PHYSICS I

08:30AM-11:30AM

2nd TERM

REPUBLIC OF RWANDA

KAYONZA DISTRICT

ORDINARY LEVEL DISTRICT ASSESSMENT, 2023-2024

SUBJECT: PHYSICS I

Class: SENIOR TWO

DURATION: 3Hours

Instructions: This exam consists of Two sections,

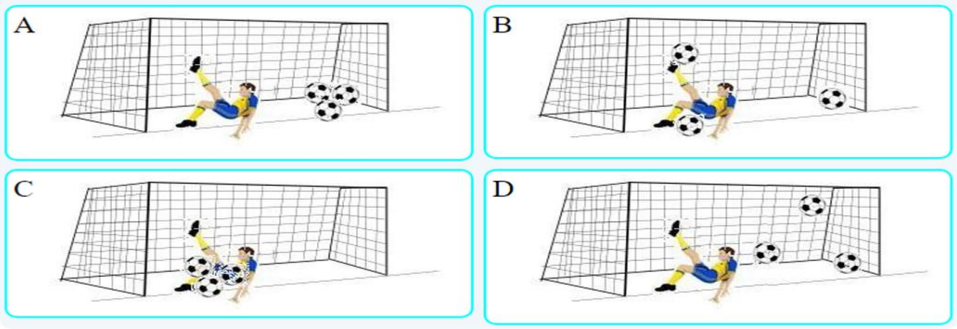
- ✓ **Section A:** Answer all questions of Section A **(55mrks)**
- ✓ **Section B:** Answer only three questions for your choice (**45mrks)**

- Scientific calculators are allowed and can be used.

SECTIONA: Attempt ALL questions(55mrks)

1.A group of students is working on tracking the growth of a plant over an entire month. Each day one member of the group needs to measure the height of the plant and record it in the group's log book. At the end of the month the groups looks at their data and notices that the numbers went up every day except one where the number went down, but then went up again the next day. What are the sources of errors for the tracking of the plant growth?**/4Mrks**

2. The shooter is aiming for the right corner of the back of the net. Which one of the following shows high accuracy and high precision? **/2Mrks**



Explain. **/4Mrks**

3.a) Differentiate acceleration from deceleration. **/4Mrks**

b) A car accelerates uniformly for 10s from 20m/s with an acceleration of 2m.s^{-2}.

i) Compute the final velocity? **/4Mrks**

ii)Calculate the distance covered by the car during that time? **/4Mrks**

4. a) What is a friction? **/2Mrks**

b) Explain any 4 examples where the friction force can be experienced in real life.**/4Mrks**

c)Explain how to reduce friction in moving parts of machines**/4Mrks**

5.a)Copy and complete with appropriate words **/3Mrks**

An.....is a pressure due to weight of air on surface area, at .....level atmospheric pressure is equal to 1.103x10^{5}Pa. Atmospheric pressure decreases with.....altitude.

b) A 150 N force is applied to an area of 0.2 m^2.

What is the pressure due to this force? **/3Mrks**

c) A nurse administers medication in a saline solution to a patient by infusion into a vein in the patient's arm. The density of the solution is 1.0 × 10^3 kg/m^3 and the gauge pressure inside the vein is 2.5 × 10^3 Pa.

How high above the insertion point must the container be hung so that there is sufficient pressure to force the fluid into the patient? **/3Mrks**

6. Explain why fuel gases are kept in hard metal cylinder. **/3Mrks**

7. Guive any two applications of Boyle's law in real life. **/2Mrks**

8. A balloon inflated in a room at 24°C has a volume of 4.L. The balloon is then heated to a temperature of 58°C.

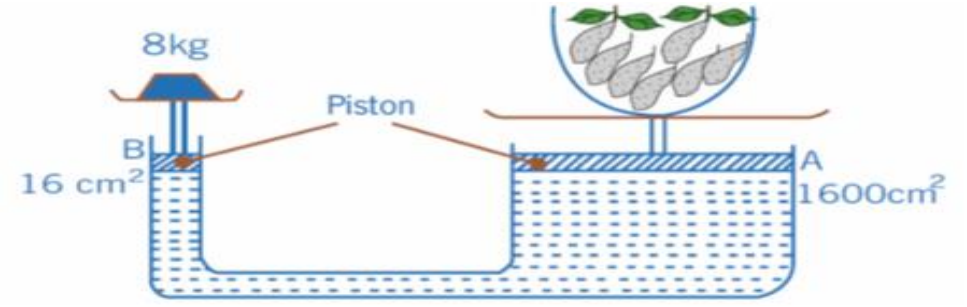
What is the new volume if the pressure remains constant? **/4Mrks**

9.A hydraulic system is used to lift a 2000 kg vehicle in an auto garage. If the vehicle sits on a piston of area 0.5 square meter, and a force is applied to a piston of area 0.03 square meters, what is the minimum force that must be applied to lift the vehicle? **/4Mrks**

SECTIONB: Attempt THREE questions in this section(45mrks)

10. a)State Pascal's principle and give different situations where Pascal's principle is used in our daily lives. **/5Mrks**

b) Figure below shows a hydraulic weight bridge which works on the principle of Pascal's law.



