*Candidate's Examination Number.....*

**THE UNITED REPUBLIC OF TANZANIA**
**NATIONAL EXAMINATIONS COUNCIL**
**FORM TWO NATIONAL ASSESSMENT**

**031**

# PHYSICS

**Time: 2:30 Hours** **Friday, 18th November 2016 a.m.**

**Instructions**

1. This paper consists of sections A, B and C.
2. Answer **all** questions in each section in the spaces provided.
3. **All** writing must be in blue or black ink **except** drawings which must be in pencil.
4. **All** communication devices and calculators are **not** allowed in the examination room.
5. Write your **Examination Number** at the top right corner of every page.
6. Where necessary the following constants may be used:
   (i) Acceleration due to gravity, $g = 10 m/s^2$.
   (ii) Density of water = $1 g/cm^3$ or $1000 kg/m^3$.

| FOR EXAMINERS' USE ONLY | | |
|---|---|---|
| **QUESTION NUMBER** | **SCORE** | **EXAMINERS' INITIALS** |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |
| **TOTAL** | | |

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**SECTION A (20 Marks)**

1. For each of the items (i) – (xx), choose the correct answer among the given alternatives and write its letter in the box provided.

(i) Results obtained from Physics experiment can form
A Scientific Laws B Scientific Principles
C Scientific Theories D Scientific Procedures.

(ii) Which of the following are used to stop fire?
A Matches B Extinguishers
C Fuels D Brushes.

(iii) Micrometer screw gauge reads 5.0mm and 0.95mm for sleeve and thimble respectively, the length of object will be
A 5.95mm B 59.5mm
C 0.595mm D 0.0595mm.

(iv) The force which exist between two closely bar magnets with like poles is known as
A attractive B repulsive
C friction D compressional.

(v) Buoyant force is mainly determined by
A volume and density B volume and mass
C weight and mass D weight and density.

(vi) Which one is an example of a force?
A Weight B Atom C Mass D Magnet.

(vii) Apparent loss in weight is known as
A upthrust B apparent weight
C pressure D weight.

(viii) An upthrust experienced by the body which weighs 5.0N in air and 3.2N when is completely immersed in a liquid is
A 0.4N B 0.6N C 1.6N D 1.8N.

(ix) A physical phenomenon observed when a tea bag is dropped into a cup of hot water is called

A Diffusion B Capillarity C Osmosis D Solution

(x) The walls of a dam are mad thicker at the bottom than at the top because

A pressure of water at the bottom is greater
B pressure of water at the bottom is less
C weight of water at the bottom is greater
D weight of water at the bottom is less.

(xi) How can you distinguish a lever from a pulley?

A Lever turns on pivot while pulley turns on an axle.
B Lever changes direction of applied effort while pulley does not.
C M.A. of a lever is effort arm over load arm while M.A. of pulley is $\frac{R}{r}$.
D V.R. of a lever is $\frac{2\pi R}{P}$ while that of pulley is $\left(\frac{R}{r}\right)^2$.

(xii) The term displacement means

A a distance covered in a given direction
B a distance covered without direction
C a rate of distance
D a rate of velocity.

(xiii) Which of the following is the most closely related to inertia?

A Weight B Acceleration C Mass D Force.

(xiv) Why is water unsuitable for a thermometer liquid?

A It does not wet a glass. B It wets a glass.
C It is opaque. D It is good conductor of heat.

(xv) The energy which is obtained from the hot rocks underground is called

A Geothermal energy B Solar energy
C Water energy D Wind energy.

(xvi) In Figure 1 the angle of reflection is equal to

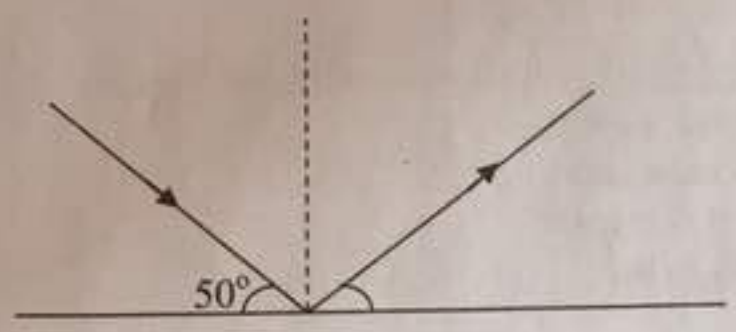


**Figure 1**

A 50° B 40° C 130° D 45°.

