NAME:_____ SIGNATURE:_____

P535/1
PHYSICS
PAPER 1
NOVEMBER, 2024
2hours

CLEVERLAND HIGH SCHOOL-MAYA
END OF YEAR ASSESSMENT EXAMS 2024
Senior Two
PHYSICS
PAPER 1
2hours

INSTRUCTIONS TO STUDENTS;

• Attempt four (4) questions.

Item 1

Two men in a certain village are always contracted by people to dig pit latrines at their homes and in some community schools. They pass the following equipment to carry out their work a hoe, a wheel barrow, a bow saw, a hammer, a rope, sisal, strings, nails, pick axes, spades, plastic bucket, a tape measure and a pulley system containing two pulleys in the upper block and one pulley in the lower block. As the pit deepens, a rope is tied on the bucket and it is lowered down filled with soil and pulled out to be emptied by use of the pulley system until the task in completed.

Hint: On average their bucket filled with soil weighs 12kgs and the efficiency of the pulley system used is 80%.

Task.
As a physics student;
(a) Help the men to categorize any four of their machines in accordance to the class of levers you learnt where possible. (4 scores)
(b) Draw a diagram of the pulley system they use showing how the string are aligned in simplifying their work. (3 scores)
(c) Determine the effort applied. (5 scores)

(d) Explain to the men why the efficiency of the machine is less than 100% and suggest ways how they could increase its efficiency. (4 scores)

Item 2

Two men James and Peter were asked tasked to transfer bags of cement. Peter lifted 2 bags each weighing 50kgs and carried them through distance of 4 meters. James carried one bag from the ground floor to the first floor using 150 stairs of height 0.02 meters each.

(a) By calculation of the two men who did more work?

(b) If Peter did his work in 3 minutes and James in 1 minute who did work with more power show working.

(c) Advise Peter and James separately on how they can simply their work use the knowledge of machines. Clearly tell them the best machine each can use to have;

Their work done using the least possible energy

(d) (i) Help them know how they can separately improve on the efficiency of the machines chosen in order to further useless effort.

(ii) Musa bought a package of weight 350N in a box whose dimensions are 5m x 1m x 3m. Calculate the minimum and maximum pressure the box can exert on it support.

Item 2

A hydraulic press machines also applied the same principle above. At a certain garage it is used to lift a car of weight W resting on a piston of cross section area $100cm^2$ by using an effort of 20N at a Piston of cross-sectional area of $2cm^2$.

Task.

a) Calculate the weight W of the car.

b) A woman putting on high-lighted shoes damage a cemented floor compared to one putting on flat shoes. Explain the real life observation.

c) Atmospheric pressure is the pressure exerted by the weight of air on all objects on the earth's surface. It is measured using a barometer. Give and explain one real life situation that really demonstrates/shows that atmospheric pressure does exists.

Item 4

Students in a certain school are on a trip in a mountainous area where they are allowed to climb only 500m per day. They moved along with a barometer place A, the barometer read 69.5cmHg. While it read 75.6cmHg at another place B. the

students reported that food cooked at point B took longer to get ready as compared to that at A. this led to an argument between the learners since the food was prepared with the same amount of fuel. On their night, learners were warned of the possibility of nose bleeding during their journey. They were however not sure of which of the point A and B they were most likely to nose bleed.

Task.

Use your knowledge of physics to help students.

    (a) Determine if they had covered the required altitude for the day.

    (b) Identify when they were more likely to nosebleed.

    (c) To understand why the food prepared at B took longer to get ready as compared to that at A.

Item 5

A young man is planning to build his first house in life. He has no experience in construction work. He approaches an engineer who recommends him to buy the following materials for the foundation of the house, steel bar (hollow type), dump proof course, clay bricks, cement and gravel, after construction of the foundation, he has to hire a casual worker who uses a force of 80N to push 50kgs of soil along a piece of timbers which is 15m long to fill the foundation with soil. The height of the foundation is 2m from ground. The young man complains that these materials are many some of them should be removed.

Task.

Using the knowledge of physics,

    (a) Explain to the young man why.

    (i)   Damp proof course is important in this work.

    (ii)   Hollow steel bars are necessary.

    (b) Advise the man on how the foundation should be made stronger and stable.

    (c) Determine the efficiency of the system used to fill the foundation with soil.

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END

MERRY X-MASS AND HAPPY NEW YEAR

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