i)What is the pressure at B? **/4Mrks**

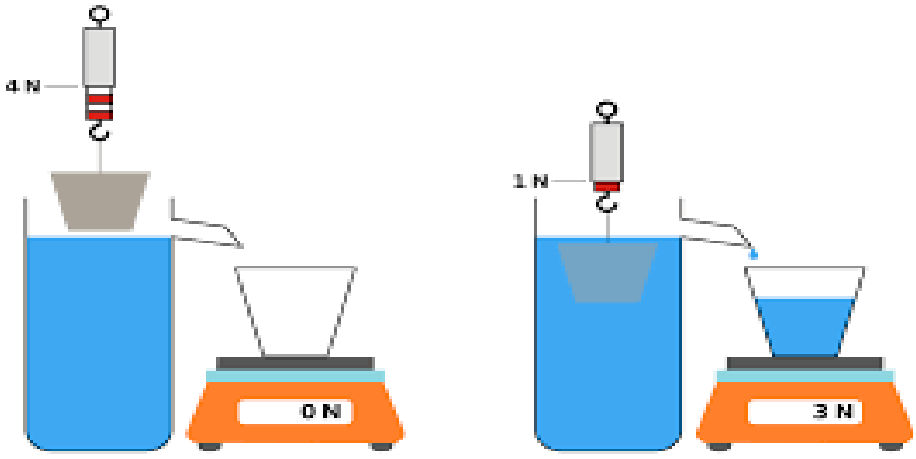
ii)What is the pressure at A? **/2Mrks**

iii)What is the weight of the vegetable on the large piston A if the weight bridge is in equilibrium? **/4Mrks**

11.(a)State Archimedes' principle and give different situations where Pascal's principle is used in our daily lives. **/5Mrks**

(b) Explain how it is possible for ships made of metals like aluminium or iron float in water, knowing that metals are more dense than water while the iron nail sinks in water. . **/4Mrks**

(c) The set up below is used to prove Archimedes' principle



Name all materials required prove Archimedes' principle and write down procedures or steps to prove Archimedes' principle. **/6Mrks**

12. (a)State law of conservation of mechanical energy and give its applications in real life situation. **/4Mrks**

(b)A rollercoaster of total mass (passengers and coaster) of 800kg moved with speed of 20m/s at 12m high. Like shown in the figure below

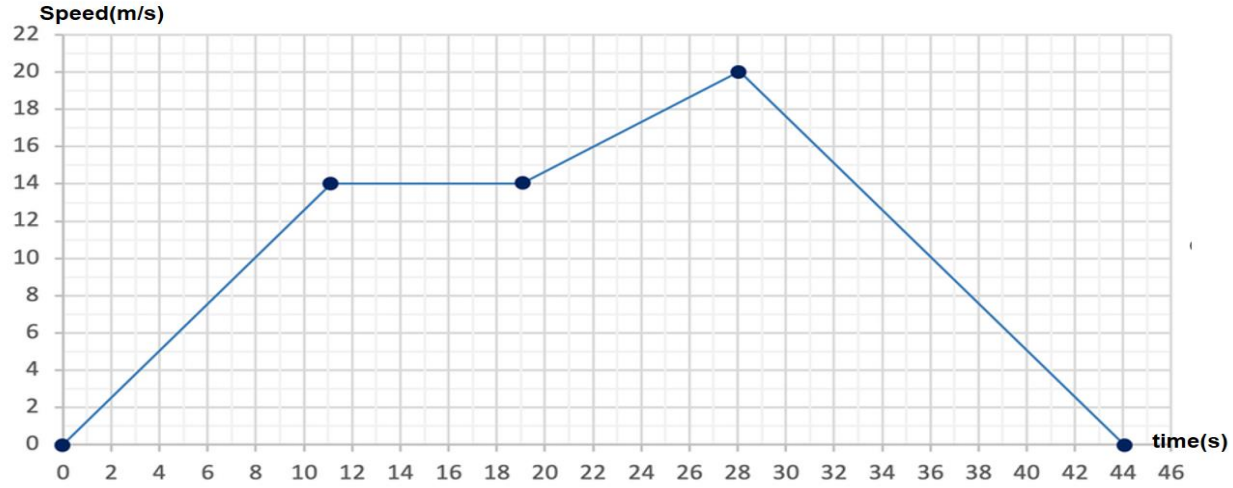


(i)Calculate the total energy (Mechanical energy) of rollercoaster**/3Mrks**

(ii)Calculate the kinetic energy of rollercoaster at 6m high**/4Mrks**

(iii)Calculate the height at which rollercoaster reached, if it has a speed of 10m/s**/4Mrks**

13 It is given speed-time graph of linear motion of moving car below:



(a)Describe the motion of each part of the journey. **/4Mrks**

(b)Estimate the speed of moving vehicle at 40s. **/2Mrks**

(c)Determine the average speed of the vehicle of its whole journey. Comment on your answer. **/4Mrks**

(d) Calculate gradient of the graph for the first 11seconds and the deceleration for the moving car**/5Mrks**