

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATION TRAINING
MAPAMBANO EDUCATION CENTRE (MAECE)
PHYSICS TERMINAL EXAMINATION
FORM IV

Time: 2:30hour

Date: 30th July 2016

Instructions:

- This paper consist section A and B
- Answer all questions in both sections

SECTION A: (30 MARKS)

1. Choose the suitable answer by writing its letter in the box

- i The relationship between matter and energy is the one of the define
 - a) Chemistry
 - b) Physics
 - c) Mathematics
 - d) No Answer

- ii Temperature of the body is measured by
 - a) Calorimeter
 - b) Thermometer
 - c) Heater
 - d) Voltmeter

- iii Physics quantity which have magnitude and Direction
 - a) Scalar
 - b) Vector
 - c) Length
 - d) Time

- iv One of the following are the source of thermal energy
 - a) Moon
 - b) Sun
 - c) Cloud
 - d) Smoker

- v The mass of the substance which is 10kg has the new ton of
 - a) 9800N
 - b) 98N
 - c) 1000N
 - d) 0.98N

- vi The tendency of the water to be cooled from 4°C to 0°C is
 - a) Evaporation
 - b) Anomalous
 - c) Expensivity
 - d) Boiling Pond

vii Is a tool used to measure small diameter of the wire

- a) Metre ruler
- b) Micrometer screw gauge
- c) Tape measure
- d) Stop watch

viii A substance that catch fire easily

- a) Toxic
- b) Flammable
- c) Irritant
- d) Harmful

ix Anything that have got mass and occupy space

- a) Volume
- b) Matter
- c) Mass
- d) Length

x Work is done, there is

- a) Force only
- b) Force and Displacement
- c) Newton
- d) Displacement

If

2. Match the words in list A which are corresponding to list B by writing the letter besides the item number

LIST A	LIST B
i. Has magnitude only	A. Angle
ii. Example as vector quantities	B. Motion between two moving body
iii. Way of determine the horizontal components and vertical components	C. Have the same magnitude
iv. Has both magnitude and the direction	D. Used to find unknown side
v. Relative motion	E. Resolution of vector
vi. Triangular law of force	F. Vector
vii. Pythagoras theorem	G. One of the way of using graphical to find the third side
viii. Equivalent vector	H. Tail and head
ix. Way of representing vectors	I. scalar
x. The direction of the vector	J

3. Fill the blank with correct word(S)

- i. Friction is high in
- ii. The SI unit of linear expansivity is.....
- iii. Resistance is parallel have the same.....
- iv. The SI unit of heat is.....
- v. There are types of curve mirror
- vi. The ratio between limiting friction and normal reaction is called.....
- vii. Force in a depends on
- viii. Fire Kit contain oil..... and
- ix. stage of scientific procedure is
- x. micrometer used to measure the small diameter of the wire which is about.....

$$P = \frac{f}{A}$$

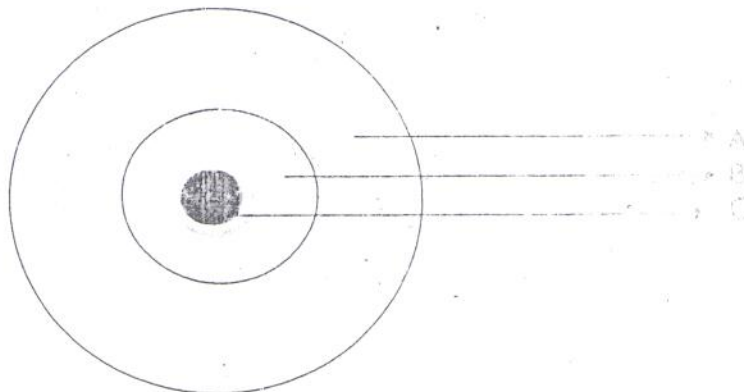
SECTION B (70 marks)

