

PRESIDENT'S OFFICE
REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT
KIBAHA DISTRICT COUNCIL



DISTRICT FORM FOUR MOCK EXAMINATION

CODE: 031/1

PHYSICS 1

TIME: 3:00 HOURS

Tuesday, 01/04/2025

Instructions

1. This paper consists of three sections A, B and C with a total of **eleven (11)** questions
2. Answer **all** questions section A and B and only **two (2)** questions in sections C
3. Non- programmable calculators and mathematical table may be used in examination room.
4. Write your **examination number** on every page of your answer booklet(s) provided
5. Where necessary the following constants may be used
 - (i) Acceleration due to gravity = 10ms^{-2}
 - (ii) Density of water = 1g/cm^3
 - (iii) Specific heat capacity of water = $4200\text{JKg}^{-1}\text{K}^{-1}$
 - (iv) Specific latent heat of fusion of ice = 334000JKg^{-1}
 - (v) Specific heat capacity of brass = $320\text{JKg}^{-1}\text{K}^{-1}$
 - (vi) Specific heat capacity of aluminum = $900\text{JKg}^{-1}\text{K}^{-1}$

SECTION A (16 Marks)

Answer all questions in this section

1. For each of the items (i) – (x), choose the correct answer from among the given alternatives and write its letter beside the item number in the answer booklet provided
 - (i) When you measure the length of an object using a metre rule, which of the following error is caused by wrong position of your eye?
 - A. Zero error
 - B. Parallax error

- C. Instrumental error
- D. Metre error

E. Eye error

(ii) The same load is immersed in liquid A and then, in liquid B. The extent to which the body sinks in liquid B is less than in liquid A. What conclusion can be derived from such an observation?

- A. The density of solid body is less than that of the liquid in both cases.
- B. The density of liquid A is the same as that of liquid B
- C. The density of liquid B is more than that of liquid A
- D. The density of liquid A is more than the density of liquid B
- E. The density of the body is the same as that of liquid A and Liquid B

(iii) What would happen to the relative humidity of air if no water vapour is added or removed from cooling air?

- A. Increase
- B. Decrease
- C. Remain constant
- D. Keep fluctuating
- E. No relative humidity.

(iv) Which statement is correct about the half life of a radioactive source ?

- A. It is half the time for the radioactive source to become safe
- B. It is half the time it takes the an atom to decay
- C. It is half the time it takes the activity of the source to decrease to zero.
- D. It is the time it takes for an atom to decay
- E. It is the time it takes the activity of the source to decrease by half

(v) When water waves travel to a shallow region, the following may occur.

1. The frequency change
2. The wavelength is unchanged
3. The velocity decrease

Which of the following is correct?

- A. 1, 2 and 3
- B. 1 and 2 only
- C. 2 and 3 only
- D. 3 only
- E. No answer

(vi) Which of the following is the case of heat transfer by radiation?

- A. Heat received by a person when touches hot object
- B. Cooling of parts in furnace
- C. Blast furnace
- D. Heat received by a person from fire place
- E. Heating of building

(vii) What are the two factors that determine buoyancy?

- A. Mass of the object and density of the object
- B. Volume of fluid displaced and mass of object
- C. Weight and mass of the object
- D. Density of the fluid and weight of the object

- E. Volume of the fluid displaced and density of fluid.
- (viii) Which of the following is a reason why diffusion occurs more quickly in a gas than in liquid?
- Liquid contains a layer on its surface
 - The gas contain semi – permeable membrane
 - The speed of molecules in gas is greater than in liquid.
 - The gas molecules is small in size compared to the liquid molecules
 - The speed of molecules in gas is less than in liquid.
- (ix) Which of the following statement is a different between light wave and sound wave?
- Light wave are long and sound wave are short
 - Interference is obtained with light wave but not with sound wave
 - Sound wave do not travel in water but light wave travel in water
 - The speed of light is independent of the medium in which it travel
 - Light is an electromagnetic wave but sound is a mechanical wave
- (x) Asteroids which manage to reach the earth surface are called
- Comets
 - Meteorites
 - Constellations
 - Stars
 - Meteors

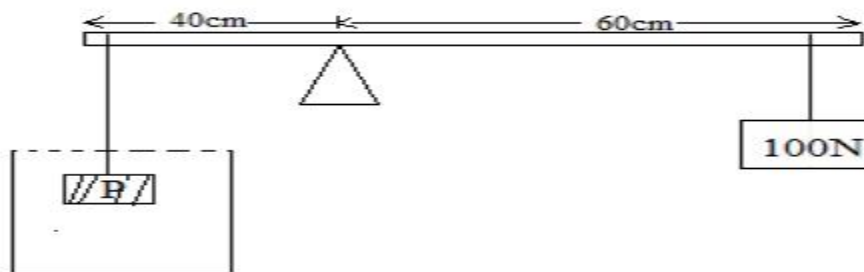
2. Match the item in List A with the responses in List B by writing the latter of the correct response beside the item number.

