ACTIVITIES BASED ON LABORATORY MATERIALS

4th ESO - PHYSICS AND CHEMISTRY

Access the **IES Marqués de Comares** website, where you will find the Virtual Museum of Physics and Chemistry. In this museum your will find instruments and laboratory material whose functioning is based on the knowledge that we are working on in this subject. Check the information you need to answer the following activities.

1. Explain what it is used for or what purpose the laboratory has a "safety tube".

2. The wattmeter is an instrument used to measure:

    a) The number of oscillations or beats of an object.
    b) Power of the current flowing between two points.
    c) The density of a mixture.
    d) The intensity of the electric current between two points.

3. The micrometer is an instrument for measuring small lengths with great accuracy. What can be a suitable multiple or submultiple to express the lengths measured with the micrometer?

    a) kilometer.
    b) decimeter
    c) decameter
    d) millimeter.

4. The micrometer is an instrument for measuring small lengths with great accuracy. Check what is the minimum sensitivity or error that we can make in a measurement with the micrometer.

    a) one millimeter (1 mm).
    b) one tenth of a millimeter (0.1 mm)
    c) one hundredth of a millimeter (0.01 mm).
    d) one thousandth of a millimeter (0.001 mm)

5. Using the micrometer to measure the length of a small metal piece, we obtain as a result 17.53 mm. However, the manufacturer of the piece tells us that the real value of its length is 17.50 mm. Determine the absolute error of the measurement.

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6. The alcohol lighter is a material used in the laboratory for heating. It provides continuous heating although with little calorific value. It is based on the combustion reaction of ethyl alcohol or ethanol with oxygen in the air. What products are obtained from this reaction?

7. The alcohol lighter is a material used in the laboratory for heating. It is based on the combustion reaction of ethyl alcohol or ethanol with oxygen in the air. What are the heat-releasing reactions called?

8. The alcohol lighter is a material used in the laboratory for heating. It is based on the combustion reaction of ethyl alcohol or ethanol with oxygen in the air. What is the chemical formula of ethanol?

    a) CH_3OH
    b) $CH_3\ CH_2OH$
    c) $CH_3\ CH_2\ CH_2OH$
    d) $CH_3\ CH_2\ CHO$

9. The alcohol lighter is a material used in the laboratory for heating. It is based on the combustion reaction of ethyl alcohol or ethanol with oxygen in the air. Write the chemical equation for this reaction and adjust it stoichiometrically.

10. The Crookes tube is similar to that of _____, but with the gas at a lower _____. When applying a very high potential difference between the electrodes, a fluorescence appears in the area opposite the _____ and that it always has a greenish colour, regardless of the gas used. If different accessories are placed between the cathode and the anode, the properties of the _____ rays can be determined.

11. In which atomic theory was an experiment carried out using a glass ampoule (similar to the Geissler's tube), which contained a gas at low pressure, to which when applying a potential difference between the cathode and the anode, cathode rays appeared?:

    a) Dalton's atomic model
    b) Thomson's atomic model
    c) Rutherford's Atomic model
    d) Böhr's atomic model.

12. What is a psychrometer used for?

13. What is a rack and what is it used for?

Solutions: 1 (avoid splashing in very fast reactions); 2b; 3d; 4c; 5 (0.03mm); 6 (carbon dioxide (CO_2) and water (H_2O)); 7 (exothermic); 8b; 9 (2 CH_3CH_2OH + 7 O_2 → 4 CO_2 + 6 H_2O); 10 (Geissler, pressure, cathode, cathodic); 11b; 12 (measure the relative humidity of the atmosphere); 13 (it is a normally metallic support material, which is used in the laboratory to hold test tubes)