THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATIONAL TRAINING
FORM TWO SECONDARY EDUCATION EXAMINATION, 2005

0031 **PHYSICS**

Time: 2 Hours

Instructions

1. This paper consists of sections A, B and C.
2. Answer **ALL** questions
3. Question in 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 = 10 m/s^2.
   STP means T = 273 K, P = 760 mmHg.
   Density of mercury = 13.6 g/cm^3 or 13600 Kg/m^3.
   Specific Heat Capacity of water = 4200 J/kgK

SECTION A

1. This section consists of twenty (20) multiple choice items. Answer ALL questions in this section by writing the letter of the correct answer in the box provided for each item.

(i) Physics is:
A. The study of Science.
B. The relation of matter.
C. The study of matter in relation to energy.
D. None of the above.

(ii) The SI unit of length is:
A. Ammeter.
B. Galvanometer.
C. Micrometre screw gauge.
D. Metre.

(iii) Umbra refers to:
A. Partial shadow.
B. Total shadow.
C. Midnight.
D. Moon.

(iv) The pressure in liquid depends on:
A. Weight and energy.
B. Liquid and container.
C. Depth and density of liquid.
D. Volume and height.

(v) When a narrow glass tube is dipped into mercury:
A. The adhesion of molecules of mercury is stronger than the cohesion of molecules of mercury.
B. The meniscus of mercury in a glass vessel curves upwards.
C. Mercury experiences a downward force equal to its weight.
D. Level of mercury in the tube drops below that of the surrounding.

(vi) Physics is applied in many fields such as:
A. Medicine and Engineering.
B. Matter and examinations.
C. Air and books.
D. None of the above.

(vii) The quantity of energy possessed by a body which causes the vibrations of its molecules is:

A. Temperature.
B. Energy.
C. Heat.
D. Current.

(viii) The temperature at Dodoma town was 40°C. This is equivalent to::

A. 313 Kelvin.
B. 160 Kelvin.
C. 240 Kelvin.
D. 120 Kelvin.

(ix) An ammeter is an instrument for measuring:

A. Length.
B. Resistance.
C. Capacitance.
D. Current.

(x) Relates temperature and pressure at constant volume:

A. Boyle's law.
B. Pressure law.
C. Charles' law.
D. Gas law.

(xi) A piece of metal of volume 0.24 cm^3 and mass 0.72 g has a relative density (R.D.) of:

A. 3.0 g/cm^3.
B. 3.0.
C. 3.0 kg/m^3.
D. 0.3.

(xii) The presence of positive and negative charges in a body can be detected by using:

A. Voltmeter.
B. Electroscope.
C. Hydrometer.
D. Compass.

(xiii) A body which sinks in water has its density:

A. Less than that of water.
B. Larger than that of water.
C. Equal to that of water.
D. Less or equal to that of water.

(xiv) A ball and ring experiment is used to verify the knowledge of:

A. Expansion of substance.
B. Elasticity of substance.
C. Conductivity of substance.
D. Evaporation of substance.

(xv) A Vernier scale reads 0.2 mm when closed and 5.7 mm when used to measure the diameter of the cylindrical body. What is the true diameter of the cylindrical body?

A. 0.2 mm.
B. 5.9 mm.
C. 5.5 mm.
D. 5.7 mm.

(xvi) The mechanical advantage of a machine is 4. Find the effort needed to operate a machine of the load 1000 N:

A. 40 N.
B. 2800 N.
C. 250 N.
D. 1999 N.

(xvii) Food in a refrigerator is cooled by:

A. Osmosis.
B. Diffusion.
C. Evaporation.
D. Transpiration.

(xviii) A black cloth is a material which is:

A. Transparent.
B. Opaque.
C. Translucent.
D. Dark.

(xix) The velocity ratio of a system of 3 pulleys is?