(xvii) Unlike magnetic poles as well as unlike electric charges, when they brought close to each other they tend to

A attract each other
B repel each other
C exist in pairs
D separate.

(xviii) The resistance of an operating lamp rated 115 V and 0.25 A is

A 460 Ω B 29 Ω C 114.75 Ω D 230 Ω.

(xix) In which region does the north pole of a magnet can be directed?

A Towards the geographic North Pole
B Toward geographic South Pole
C Along the Equatorial
D Along the Coast of Antarctica.

(xx) Ability of man to walk properly along a road is one of the applications of

A stable equilibrium
B unstable equilibrium
C neutral equilibrium
D neutral and stable equilibrium.

**SECTION B (40 Marks)**

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

| List A | | List B |
|---|---|---|
| (i) | A state of balance of a body. | A Centre of gravity. |
| (ii) | The sum of the forces in one direction must be equal to the sum of the forces in opposite direction. | B Unstable equilibrium. |
| (iii) | A point where the force of gravity can be considered to act. | C Translational motion. |
| (iv) | The object with high centre of mass. | D Rotational motion. |
| (v) | All points in a body moves around a single line. | E Condition for equilibrium. |
| | | F Point of application. |
| | | G Equilibrium. |
| | | H Stable equilibrium. |

**ANSWERS**

| List A | (i) | (ii) | (iii) | (iv) | (v) |
|---|---|---|---|---|---|
| List B | | | | | |

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

(i) The relative density of a liquid can be easily determined by.....

(ii) The lever, pulley, inclined plane, bottle opener and see saw are examples of.....

(iii) A loaded car of mass 25000kg is moving at 20m/s, its linear momentum is.....

(iv) Laterally inverted is one of the property of the image formed by.....

(v) The materials which return to their original shape and size after removing the stretching force is called.....

4. (a) What is meant by the moment of a force about a point?

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(b) Why the door handles are placed at the end of the door and not at the centre of the door?

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(c) A line of action of a force of 48N is at a perpendicular distance of 1.5m from a point. Find the moment of the force about the point.

5. (a) Differentiate between the following terms:

(i) Constant acceleration and constant velocity.

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(ii) Momentum and impulse of a force.

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(b) Explain one application of the law of inertia in everyday life.

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(c) How long does a car accelerate from rest to 30 m/s if its acceleration is 4.5 $m/s^2$?

6. (a) Define the following terms:

(i) Pressure

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(ii) Atmospheric pressure

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(b) List two factors in which pressure in liquids depend on.

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(c) A rectangular tank which measures 5m by 4m contains water to a height of 10m. Calculate

(i) Pressure on the base.

(ii) Thrust on the base.

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**SECTION B (40 Marks)**

7. (a) State Newton's laws of motion.

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(b) Why passengers in a car surge backward when a car start moving and forward when it stopped suddenly.

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(c) A rocket expels gas at a rate of 0.5Kg/s. If the force produced by the rocket is 2000N. What is the velocity with which the gas is expelled?

8. (a) State Archimede's principle.....

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(b) Define relative density of a solid.

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(c) The mass of a density bottle is 15 g. When it is filled full with a fluid of density 1.2 g/cm$^3$, its mass is 51 g. Find the volume of the bottle.

9. (a) Define the following terms as applied in Physics:

(i) Electric current.....

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(ii) Coulomb.....

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(b) Find the equivalent resistance if two resistors of value 5 are connected in

(i) Parallel

(ii) Series.