4. (a) (i) What is beat number?
(ii) Distinguish between longitudinal wave and transverse wave
- (b) (i) what is fundamental frequency?
(ii) The fundamental frequency of vibration of a string is f . What will the fundamental frequency of the string be if the fundamental frequency of the string is halved and the tension is increased ~~4~~ times? **4 times?**
- (c) Draw a sonometer and explain how it works.
5. (a) (i) What is meant by the statement the coefficient of linear expansivity of zinc is $0.000026^{\circ}\text{C}^{-1}$?
(ii) Give two uses of expansion of solids
- (b) Zinc rod exactly in long at 10°C is 2.3mm shorter than copper, rod at the same temperature when both rods are at 26°C their length are equal, calculate the linear expansivity of copper.
6. (a) Define the following
- constellation
 - comet
 - meteorities
- (b) (i) Explain causes of the ocean tide
(ii) Distinguish between spring tide and neap tide.
7. (a) (i) What is generator
(ii) Distinguish between a.c generator and d-c generator of the induction coil.
- (b) (i) Mention two application of the induction coil
(ii) Could a transformer be used to increase in the voltage of a batter? Explain
8. (a) (i) What is a colour of light?
(ii) Distinguish between polychromatic and monochromatic light
- (b) (i) What is an angle of deviation?
(ii) Determine the angle of the deviation if the angle of the prism is 48° and the refractive index of the light from the air to glass is 1.5
9. (a) (i) What is dynamic friction?
(ii) Explain why a friction is important
- (b) The coefficient of the dynamic friction is 0.2, if the body sliding ^{at} 6m, determine the speed of the body.

16 J
100
12
14

SECTION C
Answer any one question

10. (a) (i) What is the centre of gravity?
(ii) Under what condition will two forces form a couple? Give examples of a couple.
- (b) (i) State two conditions for the body to be in equilibrium.
(ii) A heavy uniform beam AB of weight 500N is supported at its centre from the end of point B, the beam carries a weight of 3000N at a distance of 1.5m from the end A. If the beam is 4m long, determine the reaction on the support A and B.
11. (a) Define the following
i. crust
ii. mantle
iii. core
- (b) (i) Explain why the inner core is solid than the outer core.
(ii) Distinguish between fissure and central volcanoes.
(ii) The figure below represents the structure of the earth's interior



- (a) Name the part labeled A, B and C
(b) List ~~draw~~ two functions of the part labeled B,

$$A + B = 500$$

$$500$$

$$= 2000$$

$$3A$$

$$1000 + 1.5 = 3000$$

$$3000 + B = 500$$

$$= 2000$$

$$= 4500$$

$$4500 = 4500$$

THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL
CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

031/1

PHYSICS 1
(For Private Candidates Only)

Time: 3 Hours

Friday, 27th November 2015 p.m.

Instructions

1. This paper consists of sections A, B and C.
2. Answer **all** questions in section A and B and **one (1)** question from section C.
3. Calculators and cellular phones are **not** allowed in the examination room.
4. Write your **Examination Number** on every page of your answer booklet(s).
5. Where necessary the following constants may be used:
 - (i) Acceleration due to gravity, $g = 10\text{m/s}^2$ or 10N/Kg
 - (ii) Specific heat capacity of ice = 2100J/kg K
 - (iii) Specific latent heat of fusion of ice = $3.2 \times 10^5 \text{ J/kg}$
 - (iv) Average density of air = 1.25 kg/m^3
 - (v) Density of fresh water = 1000kg/m^3
 - (vi) Density of mercury = 13600Kg/m^3
 - (vii) Relative density of sea-water = 1.03
 - (viii) Pie, $\pi = 3.14$

110 7.12
200 X
(20)



SECTION A (30 Marks)

Answer **all** questions in this section.

1. For each of the items (i)-(x), choose the correct answer among the given alternatives and write its letter in the answer booklet provided.

- (i) Which of the following liquids does NOT contract if cooled from 4°C to 0°C ?
- | | | |
|------------|--------------|--------------|
| A Milk | B Pure oil | C Pure water |
| D Kerosene | E Sea water. | |

- (ii) The force that drives an electric current through an electric component is called
- | | | |
|------------------------|-------------|----------|
| A Coulomb | B Farad | C Ampere |
| D Potential difference | E An e.m.f. | |

- (iii) Figure 1 shows how the bob of a simple pendulum was pulled aside to position A and then realised to position C via position B. At what position will the bob attain the maximum kinetic energy?