A. ½.
B. 3.
C. 6.
D. 1.

(xx) A lever which has its load between the effort and fulcrum is said to be:

A. First class lever.
B. Second class lever.
C. Third class lever.
D. None of the above.

SECTION B

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

List A		List B	
(i)	Upthrust	A	Measures temperatures.
(ii)	Conductor	B	Controls temperature.
(iii)	Cohesion	C	Inverted image.
(iv)	Action of the gun	D	Apparent loss in weight.
(v)	Virtual image	E	Attraction between molecules of the same substance.
(vi)	Real image	F	Newton's first law of motion.
(vii)	Thermostat	G	Apparent weight.
(viii)	Wheel barrow	H	Newton's second law of motion.
		I	Action and reaction are equal and opposite forces.
		J	Formed behind the mirror.
		K	Formed beyond the mirror.
		L	Attraction between molecules of different substances.
		M	First class lever.
		N	Second class lever.
		O	Material which conducts charges.

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. a) The efficiency of a machine is _____
_____
_____

b) The angle between true north and the compass needle direction is known as _____
_____
_____

c) Give two examples of the effects of surface tension

(i) _____

(ii) _____

4. a) (i) What is the anomalous expansion of water?
_____
_____

(ii) Like charges repel and unlike charges attract is the _____
_____

b) Differentiate between latent heat of fusion and latent heat of vaporization.

_____
_____
_____
_____
_____
_____

5. a) Two examples of magnetic materials are:

(i) _____

(ii) _____

b) Name the material which when rubbed with a dry cloth becomes:

(i) Negatively charged _____

(ii) Positively charged _____

6. a) Mention three states of matter.

(i) _____

(ii) _____

(iii) _____

b) A car of mass 150 kg is moving with a velocity of 2 m/s.

(i) The energy possessed by the car in joules is
_____

(ii) The type of energy possessed by a car is
_____

SECTION C

Answer ALL questions in this section on separate sheets of paper provided.

7. a) Define temperature of a body.

   b) What happens when a solid object is heated?

   c) A piece of metal of specific heat capacity of 840 J/Kg°C and mass of 30 g is heated from the temperature of 100°C to a temperature of 120°C. Find the quantity of heat used.

8. a) Define specific heat capacity

   b) State Newton's first law of motion.

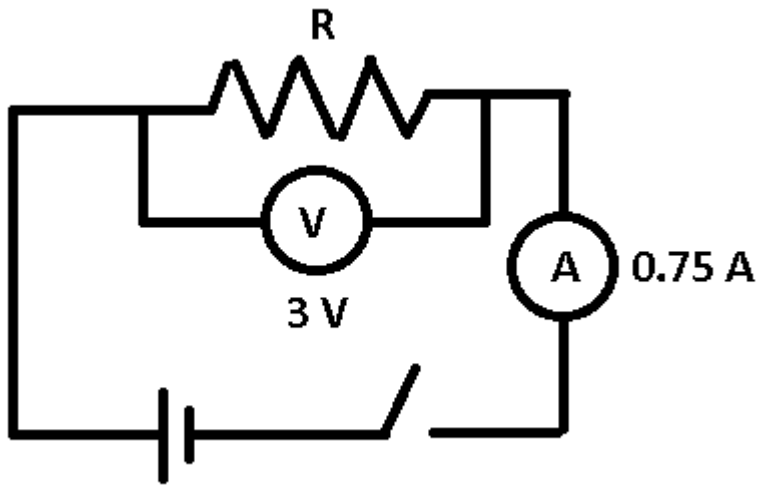
   c) A car travels with uniform velocity of 30 m/s for 5 seconds and then comes to rest in the next 10 seconds with a uniform deceleration.

      (i) Draw a velocity-time graph of the motion.

      (ii) Find the total distance travelled.

9. a) State Ohm's law.

   b) In the diagram below calculate the value of R.



   c) A potential difference of 12 V is applied across parallel resistors of 4 ohms and 6 ohms. Calculate the current in the circuit.

10. a) A screw jack with a pitch of 0.2 cm and handle of length 50 cm is used to lift a car of weight 12000 N. If the efficiency of the screw is 30%, calculate:

(i) The velocity ratio.

(ii) Mechanical advantage.

(iii) The effort used to raise the car.

b) Show how the neutral point due to two bar magnets can be formed.