THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATIONAL TRAINING
FORM TWO SECONDARY EDUCATION EXAMINATION, 2006

0031 **PHYSICS**

Time: 2 Hours

Instructions

1. This paper consists of sections A, B and C.
2. Answer **ALL** questions
3. Read carefully 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.

   Specific Heat Capacity of water = 4200 J/kgK

   Acceleration due to gravity = 10 m/s^2

   STP means T = 273 K, P = 760 mmHg.

SECTION A

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

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

   (ii) The fundamental quantities of measurement are:
   A. Length, Acceleration and Time.
   B. Length, Mass and Time.
   C. Speed, Velocity and Acceleration.
   D. Length, Velocity and Time.

   (iii) When a fire hazard from an electric fault erupts in a house:
   A. Cut off all connecting wires.
   B. Switch off the main switch.
   C. Break the main switch.
   D. Switch off the switch sockets.

   (iv) The process whereby materials recover the original length after removing the load or force is known as:
   A. Plasticity
   B. Deformation
   C. Elasticity
   D. Elastic limit

   (v) Archimedes' Principle states that:
   A. The upthrust experienced by a body when partially or totally immersed in a fluid is equal to the weight of the fluid displaced.
   B. Upthrust is equal to apparent loss in weight when a body is partially or totally immersed in a fluid.
   C. When a body is totally or partially immersed in a fluid it displaces its own weight of the fluid in which it is immersed.
   D. When a body is partially or totally immersed in a fluid, it experiences a big loss in weight.

   (vi) The SI Unit of temperature is:
   A. Centigrade
   B. Second
   C. Kelvin
   D. Fahrenheit

(vii) Pond skaters and mosquitos are able to walk on the surface of water because of the:
A. Upthrust
B. Plasticity on the surface.
C. Surface tension of water.
D. Water mass.

(viii) A suspended bar magnet comes to rest pointing approximately in the:
A. North-East direction.
B. North-South direction.
C. North-West direction.
D. Up-down direction.

(ix) A force exerted by a pressure of 20 N/m^2 and acting over an area of 2 m^2 is:
A. 10 N
B. 18 N
C. 22 N
D. 40 N

(x) What is the acceleration of a body of mass 30 kg when a constant force of 150 N is applied on it?
A. 50 m/s^2
B. 0.5 m/s^2
C. 5.0 m/s^2
D. 0.05 m/s^2

(xi) Increase in pressure raises the boiling point of a liquid This principle is used in:
A. Refrigerators and vacuum pumps.
B. Pressure cookers and ovens.
C. Pressure cookers and steam engines.
D. Refrigerators and pressure cookers.

(xii) If a pulley system as a Velocity Ratio of 5 and the Efficiency of the system is 80%, what is the Mechanical Advantage of the pulley system?
A. 5
B. 400
C. 40
D. 4

(xiii) The point at which all the weight of a body acts is called:
A. Gravitational force.
B. Upthrust
C. Centre of gravity
D. Centre of mass.

(xiv) The movement of solvent molecules from high to low concentration through a semi-permeable membrane is called:

A. Fusion
B. Osmosis
C. Diffusion
D. Pressure

(xv) Potential energy and Kinetic energy are similar because:

A. Both produce heat.
B. Both are measured in Watts.
C. One is a substitute for the other.
D. Both are forms of Mechanical energy.

(xvi) The process of removing magnetism from a material is known as:

A. Magnetic field
B. Magnetization
C. Demagnetization
D. Polarization

(xvii) 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 Amps
B. 1.5 Amps
C. 2.0 Amps
D. 2.5 Amps

(xviii) The heat energy from the sun reaches the earth by:

A. Conduction
B. Convection
C. Transparency
D. Radiation

(xix) Water of mass 3 kg is heated from 26°C to 96°C. What is the amount of heat supplied to the water?

A. 21 kJ
B. 882 kJ
C. 38 kJ
D. 400 kJ

(xx) The image formed by a plane mirror is:

A. Magnified, vertical, laterally inverted.
B. The same size as object, magnified, real.
C. Virtual, laterally inverted, same size as object.
D. Diminished, real, laterally inverted.

SECTION B

2. Match the following items by writing the letter of the correct meaning from list B below the roman number of the item in list A in the table below:

List A		List B	
(i)	Latent heat	A	Umbra.
(ii)	Boyle's Law	B	Product of mass and velocity
(iii)	Translucent	C	V / T = Constant; when pressure is Constant and T is absolute temperature.
(iv)	Totally dark shadow	D	Heat absorbed or given out without change in temperature.
(v)	Momentum	E	Detects presence of static electric charges
(vi)	Charles' Law	F	The Pressure of a givent mass of a gas at constant absolute temperature is inversely proportional to its Volume or PV = Constant when T is constant.
(vii)	Electroscope	G	Object which allows a small amount of light to pass through but the human eye cannot see through it.
(viii)	Clinical Thermometer	H	Used to measure human body temperature.
		I	Partial shadow.
		J	Measures mass.
		K	Volume related to Pressure.
		L	Boyle's dairy farm.
		M	Charles' business.
		N	Penumbra.
		O	Partial heat.
		P	Moments round the corner.