LIST A	LIST B
(i) Electronic device that converts energy from one form to another form	A. Zener diode
(ii) Electronic device that converts photons of light into electrical current	B. Light emitting diode
(iii) Electronic device in which at a critical reverse voltage a large reverse current can flow.	C. Diodes
(iv) Semiconductor device used to amplify or switch electronic signals.	D. Photo diode
(v) Semiconductor device allowing the flow of current in one direction only.	E. Tunnel diode
(vi) Electronic device that emits light when current flow through it.	F. Semiconductor diode
	G. Schottiky diode
	H. Transistor
	I. Light dependant resistor
	J. Transducer
	K. Avalanche diode

SECTION B (54 Marks)

3. (a) Assume your height is 2m and you want to buy a mirror that will show your full body image. By using the ray diagram describe what minimum size of mirror you will buy in order to minimize the cost? Assume your eyes are at 10 cm from the head top. **(6 Marks)**
- (b) A simple microscope with a focal length of 5cm is used to read the division of scale 1.5 mm in size. How large will the size of the division be as seen through the simple microscope_ **(3Marks)**

4. (a) A body P of weight 200 N is completely immersed in water and balanced with 100 N Weight as shown in the figure1 below.



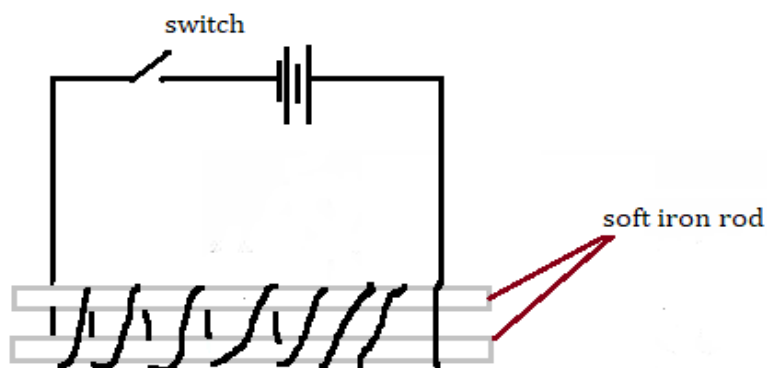
Calculate the volume of body P (5 Marks)

- (b) A box of mass 50kg is raised vertically with a uniform acceleration "a" when a force of 700 N is acting in a rope. Calculate the uniform acceleration (4Marks)
5. (a) A standard six pupil was arguing in front of a form four student that, fundamental physical quantity is same as the derived physical quantity. You as form four student explain how you will correct him by giving him even two examples on the same. (5 Marks)
- (b) A pulley system is made up of 8 pulleys. An effort of 200N is applied on the pulley system, if the pulley system has an efficiency of 80%. Find the maximum load. (4 Marks)
6. (a) The increase in volume of 10cm^3 of mercury when the temperature rises by 100°C is 0.182cm^3 . What is the volume expansivity of mercury? (4 Marks)
- (b) A brass cylinder of mass 100g was heated first to a temperature of 100°C and quickly transferred to an aluminum calorimeter of mass 150 g containing 120g of paraffin at 10°C . If the final steady temperature of the paraffin after stirring was 25°C , calculate the specific heat capacity of paraffin c_p . (Neglect the heat loses to the environment) (5 Marks)
7. (a) Using the parallelogram law of vector addition, find the resultant, F_R of two forces, $F_1 = 20\text{N}$ and $F_2 = 40\text{N}$ acting on an object with an angle 45° between them. (4.5 marks)
- (b) A radioactive source has a half-life of 80 seconds. How long will it take for $\frac{7}{8}$ of the source to decay? (4.5 marks)
8. (a) Briefly explain what is earthquakes and how it occurs (4.5Marks)
- (b) Briefly explain the two main types of ocean tides (4.5Marks)

SECTION C (30 Marks)

Answer **two (2)** questions from this section

9. (a) Why is it not possible to charge a metal rod by holding it in your hand and rubbing it with a duster? **(5Marks)**
(b) Draw a well labelled diagram of charge density distribution on a Pear - shaped conductor. **(5Marks)**
(c) An electric kettle is rated 220 V /2Kw is connected to the supply by using a wire plug. When the switch is switched on the kettle works at a rate of 1.5 Kw. determine the resistance of the wire plug.**(5Marks)**
10. (a) Electronics digital circuits uses constant low 5 voltage dc. You as A physicist describe how will you achieve the constant 5 V dc from 12 V dc supply? **(6 Marks)**
(b) Describe how you separate cathode rays and x – rays by using magnet. **(5Marks)**
(c) Explain why is high voltage is an essential part in cathode ray tube? **(04Marks)**
11. (a) An observer stands between two cliffs and claps hands. An echo is received after 2 s and 2.5s respectively. If the speed of sound in air is 330 m/s , find the distance between the cliffs. **(5Marks)**
(b) Draw a well labelled diagram of an induction coil and give its two applications.**(5Marks)**
(c) Two soft – Iron rods are suspended inside a solenoid as shown in figure below.



When the switch is closed, will the two rods move towards each other or away from each other? Explain your answer. **(5Marks)**