**535/1**

**PHYSICS**

**PAPER 1**

**2024**

**2 ½ hours**

**MUGARUTSYA SECONDARY SCHOOL**

***UGANDA CERTIFICATE OF EDUCATION***

**S.4 END OF TERM ONE EXAMINATIONS 2024**

**PHYSICS**

**PAPER 1**

**THEORY**

**2 HOURS AND 30 MINUTES**

**INSTRUCTION TO CANDIDATES**

* **This paper consists of 2 sections ie. Section A and B.**
* **Attempt all the questions**
* **Where necessary, assume**

1. **Acceleration due to gravity =10ms-2**
2. **Speed of sound in air =33oms-1**
3. **Density of water = 1000kgm-3**
4. **Specific heat capacity of water = 4200Jkg-1K-1**

**SECTION A (40 MARKS)**

1.Light propagating from one medium to another to different optical densities suffers change in speed

1. What physics term is given to this phenomenon. (1 mark)

………………………………………………………………………………………………………………………………….

1. What laws govern the term in (a) above. (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Light from air is made to strike the surface of alcohol of refractive index 1.36. The incident light makes an angle of 20with the normal at the point of incidence. What is the angle of refraction as the light passes the air alcohol interface? (2marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

2.(a) The following table shows the data Collected from s.4 physics lesson about motion use it to answer the questions.

|  |  |  |
| --- | --- | --- |
| Name of the member | Distance ran (m) | Time taken (s) |
| Munda | 25 | 10 |
| Kasekende | 24 | 12 |

Using the knowledge of motion , who is faster? (3 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. State any two differences between speed and velocity (2 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

3.(a) Explain why it is easier to write with a pencil on a paper than on a plastic bottle. (3marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Agnes was driving under a light drizzle along Nalya Namugongo road, a motor rider (Boda boda ), Suddenly skidded off the road infont of Agnes’ car. Agnes immediately applied the brakes but it was useless move.

Explain why the move was a useless one (2marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

4. In a car test , a car of mass 1100kg travels at a speed of ms-1 and collides with a stationary van of mass 3000kg. After collision, the car and the van more together with common velocity v



(a) Define the term momentum (1mark)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Calculate the velocity V of the car and the van after collision (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. Calculate the total kinetic energy of the car and the van after collision. (2 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

5.Hamuza is puzzled because his metallic doors are always very hard to close during day time when it is shining too much and the same doors are very easy to close in the evenings when the temperature have lowered by considerable amounts.

1. As a physics student who understands better, explain the above phenomenon to Hamuza (3marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Give any two applications of the above scenario (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

6. Study the figure below and answer the questions that follow.



1. The figure above shows excited learners of Kamuli boys s.s after winning a football tournament. In relation to stability , explain the dangers of such situation (4marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Mention any two types of equilibrium (1mark)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

7. (a) State Pascal’s of pressure transmission (1 mark)

…………………………………………………………………………………………………………………………………………

…………………………………………………………………………………………………………………………………………………….

(b)identify two machines which operate on the above principle.( 2marks)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………..

1. A certain machine applies the above principles. At a certain garage, it is used to lift a car of weight W resting on a piston of cross sectional area 100cm2 by an effort of 20N at a piston of cross sectional are 2 cm2. Calculate the weight of the car. (2 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

8. A man was fishing in Lake Mburo using a copper wire of diameter 0.32mm. The wire is 256.0 cm long. He hooked a fish of 3 kg and the length of the wire changed to 262.0cm. calculate the

1. Stress (3 marks)

………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

1. Strain in the copper wire (2 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

9. The students of s.1 class were studying physics, the chapter of forces and their physics teacher gave them research about forces and their effects. As they were searching they came a cross that the S.I unit of force is Newton which was named after scientist. As a learner of s.4, you have been selected by the teacher to present the laws which were stated by sir Isaac Newton. Using relevant life examples, state and explain the laws discovered by the scientist (5 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….

10. As a learner of who has got knoweldge of heat quantities and vapour. Explain why water is used as a coolant in most industries. (5 marks)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………

**SECTION B.**

**This Section Contains Extended Scenario Based Items**

**Attempt All Questions.**

11. A brass band was invited to play during a celebration near a tall building, a distance slightly more than 17m away. Two friends standing in the same direction and in line with the playing band, heard the sound from the band at different intervals of time which attracted them to go and attend the celebration. On arrival, the sound they heard was unclear confused and indistinct. The two friends heard sound after 4s and 5s .

As a physics student, help the two friends understand why;

1. They heard the sound at different intervals.
2. The sound they heard was unclear, confused and indistirict.
3. Why sound is clear at night than during the day**.(10 marks)**

12. A certain family stays nearby the murum road and a school. Every day, the family receives dust raised by moving vechicles from the road and the bad smell from the school pit laterine is not so much either. But these conditions worsen around midday on hot sunny days. The family is disgusted by these conditions. They donot know the cause of these onditions.

As a physicist (researcher), write a comprehensive message to the family explaining the causes of the above phenomenon. **(10marks)**

13.(a) The solar system is composed of big, small and much smaller objects

(i) Name any four components of the solar system (2marks)

(ii) Name the force that holds the components together (01 mark)

(b)In the solar system , a planet is a celestial body that moves around the sun in a defined path and

* Has sufficient mass to keep it in a round (Sperical) shape
* Has cleared the “neighbor hood “ around its path of debris and bolder

The solar system has eight (8) planets which have the above qualities.

1. Which name is given to the path in which the planet moves ? (01 mark)
2. The planets are classified into terrestrial (inner) planets and jovian (outer) Planets. Identify the planets in their respective classes (4 marks)
3. Of recent, pluto was disqualified from being a planet and re-classified as a dwarf, pulto lies in the kulper belt which is full of iay bodies and debris out past Neptune. Explain why pluto was disqualified as aplanet (1 mark)

(c)Explain why the earth is said to be the planet known to support human life (1mark)

14.(a) Students of the academy heading for a Georaphy trip would hear varying sounds of the bus at various times, at same point, the sound increased and the bus speed increased and at other points,the sound changed and speed increased, one of the student told others that it was due to acceleration and velocity, as a physics student,

Define the terms ‘velocity’ and acceleration and state S.I unit of each (3marks)

(b)Engineer Busulwa initially driving at 25ms-1 on ENTEBBE EXPRESS HIGHWAY uniformly accelerates to 30ms-1 in 4 seconds. He maintained this steady velocity for another 10 seconds. He again accelerated uniformly to V ms-1 at a rate of 2.5ms-2 in the next 4 seconds. After seeing a mad person ,he instantly applies brakes and accelerates uniformly to rest in the last 2 seconds.

(i) Caculate the value of V (01 mark)

(ii) Sketch the velocity –time graph for the motion above (02 marks)

(iii) Caculate the total distance covered (02 marks)

(iv) Find the average speed (02 marks)

**END**