Candidate's Examination Number _____

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
FORM TWO SECONDARY EDUCATION EXAMINATION

0031 **PHYSICS**

Time: 2:30 Hours **Friday, 28th November 2014 a.m.**

Instructions

1. This paper consists of sections A, B, and C.
2. Answer **all** questions 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 1,000 kg/m^3

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

(i) The study of matter in relation to energy is called
A Chemistry B Physicists
C Biology D Physics. ☐

(ii) The force which causes wear and tear between machine parts is known as
A friction B torsional
C repulsive D magnetic. ☐

(iii) As one goes far away from the Earth, the density of air
A becomes bigger B becomes less
C remains constant D increases twice. ☐

(iv) A ferry boat floats in seawater because its density is
A greater than that of water B smaller than that of water
C the same as its weight D greater than its weight. ☐

(v) Study Figure 1 below.

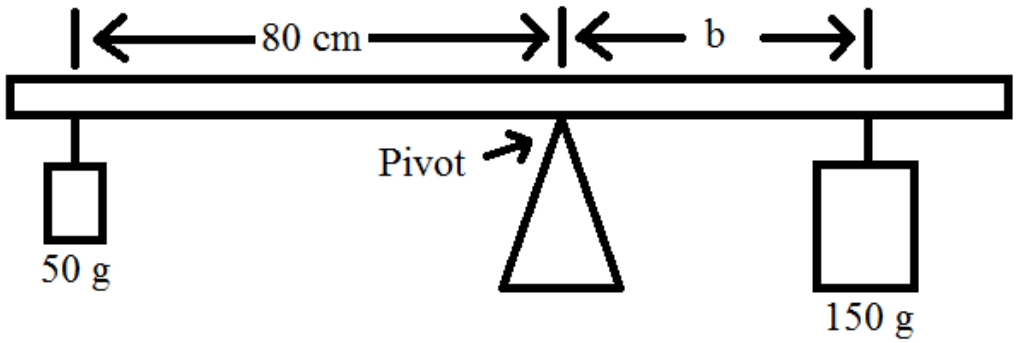

Figure 1

How far from the pivot must the 150 g mass be placed for the system to be in equilibrium?
A 16.7 cm B 17.6 cm
C 36.6 cm D 26.7 cm. ☐

(vi) A patient who is to get an injection when a nurse applied a small force to push a needle feels much pain on his skin due to
A very high pressure B very low pressure
C blunt of the needle tip D small applied force. ☐

(vii) The suspended magnetic needle always comes to rest with its axis in a vertical plane called
A geographic meridian B magnetic meridian
C geographic declination D magnetic declination. ☐

(viii) As the angle between two plane mirrors increases, the number of images formed
A decreases B increases
C remains constant D goes to infinite.

(ix) Which of the following materials does not allow light to pass through
A glass B tinted glass
C clear plastics D human bodies

(x) To view objects that are out of direct vision we can use a
A telescope B microscope
C periscope D slide projector.

(xi) The process by which water soaks through the cells of rice and beans is called:
A capillarity B cohesion
C diffusion D osmosis.

(xii) Which of the following is a property of mercury as a thermometric liquid?
A Boils at 78°C B Boils at 360°C
C Wets glass D Expands rapidly

(xiii) The area under a velocity-time graph represents
A distance B speed
C acceleration D deceleration

(xiv) If the pitch of a micrometer screw gauge is 0.5 mm, then its thimble has
A 10 equal divisions B 100 equal divisions
C 50 equal divisions D 500 equal divisions

(xv) Which of the following is a magnetic material?
A Copper B Cobalt
C Zinc D Brass.

(xvi) An electrostatic machine which produces an unlimited supply of sparks by induction is called
A a gold leaf electroscope B an electrophorus
C a generator D a speedometer.

(xvii) The quantity of electric current caused by excess electrons is called
A coulomb B electric charge
C electric current D electrification.

(xviii) Which of the following is not a sustainable source of energy?
A Sun B Generator
C Wind D Sea waves

(xix) A temperature of 68°C is equivalent to
A 20°F B 45°F
C 154.4°F D 90.4°F.

(xx) "Action and reaction are equal in magnitude but opposite in direction." This statement refers to

A the law of inertia
B Newton's second law of motion
C the principle of moments
D Newton's third law of motion.

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 the table provided.

LIST A	**LIST B**
(i) Measures how much the position has changed.	A. Gravitational acceleration.
(ii) Measures the net change in position.	B. Average speed.
(iii) Rate of change of distance.	C. Acceleration.
(iv) Rate of change of displacement.	D. Uniform acceleration.
(v) The constant rate of change of displacement.	E. Free-fall motion.
(vi) Rate of change of velocity.	F. Distance.
(vii) Motion under the effects of gravity.	G. Speed.
(viii) Measures the rate at which position changes.	H. Speed in metres.
	I. Velocity.
	J. Uniform velocity.
	K. Displacement.

