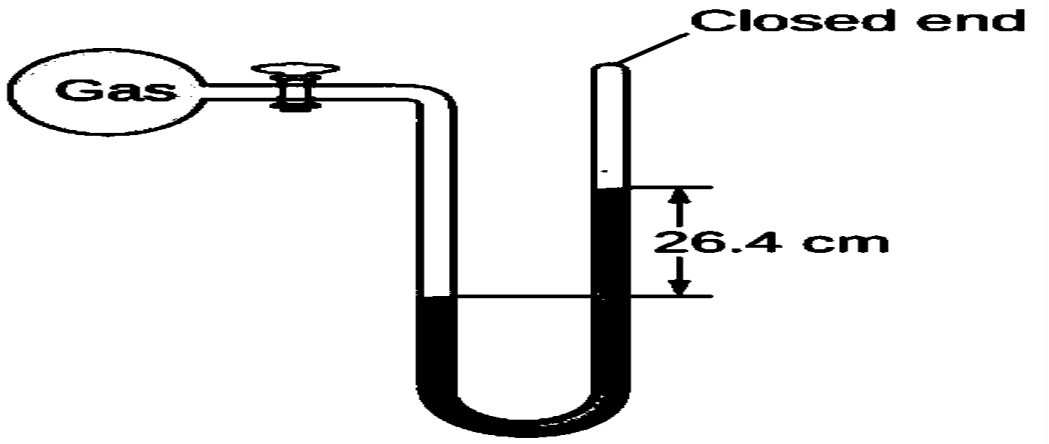
**GRADE 10**

**OPENER TERM 2 2026 ASSESSMENT**

**PHYSICS**

# MARKING SCHEME

1. State two branches of physics. (2marks)
   Geometric Optics, mechanics, Electricity and magnetism, Nuclear physics
2. As a physics student knowledge gotten from the subjects becomes crucial in the day to day solutions. How is this knowledge important? (3 marks)
   Award marks for relating key branches with solutions or importance of physics
3. State three careers that are physics dependent. (3 marks)
   Dental surgery, Civil engineering, Civil Engineering, Teaching, Electrical and Electronics.
4. A balloon rising in the atmosphere may burst as it rises. Explain this phenomena. (2 marks)
   As the balloon rises atmospheric pressure decreases the pressure in the balloon exerts more pressure on the fabric making the balloon to eventually burst when the air pressure inside the balloon becomes greater than the fabric pressure and the atmospheric pressure.
5. State two factors that affect pressure in fluids. (2 marks)
   Depth, Density.
6. Atmospheric pressure is crucial in daily life. Explain an experiment you would carry out to demonstrate its existence. (5 marks)
   Apparatus: water glass, card, water. Procedure: fill the glass of water to the brim, slide the card to cover the glass, invert the glass observation: the card stays in place and the water does not pour. Conclusion: the card was pressed against the glass of water by atmospheric pressure.
7. When measuring pressure SI units are used state its SI units. (1 mark)
   $N/m^2$ , Pascal.
8. Determine the pressure of the gas below that raises the level of water as shown below.(3 marks)
   (Density of water=1000kg/m3)




   P=hρg= 0.264 X 10 X 1000 = 2,640N/M2

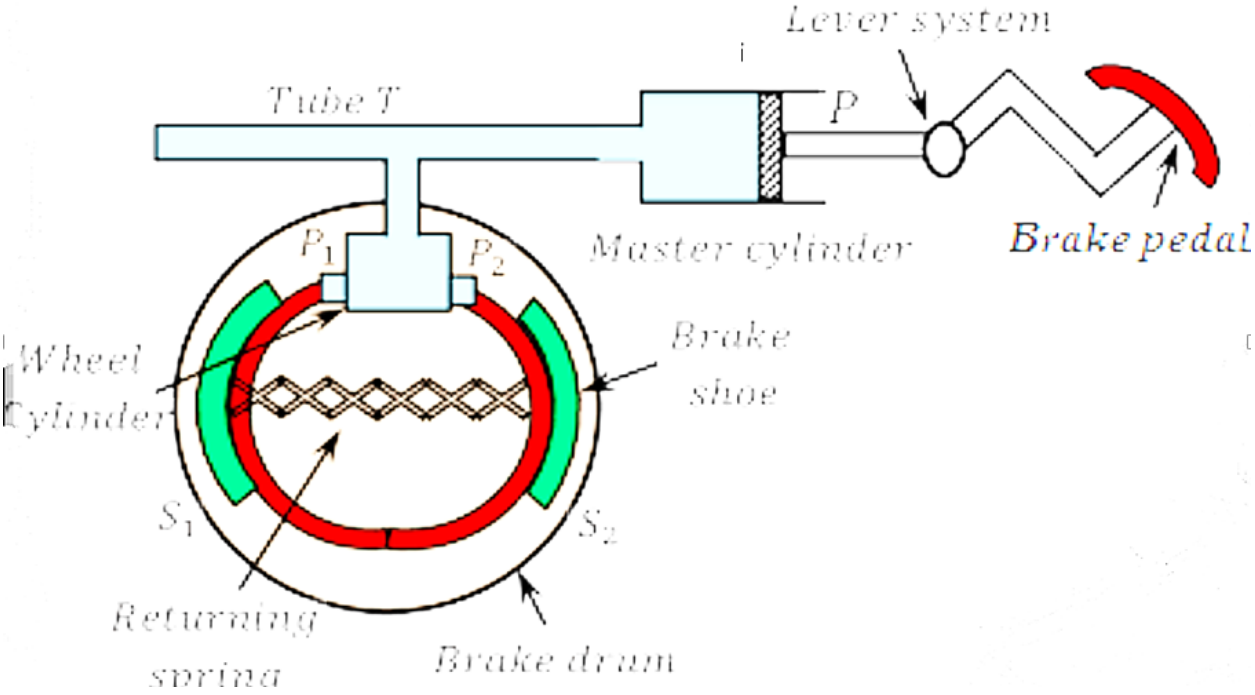
9. A fisherman dives 25m below the sea water. Given that the sea water is 1.03g/cm3, gravitational force (g) is 10N/Kg and atmospheric pressure is 103, 000n/m2. Determine the following:
   i) The pressure exerted by the sea water on the man. (3 marks)