(c) Study carefully Figure 2 and then answer the question that follows:

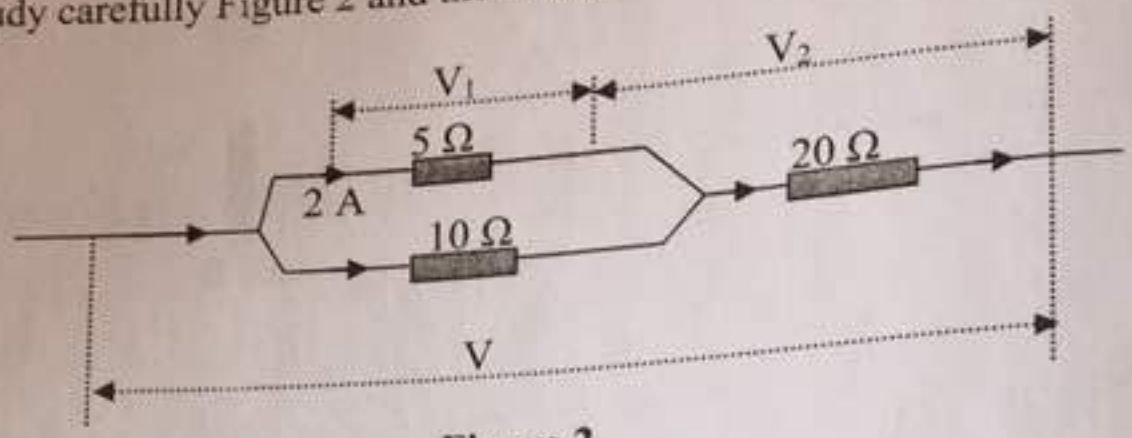


**Figure 2**

Calculate the values of V, $V_1$ and $V_2$.

Study Figure 3 and then answer the questions that follow.

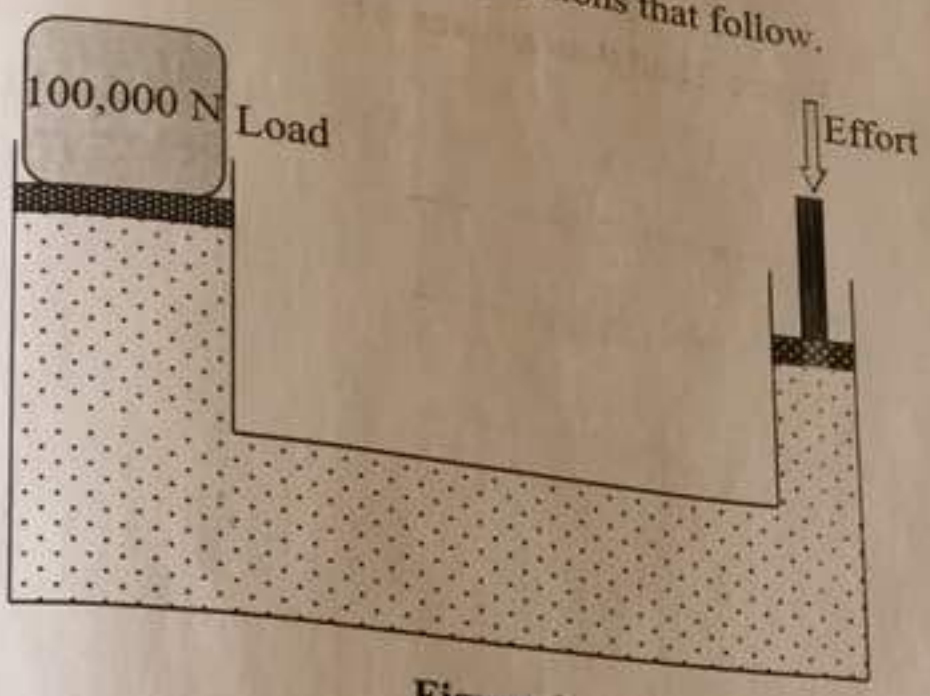


**Figure 3**

(a) Give the name of Figure 3.

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(b) The machine in Figure 3 is used to lift a container weighing 100,000 N. The radius of effort piston is 20 cm and the radius of load piston is 5 m. If the efficiency of the machine is 90 %, calculate velocity ratio and its mechanical advantage (M.A).