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 space provided.

(i) The product of mass and velocity of a body is called _____.

(ii) Claw hammers and pairs of scissors are in which class of levers? _____

(iii) Weight has the same SI unit as _____.

(iv) An instrument used to measure pressure of a gas is known as _____.

(v) The tendency of a liquid to rise in narrow tubes is called _____.

4. (a) Define the following terms as applied in measurements and give two examples:
(i) Fundamental quantities _____

(ii) Derived quantities _____

(b) Figure 2 shows a graduated cylinder containing water before and after a stone is immersed.

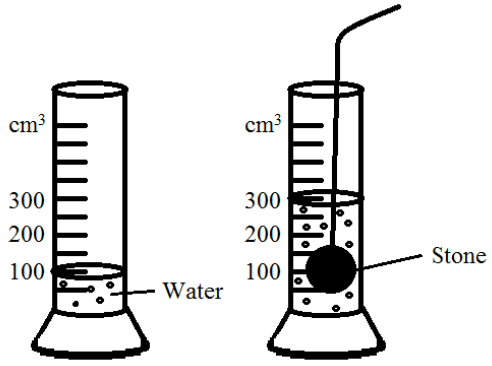

Figure 2

If the mass of the stone is 50 g, calculate the

(i) Volume of the stone.

(ii) Density of the stone.

5. (a) (i) List two characteristics of images formed by plane mirrors.

_____

_____

(ii) Giver a reason why the sky appears blue during a clear sunny day?

_____

_____

(b) Draw the diagram of each of the following:

(i) Parallel rays of light.

(ii) Divergent rays of light.

(iii) Convergent rays of light.

6. (a) Define the following terms as used in Physics and give their SI units:
   (i) Work _____
   _____

   (ii) Energy _____
   _____

   (b) A man lifts a load of 20 kg through a height of 4 m in 10 seconds. Calculate the:

   (i) Work done.

   (ii) Power developed by the man

SECTION C (40 Marks)

7. (a) (i) State the principle of moments _____
   _____
   _____
   _____

   (ii) A uniform half metre rule is freely pivoted at the 20 cm mark and it balances horizontally when a body of mass 30 g is hung at 5 cm mark from one end. Calculate the mass of the rule.

   (b) (i) What is meant by equilibrium? _____
   _____
   _____

   (ii) List three applications of equilibrium in daily life.
   _____
   _____
   _____

8. (a) Define the following terms:

(i) Inertia _____

_____

_____

(ii) Impulse_____

_____

(b) (i) Give two practical examples where impulse and momentum play an important role.

_____

_____

_____

(ii) A tennis ball of mass 120 g moving at a speed of 10 m/s was brought to rest by one player in 0.02 seconds. Calculate the average force applied by the player.

9. (a) (i) What is the function of a rheostat in an electric circuit?

_____

_____

(ii) List four factors that affect the resistance of a conductor.

_____

_____

_____

_____

(b) Study the circuit diagram in Figure 3, then answer the questions that follow:

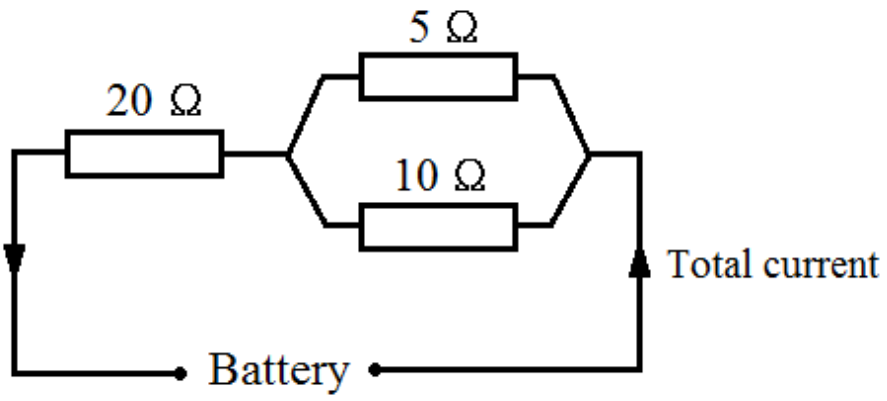

Figure 3

If the current flowing in 5 Ω resistor is 2 A, calculate the

(i) Current flowing in the 10 Ω resistor.

(ii) Potential difference (p.d.) across the 20 Ω resistor.

10. (a)(i) Define the term pressure and give its SI unit.

_____

_____

_____

(ii) Why are dams constructed thicker at the bottom than at the top?

_____

_____

_____

(b) (i) List three applications of hydraulic presses.

_____

_____

_____

(ii) A hydraulic brake has a force of 1000 N applied to a piston whose area is 50 cm^2. Calculate the pressure transmitted throughout the liquid.