   P=hρg = 25 X 10 X 1030 = 257500N/M2

ii) Total pressure on him. (2 marks)

=257,500+103,000 =267,800N/M2

10. Below is a diagram of a hydraulic break system explain how the system works (4 marks)




When the brake pedal is pressed the pressure is transmitted to the brake fluid in the master cylinder which transmits the pressure to the slave piston that pushes the break shoe that pushes the break lining to oppose motion.

11. A student was given a pipe to irrigate a land from a tank full of water with no tap and opened on the upper part raised 10m high from the ground. Explain as a physics student how you would irrigate the land. (3 marks)

    Insert the pipe on the upper part of the tank. Suck the water from to ensure water flows out and use it to irrigate while maintaining the level of the lower part of the pipe below the water depth to utilize barometric pressure. OR fill the pipe with water to ensure there is no air in it and insert it in the tank

12. Define the following term relating to material properties;
    a. Elastic deformation. (2 marks)

       is a temporary change in shape that a material undergoes when subjected to stress when stress is withdrawn the material returns to its original shape e.g. a rubber band or metal spring.

    b. Plastic deformation. (2 marks)

       Is a permanent change that occurs when a material is subjected to stress beyond its elastic limit. Atomic bonds are broken and deformed there is a permanent shift in the material structure e.g. bending a metal rod or a paper clip.

    c. Ductility (2 marks)

       Is the ability of a material to be drawn into wires or elongated under tensile stress without fracturing. E.g gold and copper

    d. Malleability (2 marks)

       Is the ability of a material to be hammered, rolled or pressed into thin sheets without fracturing. Is a measure of how a material can easily be deformed under compressive stess. E.g Aluminium can be compressed to form an aluminum foil.

    e. Brittleness (2 marks)

       Is a property of a material to break without going through much permanent distortion.

13. State Hooke's law (1 mark)
    For a helical spring or elastic material extension is directly proportional to the stretching force provided the elastic limit is not exceeded. F=ke.
14. A spring produces an extension of 12mm when a force of 0.6N is applied to it. Calculate the spring constant for the system that has two such springs arranged in:
    a) Series (3 marks)
    Total extension = 2x0.012=0.024M
    k=F/e=0.6/0.024=25N/M
    b) Parallel (3 marks)
    E=1/2x12mm=6mm=0.006M
    K=F/e=0.6/0.006=100N/M
15. A wire of length 2 m and cross sectional area of 0.0001$m^2$ is stretched by a load of 1020 N. The wire is stretched by 0.1 cm. Calculate the following:
    a. Longitudinal or tensile stress (3 marks)
    =F/A
    =1020/0.0001=1.02x$10^7$ N/$M^2$
    b. Longitudinal or tensile strain (3 marks)
    =$\Delta L/L_o$ 0.001/2=0.0005
    c. Young's modulus of elasticity (3 marks)
    $Y=\delta/\varepsilon$ = 1.02x$10^7$ / 0.0005 = 2.04x$10^{10}$ N/$M^2$
16. Explain how a force pump works (5 marks)
    on the upstroke of the plunger, the outlet or delivery valve is closed and the inlet valve opens. The low air pressure produced in the barrel causes the water below to move up the downpipe and eventually fill the barrel. On the downstroke, the inlet valve closes, the outlet valve opens, and the water is forced out via the outlet pipe, which is located at the bottom of the barrel. Water is only expelled on the downstroke
17. What are the advantages of a force pump over a lift pump (4 marks)

    Water can flow **continuously** thanks to a **force pump.**
    **The** maximum height **that water may be** elevated **from is** independent **of air pressure.**

18. As a physics student how can you use your knowledge to better your community (6 marks)
    The learner should outline 3 ways how he can utilize physics knowledge to solve or improve community wellbeing the answers below are just but a general guide the list is bigger.
    Physics can play an important role in developing strategies to combat climate change, in the development of cleaner energies, and in the development of technological advancements.
    Physics contributes to the technological infrastructure and provides trained personnel needed to take advantage of scientific advances and discoveries.
    Physics is an important element in the education of chemists, engineers and computer scientists, as well as practitioners of the other physical and biomedical sciences.