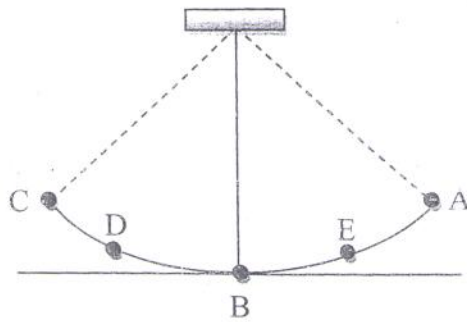


Figure 1

- | | | |
|--------------|---------------|--------------|
| A Position A | B Position B | C Position C |
| D Position D | E Position E. | |
- (iv) What makes a coin inside the water at the bottom of a vessel appear to rise when viewed from above?
- | | | |
|------------------------|-------------------------|--------------------|
| A Reflection of light. | B Refraction of light. | C Mirage of light. |
| D Spectrum of light. | E Diffraction of light. | |
- (v) Which one of the following is the characteristic of the magnetic lines of force?
- | |
|--|
| A They cross each other. |
| B They cannot pass magnetic substance. |
| C They run from South pole to North pole outside the magnet. |
| D They are continuous and form closed loop. |
| E They attract each other when travelling in the same direction. |

- (vi) The free charge carrier of electricity through pure semiconductors are
 A electrons and holes B electrons and protons C neutrons and holes
 D neutrons and protons E protons and holes.
- (vii) A larger celestial body in the solar system made up of hot gases are known as
 A Planet B Star C Moon
 D Constellation E Galaxy.
- (viii) Which of the following phenomenon is a consequence of global warming?
 A Black bodies effect B Atmospheric pressure C Greenhouse effect
 D Electromagnetic effect E Earthquakes.
- (ix) A book appears to be red when seen in white light, but in magenta light it will appear to be
 A blue B yellow C green
 D red E magenta.
- (x) Figure 2 shows the arrangement of three capacitors:

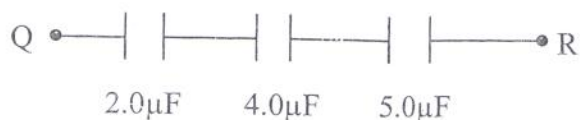


Figure 2

What will be the value of equivalent capacitance across two terminals QR?

- A $1.95\mu\text{F}$ B $1.05\mu\text{F}$ C $1.85\mu\text{F}$
 D $1.59\mu\text{F}$ E $1.15\mu\text{F}$.

2. Match the items in **List A** with responses in **List B** by writing the letter of the correct response in the answer booklet provided.

List A	List B
(i) An instrument that resist the flow of electric current.	A. Galvanometer
(ii) An instrument that cuts off the flow of current in a circuit when exceeds a specific value.	B. Battery
(iii) An instrument used to measure the electromotive force.	C. Voltmeter
(iv) An instrument that detects the presence of electric current.	D. Ammeter
(v) An instrument used to measure the flow of electric current in a circuit.	E. Rheostat
(vi) An instrument that measures the potential differences of a wire.	F. Potentiometer
(vii) An instrument which protects an electric circuit against excess current.	G. Transformer
(viii) An instrument that produce electrical energy.	H. Resistor
(ix) An instrument designed to produce variable resistance.	I. Spectrometer
(x) An instrument that detects small electric charges.	J. Gold leaf Electroscope
	K. Circuit breaker
	L. Fuse
	M. Thermostat

3. For each of the items (i) - (x), fill in the blank spaces by writing the correct answer in the answer booklet provided.

- (i) The product of force and time is known as _____.
- (ii) The study of stationary electric charges is called _____.
- (iii) Which process involves heat transfer through gases? _____.
- (iv) What physical quantity is obtained by the ratio of distance moved by effort to the distance moved by the load? _____.
- (v) Which category of the material whose electrical conductance lie between an insulator and a conductor? _____.
- (vi) The discharge of electrons from heated metal is known as _____.

- (vii) The process of mixing coloured lights by reflection from a white surface is called _____.
- (viii) What name is given to the fixed path along which planets travel around the sun? _____.
- (ix) Which device is used to control the flow of current in one direction within an electronic circuit? _____.
- (x) The nature of an earthquake is usually described by measuring its magnitude and _____.

