NAME: …… STREAM: ……

535/1
PHYSICS
Paper 1
Aug, 2024
1 Hour

END OF TERM II EXAMINATIONS 2024

Uganda Certificate of Education

S.2 PHYSICS

Paper 1

1 Hour

INSTRUCTIONS:

- This paper consists of **three** test items.
- You are required to attempt **only two items in all**.
- Write your answers on the answer sheet(s) provided, beginning the solution of each item on a fresh page.
- Where calculations are involved, show all the necessary working.
- Attach the question paper on your answer sheet(s).

ITEM 1

Mugumya logistics is a new company that specialises in transportation of heavy cargo. The company wishes to recruit workers who are powerful enough to load cargo on to large trucks. In order to ensure that only powerful candidates are recruited, the manager uses two criteria to interview the applicants. First, he estimates the power of the applicants. Any applicant who has a power exceeding $\mathbf{4}\boldsymbol{W}$ passes the first interview and goes to second interview where the applicant is expected to lift load of $\mathbf{450}\boldsymbol{N}$ using a machine $\mathbf{75}\%$ efficient and known to have a velocity ratio **4**. The manager was advised to determine the power of the applicant using a stair case of **10 stairs** each of height $\mathbf{12}\boldsymbol{cm}$. One applicant of mass $\mathbf{50}\boldsymbol{kg}$ takes **2 minutes** to run up the stair case. As a learner of Physics;

(a) advise the learner on whether to allow the applicant to proceed to the next interview.

(07 scores)

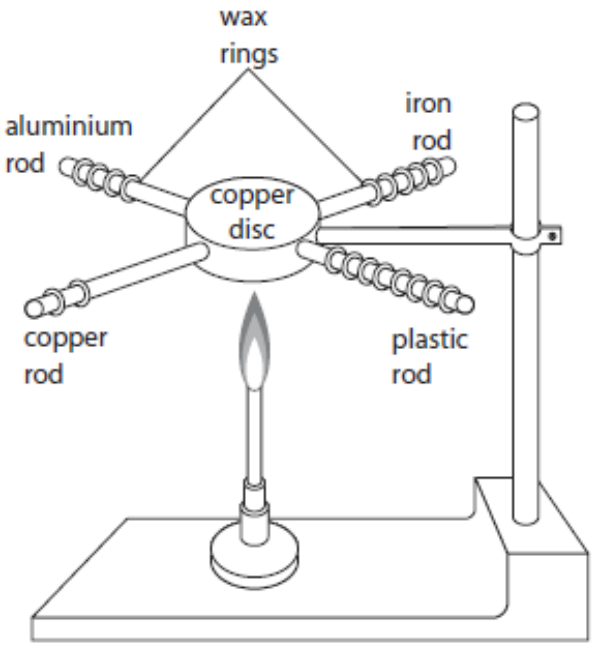
(b) determine the minimum effort that would be required by the applicant to lift the load.

(05 scores)

ITEM 2

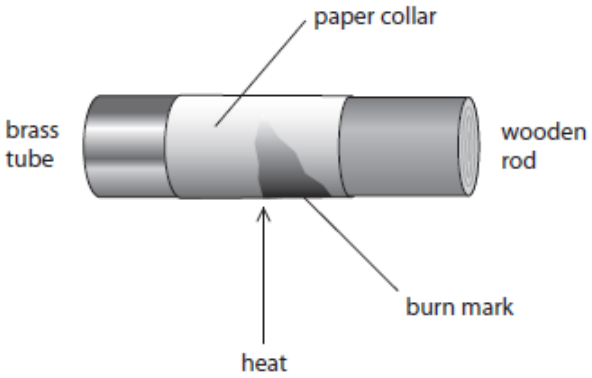
During a Physics lesson, a teacher performs three separate experiments to demonstrate conduction of thermal energy.

In the first experiment, he inserts four rods of different material into a copper disc and places 8 pieces of wax rings onto each rod. She then heats the copper disc with a Bunsen flame. The figure below shows the results of the experiment after the copper disc was heat for a few minutes.



In the second experiment, he places lumps of ice in a test tube, places a wire mesh on top of ice and fills the test tube with water. He then heats up the top of the test tube until the water boils.

In the third experiment, he inserts a wooden rod into the end of a brass tube and wraps the interface of the two materials with a paper collar which he then heats. The figure below shows the result of the experiment after a few minutes.



As a learner of Physics, help the students who did not attend the lesson that day to understand;

(a) what the first experiment tells us about conduction of thermal energy. **(04 scores)**

(b) the importance of the wire mesh and the observations made in the second experiment. **(05 scores)**

(c) why the paper collar was burnt on the wooden rod but not on the brass tube. **(03 scores)**

ITEM 3

A war erupted between two groups of soldiers who had camped on opposite sides of a certain hilly area surrounded by small water bodies. The soldiers communicated by throwing a stone in water to alert their colleagues of any danger ahead however the stone could alert their enemies too. One of the soldiers had **small sizable plane mirrors** and a **torn paper box** in his bag. Occasionally, the leader of one group of soldiers sent spies to peep behind the hills to see where the enemy troops were hiding but they could be captured and killed. One day as it was threatening to rain, bright colours of different kind spread out in the sky. This scared the soldiers and they took off and hid in a cave which is very dark inside as the rays from the sun couldn't reach there.

As a learner of Physics,

(a) advise the leader of the soldiers on how they could be able to see where the enemy troops are hiding without having to climb up the hill. **(06 scores)**

(b) help the soldiers understand the cause of the bright colours that spread out in the sky. **(02 scores)**

(c) advise the soldiers on how they would solve the problem they faced inside the cave. **(04 scores)**

*****END*****