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. State the SI unit of each of the following:
   (i) Current _____
   (ii) Density _____
   (iii) Heat _____
   (iv) Speed _____

4. a) Distinguish between upthrust and apparent weight.
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____
   _____

b) Apparent weight of a body is 6.4 N. If the weight of liquid displaced is 4.7 N, what is the weight of the body in air?

5. a) What do you understand by the following terms:

(i) Work

(ii) Power

(iii) Energy

b) List down five forms of energy:

(i)

(ii)

(iii)

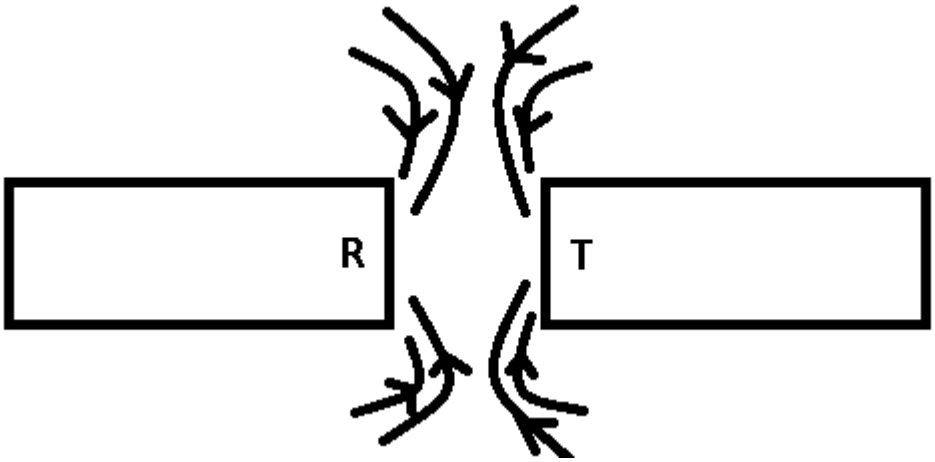
(iv)

(v)

6. a) Name the following electrical symbols:

Symbol	Name
(i) 	
(ii) 	
(iii) 	
(iv) 	
(v) 	

b) Name the magnetic poles R and T in the diagram



Pole R is _____

Pole T is _____

SECTION C

Answer ALL questions in this section. All calculations and answers should be written in the spaces provided.

7. a) Define:
   (i) Heat Capacity

   _____
   _____
   _____

   (ii) Specific Heat Capacity

   _____
   _____
   _____

   b) Sketch (not to scale) a graph to illustrate what happens when a solid at room temperature is heated until it vapourizes.

   c) The temperature of a substance is 180°C. What is the temperature of the substance on the Fahrenheit scale?

   _____
   _____
   _____
   _____

8. a) State the Principle of moments

   _____
   _____
   _____
   _____
   _____

   b) Mention three states of equilibrium

   _____
   _____
   _____

   c) A uniform 50 cm ruler is freely pivoted at the 15 cm mark and it balances horizontally when a body of mass 40 g is hung from the 2 cm mark.

(i) Draw a clear diagram of the arrangement

(ii) Calculate the mass of the ruler

_____
_____
_____
_____

9. a) Define Pressure and state its SI units

_____
_____
_____

b) Explain why it is easier to cut a piece of meat using a sharp knife than a blunt knife.

_____
_____
_____
_____
_____
_____
_____

c) A rectangular box whose dimensions are 1.2 m by 0.5 m by 2 m has a density of 25 kg/m^3. Calculate the maximum pressure which it can exert when placed on flat ground.

_____
_____
_____
_____
_____
_____
_____

10. a) A Voltmeter connected across an electric bulb reads 3 V and an ammeter in series with a battery of 2 cells reads 0.2 A. If the switch is closed:

(i) Draw a circuit diagram to represent the information

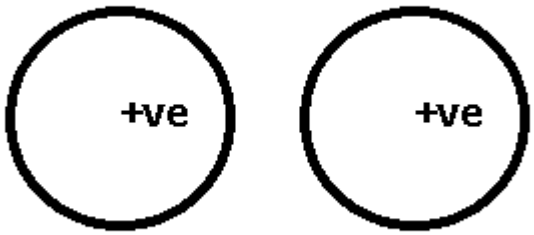
(ii) Calculate the resistance of the electric bulb.

_____
_____
_____
_____

b) (i) State the law of static electricity

(ii) Draw electric fields for the following static charges showing neutral (N) points

1.



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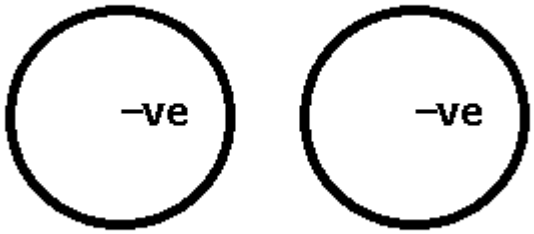

c) Write two advantages of friction

_____
_____
_____
_____
_____