SECTION B (60 Marks)

Answer **all** questions in this section.

4. (a) Distinguish between density and relative density.
- (b) (i) State the law of floatation.
(ii) List two conditions for the body to float.
- (c) (i) A ship of mass $1.2 \times 10^6 \text{ kg}$ floats in sea-water. What volume of sea-water does it displace?
(ii) If the ship in (c) (i) enters fresh water, what mass of cargo must be unloaded so that the volume of fresh water displaced is equal to that of sea water?
5. (a) (i) When is friction useful?
(ii) Give two disadvantages of friction.
- (b) Study Figure 3 then answer the questions that follow:

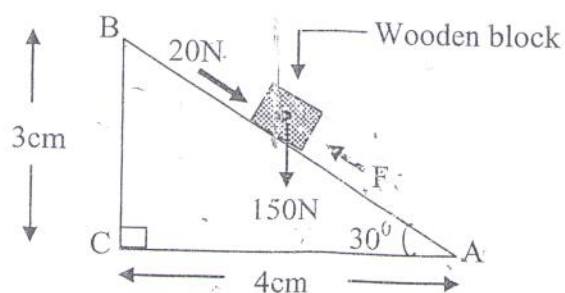


Figure 3

- (i) Calculate the work done in rising the wooden block from point A to B.
- (ii) Briefly explain if it is possible for the wooden block to remain stationary when placed at the mid-point of an inclined plane?

- (c) A machine with two pulley system and efficiency of 75% is used to lift a load of 120N through a distance of 0.5m. Calculate:
- Its mechanical advantage.
 - The energy wasted by the machine.
6. (a) Mention three sources of thermal energy in everyday life.
- (b) How can the temperature of the following substances be compared with its steam?
- Boiling pure water.
 - Boiling porridge.
- (c) A lump of copper of mass 0.5 kg is placed in an oven for some time then quickly transferred to a large dry block of ice at 0°C forming 0.3kg of ice after a short period.
- Estimate the temperature of the oven.
 - Give two reasons why the estimated temperature in (c) (i) might be lower than the actual temperature of the oven?
7. (a) List four common devices which utilize the atmospheric pressure.
- (b) Explain why the swimmer feels much greater pressure of water at the deep end than at the shallow end?
- (c) Calculate the height of the mountain given that its air pressure at the base is 75cmHg and that at the top is 60cmHg.
8. (a) (i) Explain what happens when a white light is incident on a triangular glass prism.
(ii) Calculate the angle of refraction in the glass if light is incident in air at 40° on a plane glass surface of refractive index of 1.52.
- (b) Derive an expression, $u = \left(\frac{m+1}{m}\right)f$ by using the mirror formula where, m stand for magnification of the image formed and other symbols carry their usual meaning.
- (c) A concave mirror has a focal length of 40 cm. How far from the mirror must an object be placed to produce an image that is
- twice the size of the object.
 - half the size of the object.
9. (a) Describe four signs before an earthquake occurs.
- (b) (i) List four effects of volcanoes.
(ii) Briefly explain how volcanoes are formed.

- (c) Figure 4 shows the structure of volcano. Identify the parts marked A, B, C, D and E.

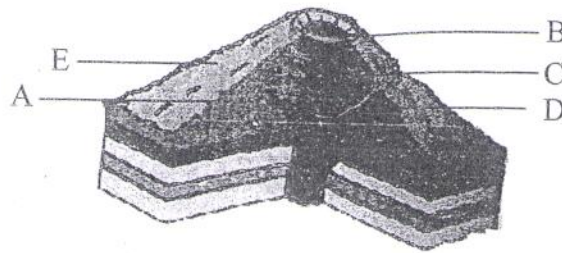


Figure 4

SECTION C (10 Marks)

Answer **one (1)** question from this section.

10. (a) (i) Define thermionic emission.
 (ii) What is the function of metal rectifiers in battery chargers?
- (b) Figure 5 shows a stationary wave, W obtained on the screen when an a.c voltage, V is connected to the Y plate of an Oscilloscope.

