WUNNA EDUCATIONAL SERVICES

LEARNERS' ASSESSMENT BOARD (WESLAB)

Uganda certificate of Lower secondary education
LSC PHYSICS REVISION ITEMS SET ONE

Item 1

In a certain town, it is a must for drivers to be tested with their vehicles for road- worthiness. On a certain day, a car started from rest and accelerated to 50 ms^{-1} in 10 seconds. The driver maintained that velocity for 20 seconds and suddenly decelerated to rest in 2 seconds causing him to crush into windscreen. As a result, the car tyres wore out on the tarmac causing a lot of heat on the ground.

Task

You have been tasked to write a report to explain the scene. In your report include a motion graph, find the rate at which the car's velocity reduces and explain, with reasons, why driver crushed into the wind screen. Advise by stating whether the driver's average speed exceeded the speed limit of 8 ms^{-1} and how he would prevent the crushing. (20 scores)

Item 2

Challenges arise in a community of an isolated district in Uganda. Mixed beliefs, anxiety, mistrust and poverty have cropped up. Rainbows happening to some places when it rains and illusionary water pools on sunny days on road surfaces have been attributed to area clergy and witch-doctors.

Furthermore, there is change in color where different objects when placed in the night security lights of one of the residents, who is believed to have miraculous powers of God. A lot of money is being spent by residents to get miracles to avoid misfortunes and evil spirits from spiritual people.

Task

Prepare a speech you would give in the upcoming community gathering to address this challenge. (20 scores)

Item 3

Of recent, a storied building being constructed in Kampala near Munyonyo collapsedand took very many lives. However, when police arrested the contractor and asked the cause of the collapse, he complained that the client did not give enough money to buy the appropriate materials for constructing the building given that the place is affected much byharsh weather conditions. However, when the KCCA Engineer was tasked to analyze the situation, he said "the mechanical properties of the materials being used are below the standard required for a storied building near such areas. He said Young's modulus of steel should be about 2.0×10^{11} Nm^{-2}". This statement confused the public the more.

A force of 500N causes an extension of 20mm on an iron bar of length 100cm whose cross-sectional area is 0.05 cm^2.

Task

As a learner of Physics, you have been asked by police to produce a report about the sceneto help the police carry out investigation on the contractor.(20 scores)

Item 4

There has been an outbreak of malaria in your community and your friend is admitted in hospital. You have been delivering a warm meal; however, you are required to deliver a hotmeal for her in the hospital.

Task

Without using a food flask, how would you ensure that the food you have preparedremains hot until you reach the hospital?(20 scores) Item 5

On evening, Catherine kept juice in a tightly filled and corked glass bottle in a deep freezer. On opening the freezer, the following morning, she found the glass bottle broken with the juice frozen. As a Physics learner, explain to her what happened and adviseher on what to do next time.(20 scores)

Item 6

A boy was travelling with her parents by means of water transport. He carried a ball and a phone taking selfies along the journey. On their way, water waves disturbed the boat and all he had on his hands dropped in water. However, with much disappointment of losing his phone, allover sudden, he realized the ball was still on top of water though his phone was nowhere to be seen. This scene left them wondering the magic with the ball. As they continued, they looked in the air and saw two people seated in a bucket connectedto a balloon with burning flame was carrying them in space. The boy was confused and wondered how the two men would land safely on the ground though his parents could not explain anything to him.

Support information
Take the density of water = 1000 kgm^{-3}
Acceleration due to gravity = 10 ms^{-2}
Mass of the boat = 200 kg
Mass of a phone = 500 g
Volume of a phone = 50 cm^3
Volume of a ball = 20 cm^3
Volume of the boat = 3000 cm^3
Task
As a Physics learner, help the boy understand what happened while on the boat and explain for him how the two heavy men were carried by just a balloon with burning air.(20 scores)

Item 7
The rampant rains in the country have caused destruction of lives and property. The citizens have been advised to relocate to the nearby camp gazetted by the government. However, they do not have enough food. The World Food Programme (WFP) has supplied bags of maize flour packed in 50 kg sacks, but wishes to give the flour in different ratios. That is,
Families with more than 10 members: 25 kg.
Between 7-9 members: 20 kg
Between 4-6 members: 15 kg
Below 4 members: 10 kg
All district leaders to take 50 kg each
Unfortunately, they did not carry the weighing machine, but there is a nearby carpentry with auniform piece of wood of mass 30 kg and length 4 m.
Task
Write a report to the store man explaining how he can measure the different masses using thepiece of wood (20 scores)

Item 8
The school welfare department is facing a challenge of rain affecting their catering activities due to lack of a kitchen. The school is planning to construct a modern kitchen, whichcan save energy and reduce on the temperature inside.
Task
You are appointed as the head of construction committee for this kitchen, conduct a survey and compile a report you will present to the school welfare department showing the kind of cooking utensils required, how to paint the walls to reduce heat inside and outside the kitchenand how to manage air exchange inside the kitchen. (20 scores)

Item 9

At a construction site, Mbwali Milly was tasked to carry bricks from where they were to the masons. The task was tiresome. She applied a lot of energy and would carry a few bricks a day. She asked the foreman for a wheelbarrow. Soon, she had to take the bricks up the building.This time, she asked for a plank of wood which she used to make an inclined plane. But she would be tired by noon! So, the foreman suggested that she makes a single machine that wouldmove the bricks up vertically.

When the foreman looked in the vicinity, he realised that there was a motorcycle wheel, long ropes, straight poles, tall enough to reach the position where the bricks were to be put, and a large hemispherical pan.

Task

Make a brief explanation why and how each machine was able to simplify work.(08 scores)

Show how Milly could assemble the items to come up with a simple machine and how she would use it to lift the building materials up to the floor in the shortest time possible.

Item 10

During preparation for the function or party at your school, two decorators disagreed on the right position to hang the balloons. One preferred the balloons to beplaced in direct sunshine. However, the other insisted that they should be inside the tent.

Task

Make a brief explanation why and how each machine was able to simplify work.(08 scores)

Show how Milly could assemble the items to come up with a simple machine and how she would use it to lift the building materials up to the floor in the shortest time possible.