is between the Earth and the sun	I	Moon eclipse
(viii)	Solid changing to vapour directly	J	Velocity Ratio
		K	Evaporation
		L	Adhesive force

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

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

3. Differentiate between boiling and evaporation:

   (i) _____

   (ii) _____

   (iii) _____

   (iv) _____

4. For an object to remain in equilibrium when subjected to a number of parallel forces, the following conditions must be met:

   (i) _____

   (ii) _____

5. a) Three methods commonly used to magnetize magnetic materials are:

   (i) _____

   (ii) _____

   (iii) _____

b) One similarity between micrometer screw gauges and vernier callipers is that:

_____

6. a) Heat is _____

while temperature is _____.

b) The efficiency of a machine is always less than 100% because

_____

c) The pressure exerted on an area of 10 m^2 by a force of 2N is:

_____

SECTION C

7. a) Give the difference between acceleration and deceleration.

   _____

   b) A car accelerates uniformly from 480 m/s in 50 seconds. It then decelerates to a stop in 100 seconds. Calculate the acceleration and deceleration of the car.

8. a) A block of iron of mass 1kg is placed on top of a horizontal table. If the horizontal force required to just move the block is 1.96N, calculate the coefficient of friction between the two surfaces.

   b) The temperature of 2kg of a metal block was raised from 40°C to 90°C. The heat energy used was 38,000J. Calculate the specific heat capacity of the metal.

9. a) Draw an electric circuit showing proper arrangement of ammeter (A), voltmeter (V), battery of two cells, a fixed resistor (R), and an open switch (S). Show the direction of flow of current (I).

   b) Calculate the amount of voltage required to drive a current of 2A through a resistor of 20Ω.

10. a) Mention types of mechanical energy

(i) _____

(ii) _____

b) A body of mass 10kg is raised to a height of 4 metres above the ground in 2 seconds.

(i) Find the energy possessed by the body after raising it.

(ii) What type of energy is possessed by the body?

_____