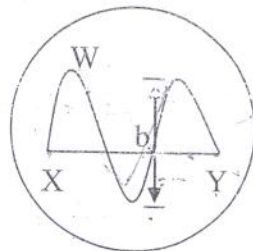


Figure 5

- (i) What does part XY and the height, 'b' represents?
 (ii) Briefly explain how the value of 'b' can be achieved.
- (c) (i) Give four applications of X- rays in daily life activities.
 (ii) Explain how X- rays are produced.
11. (a) (i) List four behaviours of waves.
 (ii) Give two applications of each behaviour listed in 11 (a) (i).
- (b) (i) Differentiate echoes from reverberations.
 (ii) Why is it important to use sound absorbers in larger buildings?

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATIONAL TRAINING
MAPAMBANO EDUCATION CENTRE (MAECE)



P.O. BOX 32272,
DAR ES SALAAM.

PHYSICS MOCK EXAMINATION
FORM IV

TIME: 3:00 hrs.

Date: 11/08/2016

Instructions

- This paper consists of three section A, B and C
- Answer all questions in section A, B and C, only one question from section C
- The following constant can be used
- Acceleration due to gravity = 9.8m/s^2
- $\pi = \frac{22}{7}$
- Specific heat capacity of water $c_w = 4200\text{J/kg}^\circ\text{C}$

SECTION A: (30 MARKS)
Answer all questions

1. For each of the item (i) – (x), Choose the correct answer from among the given alternatives and write its letter beside the item number.

- (i) A girl of mass 50kg run with a velocity of 2m/s, the movement of energy of the girl is
(a) 100N (b) 100W (c) 100J/S (d) 100S []
- (ii) The heat from the sun reaches the earth by
(a) Radiation (b) Convection
(c) Convection (d) Light rays []
- (iii) The convectional current in npn transistor is
(a) In ward (b) Out word
(c) the same (d) No above []
- (iv) The rate of change of momentum is always proportional to
(a) Force (b) Time
(c) Velocity (d) Impulse []
- (v) A blue T-shirt absorb all the colours of the white light except blue, in red light the blue T-shirt looks
(a) Red (b) Blue (c) white (d) Black []

- (vi) The layer in the atmosphere where weather phenomena are formed in the
 (a) Ionosphere (b) Mesosphere
 (c) Troposphere (d) Exosphere []
- (vii) The graph of velocity of against time, the slope of the graph represent
 (a) Velocity (b) Distance
 (c) Acceleration (d) Displacement []
- (viii) One electron represent
 (a) 96500C (b) $1.6 \times 10^{-19}C$
 (c) 0.32 Ampore (d) $1.6 \times 10^{19}C$ []
- (ix) The particle which is always used in nuclear bombardment is
 (a) Beta particle (b) Neutron
 (c) Gamma rays (d) Alpha particles []
- (x) If the Resistance is doubled and the potential difference across it is reduce to one third, what is the ratio of old current to new current
 (a) $\frac{3}{2}$ (b) $\frac{2}{3}$ (c) $\frac{1}{3}$ (d) $\frac{1}{6}$ []

2. Match the items in List A with those in List B by writing the correct letter beside the item number

LIST A		LIST B	
(i)	Venus	A.	Energy dissipated
(ii)	Kwhr	B.	In the nucleus of atom
(iii)	Radiation	C.	Vision
(iv)	Voltammeter	D.	Geiger muller tube
(v)	Proton	E.	Universal force
(vi)	Commutator	F.	Heart beat
(vii)	$6.67 \times 10^{-11} \text{ NM}^2 \text{ kg}^{-2}$	G.	Aluminum and zinc
(viii)	Non-magnetic metals	H.	Cell in electrolysis
(ix)	Visible light	I.	D.C generator
(x)	Stethoscope	J.	Newton
		K.	Morning star

$$\frac{R_1 V_1}{R_2 V_2} = \frac{1}{3} \times \frac{1}{2}$$

$$\frac{1 \times 1}{2 \times \frac{1}{3}} = \frac{1}{3} \times \frac{1}{2}$$

$$\frac{1}{2} \times \frac{3}{1} = \frac{1}{3} \times \frac{1}{2}$$

$$\frac{3}{2} = \frac{1}{3} \times \frac{1}{2}$$

3. Fill the blacks with the correct word(s).
- (i) The term given to a growing asteroid in space which can be seen with naked eyes is
- (ii) A Resistor of low resistance used to convert a moving coil galvanometer into a ammeter is called
- (iii) The combination of the multiples echo is known as

