MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) How many different elements are in a water molecule?
   A) one  B) two  C) three  D) four  E) none of these

2) Which of the following are electrically neutral?
   A) electron  B) proton  C) neutron  D) all of these  E) none of these

3) What makes an element distinct?
   A) the number of electrons
   B) the number of neutrons
   C) the number of protons
   D) the total mass of all the particles
   E) none of these

4) Solid matter is mostly empty space. The reason solids don't fall through one another is because
   A) atoms are constantly vibrating, even at absolute zero.
   B) of nuclear forces.
   C) of electrical forces.
   D) of gravitational forces.
   E) none of these.

5) When a chocolate bar is cut in half, its density is
   A) unchanged.  B) doubled.  C) halved.

6) If the mass of an object were to double while its volume remains the same, its density would
   A) double.  B) halve.  C) stay the same.

Figure 12-C

7) When a load is placed on the middle of a horizontal beam supported at each end, the bottom part of the beam undergoes
   A) compression.  B) tension.
8) A strong spring is stretched 10 cm by a suspended weight. If the weight is doubled, the spring will stretch
   A) no more.
   B) another 5 cm, making the total stretch 15 cm.
   C) another 10 cm, making the total stretch 20 cm.
   D) another 30 cm, making the total stretch 40 cm.
   E) more than another 30 cm.

9) A dam is thicker at the bottom than at the top partly because
   A) water pressure is greater with increasing depth.
   B) water is denser at deeper levels.
   C) surface tension exists only on the surface of liquids.
   D) it looks better.
   E) none of these.

10) The mass of a cubic meter of water is
    A) 1000 kg.
    B) 9800 N.
    C) 100 kg.
    D) 1 kg.
    E) 10 kg.

   *A hydraulic arrangement consists of a water filled U-tube that is wider at one end than at the other, as shown below. Pistons
   are fitted in both ends.*

11) To multiply an input force, the input end should be the one having the
    A) smaller diameter piston.
    B) larger diameter piston.
    C) relative piston sizes don't matter.

12) The pascal is a pressure unit equal to one
    A) newton per square meter.
    B) kilogram per square centimeter.
    C) kilogram per square meter.
    D) newton per square centimeter.
    E) square meter per newton.
13) Atmospheric molecules do not fly off into outer space because of
   A) their relatively high speeds.  \(\Box\) Earth gravitation.
   C) their relatively low densities.  \(\Box\) cohesive forces.

14) A balloon is buoyed up with a force equal to the
   A) atmospheric pressure.
   B) weight of the balloon and contents.
   C) density of surrounding air.
   \(\Box\) weight of air it displaces.
   E) all of these.

15) A bubble of air released from the bottom of a lake
   \(\Box\) becomes larger as it rises.
   B) becomes smaller as it rises.
   C) alternately expands and contracts as it rises.
   D) rises to the top at constant volume.
   E) none of these.

16) When a common fluorescent lamp is on, the mercury vapor inside is actually in a
   A) liquid state.  \(\Box\) solid state.  \(\Box\) plasma state.  \(\Box\) gaseous state.  E) none of these.

17) When a gas is heated and becomes a plasma, its electric charge is usually
   A) negative.  \(\Box\) positive.  \(\Box\) balanced.  \(\Box\) non-existent  E) none of these.

18) When you touch a cold piece of ice with your finger, energy flows
   \(\Box\) from your finger to the ice.  B) from the ice to your finger.  C) actually, both ways.

19) A substance that heats up relatively quickly has a
   \(\Box\) low specific heat.  B) high specific heat.

20) Heat energy is measured in units of
   A) joules.  \(\Box\) calories.  \(\Box\) both of these.

21) The moderate temperatures of islands throughout the world has much to do with water's
   \(\Box\) high specific heat.
   B) high evaporation rate.
   C) absorption of solar energy.
   D) vast supply of internal energy.
   E) poor conductivity.

22) Before ice can form on a lake, all the water in the lake must be cooled to
   A) zero degrees C.  \(\Box\) 4 degrees C.
23) During a very cold winter, water pipes sometimes burst. The reason for this is
   A) water contracts when freezing.
   B) the thawing process releases pressure on the pipes.
   C) water expands when freezing.
   D) the ground contracts when colder, pulling pipes apart.
   E) none of these.

24) Metals are both good heat conductors and good electrical conductors because of the
    A) relatively high densities of metals.
    B) ability of metals to transfer energy easily.
    C) looseness of outer electrons in metal atoms.
    D) high elasticity of metals.
    E) similarity between thermal and electrical conductive properties.

25) Hot water will cool to room temperature faster in a
    A) silver pot.
    B) black pot.
    C) depends more on the size of the pots than their color.