- (iv) The crushing can experiment is used in
- (v) The physical state of the substance is normally depends on
- (vi) The presence charge in a body can be detected by means of
- (vii) A device used to display the wave is known as
- (viii) The amount of the temperature which is possessed by the body is known as
- (ix) The point where the Hypocentre in the earth quake is known as
- (x) In order to walk, the body need a Equilibrium.

SECTION B: (60 Marks)
Answer all questions

4. (a) (i) What is electric power?
(ii) The electrical heater marked by 200W, 240V, Calculate the fuse in ^{of} ~~TNE~~ appliance?
- (b) (i) What is energy?
(ii) A ball of mass 0.2kg is dropper from a height of 20m on impact with the ground it looses 30j of energy. Calculate the height it reach on the ground.
5. (a) (i) Define the term astronomy
(ii) Is a Gemini a galaxy or constellation? Give reason
- (b) (i) Distinguish between planet and star
(ii) Lunar highland and young maria
(iii) Explain the variation of the planet in term of distance and density from the sun
6. (a) (i) What are sustainable energy source
(ii) State two application of energy generated from water
- (b) (i) Briefly explain how geothermal energy can be harnessed?
(ii) What is a wind will?
(iii) Mention two disadvantage? Of energy used by wind
7. (a) (i) Define the term earth quake
(ii) Briefly explain the difference between Hypocenter and epicenter
- (b) (i) What is global warming
(ii) Name four gases that contribute to global warming and their sources
8. (a) What is altimeter?
(b) Briefly explain the reason for the following
(i) A person of great height suffers from a nose bleeding

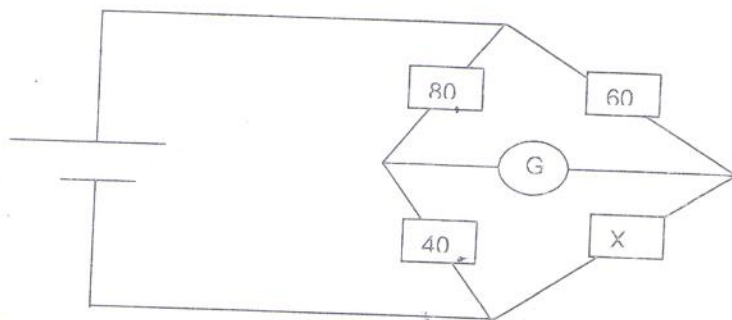
- (ii) The dam have thick wall at the bottom than of the top.
 (c) Water of density 1000kg/m^3 is maintain a column of 10 m high. A liquid a x has a density of 2.5g/1m^3 . Find the height of x which will be exerting the same pressure as the above column of water.

9. (a) (i) What is cathode ray oscilloscope
 (ii) Give two uses of the cathode ray oscilloscope
 (iii) If the time base control of the CRO is set at 10 mills second per cm and the wavelength noted was 1.8cm, what is the frequency of the waves?

SECTION C:
Answer only one question

10. (a) (i) What is a shunt?
 (ii) Distinguish between Galvanometer and Voltmeter
 (iii) Why two cells in series have higher e.m.f than two cells in parallel?
 (iv) Mention two main cable in domestic electricity and high light the colour which have been marked.

- (b) Use the circuit below, determine the unknown resistance which is marked by letter x



- (a) Define the following terms
 (i) Binding energy
 (ii) Target nucleus
 (iii) Background count
 (iv) Solid state detector

- (b) (i) What is the different between radioactivity and the rate of the chemical reaction
 (ii) State the decay constant and it units.

(c) The half-life for the β -decay of thorium - 234 is 24 days. The physics department has bought a sample of this thorium from England on the day of dispatch. Its activity was 4×10^5 c/s

- (i) What was the activity of the source 72 days later?
 (ii) What safety precautions should be supplier take to ensure that none of the dock workers should harmed?

XXXXX END XXXX

Handwritten calculations:

$$A = \frac{A_0 e^{-\lambda t}}{e^{-\lambda t}}$$

$$= \frac{4 \times 10^5}{e^{-\lambda t}}$$

$$= 4 \times 10^5 \times \frac{1}{e^{-\lambda t}}$$

$$= 4 \times 10^5 \times e^{\lambda t}$$

$$= 4 \times 10^5 \times 2^3$$

$$= 32 \times 10^5$$

$$= 3.2 \times 10^6$$

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF EDUCATION AND VOCATIONAL TRAINING
SANJE UNIVERSAL COLLEGE



SUCO

MOCK EXAMINATION FORM IV
(For both school and private candidates)
PHYSICS 1

P.O. BOX 61608
DAR ES SALAAM

TIME: 3:00 HOURS

DATE: 10th August 2016

Instructions:

- This paper consists of sections A, B and C.
- Answer all questions in section A and B and any two questions from section C.
- Cellular phones are not allowed in examination room.
- Mathematical tables and slide rule may be allowed in the examination room.
- Write your examination number on every page of your answer booklet(s).
- Whenever necessary use the following constants:

$g = 10\text{m/s}^2$ $\pi = \frac{22}{7}$, Density of water = 1g/cm^3 , s.h.c of water = 4200J/kgK^{-1}

SECTION A: (20 Marks) Answer all questions in this section.

1. For each of the items (i) – (ix) choose the most correct answer from among the given alternatives and write its letter in the bracket provided below
- (i) Which of the following is a fundamental quantity?
(a) Speed (c) Time
(b) Pressure (d) Force ()
- (ii) A body of mass 200g and density 5g/cm³. Its volume is
(a) 40cm³ (c) 0.025cm³
(b) 1000cm³ (d) 40cm ()
- (iii) The property of a body by which tends to remain at rest or moves at constant velocity is called;
(a) Equilibrium (c) Weight
(b) Momentum (d) Inertia ()
- (iv) Which one of the following changes on a body best increases its stability?
(a) Increase the area of its support base and lower the centre of gravity
(b) Raise its centre of gravity and increase the area of supporting base.
(c) Lower the centre of gravity and reduce the area of its supporting base.
(d) Raise its centre of gravity and reduce the area of supporting base. ()
- (v) A machine is 100% efficient if;
A. The load raised is greater than the effort
B. The effort distance is greater than the load distance
C. The velocity ratio is greater than the mechanical advantages
D. The work done on the load is equal to the work done by the effort? ()

- (vi) The presence of a positive electric charge in a body can be detected by using
 A. Voltmeter
 B. An electroscopes
 C. Hygrometer
 D. A compass ()
- (vii) One advantage of friction in daily life is;
 A. Produce noise
 B. Wear out of materials
 C. Reduce friction
 D. Walking
- (viii) The movement of liquid from low to high concentration through a semi-permeable is called
 A. Diffusion
 B. Brownian motion
 C. Osmosis
 D. Fusion
- (ix) A convex mirror always forms
 A. Real images only
 B. Virtual image only
 C. Inverted real image only
 D. Magnified virtual image only.
- (x) The weight of a body is 20N in air, 15N when totally immersed in water and 18N when totally immersed in liquid L. What is the relative density of L?
 A. 5N
 B. 2.5
 C. 0.4
 D. 0.5

2. Match the items in List A and those in List B provided. By writing the letter of the corresponding response beside the item number

List A		List B	
(i)	Hooke's law ^e	A.	Magnitude of electric field
(ii)	Newton's third law ^p	B.	Adjacent sides
(iii)	Parallelogram Law ^B	C.	Up thrust
(iv)	Floatation law ^c	D.	Pressure in solid
(v)	Boyle's law ^e	E.	Air resistance
(vi)	Friction: law ^F	F.	Contact body
(vii)	Pressure law ⁴	G.	Pressure in fluid
(viii)	Faraday law ^A	H.	$P_1 T_1 = P_2 T_2$
(ix)	Snell's law ^l	I.	Refraction
(x)	Charles law ^L	J.	Magnitude of magnetic field
		K.	Trigonometry
		L.	V & T
		M.	Real weight
		N.	Reflection
		O.	Momentum
		P.	$F = kq$
		Q.	$PV = \text{Constant}$
		R.	Moment $F = \mu Rmg$
		S.	$F = Ma$

SECTION B (60 Marks)

Answer all questions in this section all questions carry equal marks

3. (a) Explain what the following terms means and each state its units

(i) Energy

(ii) Work

(iii) Power

★ (b) A pumping machine raises water through a height of 12m and pours it into a tank whose capacity is 60cm^3 . If the tank is filled up in one hour, what is the power of the machine?

4. (a) (i) Give two properties that distinguish beta particles from gamma rays.
(ii) Differentiate between x-rays and white light.

(b) (i) What do you understand by the term half life of a radioactive substance?

(ii) A radioactive element has a half life of 1600 years. What will the fraction of its original mass which has decayed after 6400 years be?

(c) Find the value of a, b, c and d in the following radioactive decay equations



5. (a) Explain as to why a stick seems to bend when in water.

(b) State the laws of refraction.

(c) What do we mean by refractive index of water?

(d) The apparent depth for certain point at the bottom of water pond is 25cm. Find the real depth of this pond given that the refractive index of water is 1.3.

6. (a) Define

(i) Mechanical advantage -

(iii) Efficiency of the machine

(b) A load of 500N is raised through 5m by a machine when its effort E moves simultaneously through a distance of 25m, along its direction. If the efficiency is 80%. Calculate

(i) The total workdone by the machine

(ii) The value of E.

7. (a) Mention the instruments which are used to measure the following:

(i) The diameter of a piece of wire

(ii) The internal and external diameter of a tube about 5cm

(iii) The standard length of a rope of 100m

(iv) The thickness of a page of this paper

(v) The density or relative density of a substance.

(b) A metre rule is pivoted at its mid point. If a weight of 10N is hung from the 20cm mark, where must a weight of 120N be hung to balance the ruler?

(c) Give three classes of levers and give two example in each class.

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

★ (ii) A rectangular tank 4m long and 3m wide is filled with pure water of depth 2m. Calculate the pressure at the bottom of the tank due to the water.

(b) (i) What is the difference between speed and acceleration.

(ii) A body starts from rest and accelerates uniformly at 3m/s^2 for 4 seconds. Its velocity remain constant at the maximum value so reached for 7 seconds, and finally it comes to rest with a uniform retardation after another 5 seconds.

(a) Draw the velocity time graph.

(b) Find the average velocity for the whole journey.

SECTION C

Attempt only TWO questions from this section

9. (a) What is

(i) Kilowatt hour

(ii) Ampere

(iii) Ohm

(b) An electric kettle is rated 2Kw , 240V , What does this mean?

(c) If the electric kettle above is filled with cold water it takes 5 minutes for water to boil. Calculate

(i) The resistance of the element when the kettle is in use.

(ii) The average weekly cost of using the kettle assuming that it is filled six times each day with cold water which is then boiled. Given that $1\text{Kwh} = 250\text{Tsh}$.

10. (a) Define the following terms as applied to lenses

(i) Principal axis

(ii) Principal focus

(b) (i) Using ray diagrams find the position of the image of an object placed at $2F$ in front of a convex lens.

(ii) Give four uses of convex lens in our daily life.

(c) An object 2cm high stand on the principal axis of a convex lens at a distance of 10cm from the lens, if the focal length of the lens is 6cm , what is the position and nature of the image?

11. (a) (i) State Ohm's law.

(ii) Explain the meaning of the terms E.m.f and internal resistance of a cell.

(b) A dry cell can deliver a current of 0.15A when connected to an 8Ω resistor when another 8Ω resistor is connected in series with the first, cell can only deliver a current of 0.08A , through the combination. Calculate the E.m.f and internal resistance of the cell

12. (a) Define the following terms

(i) Star

(ii) Planet

(b) (i) What is constellation?

(ii) Mention two examples of constellations

(iii) What is the importance of constellations?

(c) (i) Explain the causes of ocean tides.

(ii) Give two types of ocean tides.

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$$P = IVt = \frac{V^2}{R}t$$
$$P = \frac{V^2}{R}$$