Circle the letter indicating the *best* answer.

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1. The atomic number of an element is equal to the number of:
   A. electrons and neutrons
   B. protons
   C. neutrons
   D. protons, neutrons and electrons.

2. The atomic symbol for a gold atom is $^{197}_{79}Au$. Clarify what this tells you about the gold atom.
   A. It contains 118 protons.
   B. It contains a total of 197 protons, neutrons and electrons.
   C. It contains 118 neutrons.
   D. It contains 197 electrons.

3. The ore Chalcopyrite has the chemical formula CuFeS$_2$. The three elements that make up this ore are –
   A. Curium, Iron and Silver
   B. Copper, Fluorine and Sulphur
   C. Carbon, Iron and Sodium
   D. Copper, Iron and Sulphur

4. An atom of calcium has 20 electrons. Its electron configuration would best be written as:
   A $^{40}_{20}Ca$
   B 20
   C 2,8,8,2
   D 2,8,10.

5. A phosphorus atom has an atomic number of 15. State how many electrons it has in its third (outermost) shell.
   A. 0
   B. 2
   C. 5
   D. 8

6. Which one of the following is not a property of non-metals? Non-metals are:
   A. normally gases or liquids at room temperature
   B. either poor electrical conductors or non-conductors
   C. able to be hammered into sheets
   D. dull, with little or no shine.

7. The atomic number of zinc (Zn) is 30. Therefore, the ion represented by the symbol $^{65}_{30}Zn^{2+}$ has:
   A. 30 protons, 35 neutrons and 28 electrons
   B. 65 protons, 30 neutrons and 32 electrons
   C. 30 protons, 65 neutrons and 28 electrons
   D. 30 protons, 35 neutrons and 32 electrons.

8. Use the periodic table to determine which of the following statements is correct about chlorine atoms.
   A. They form the ion Cl$^-$.
   B. Chlorine atoms are smaller than fluorine atoms.
   C. It is in Period 2.
   D. Chlorine belongs to the noble gas family.
9. A compound forms when:
   A. two or more elements chemically combine with each other
   B. two or more elements are physically mixed together
   C. a large number of identical atoms join together
   D. a mixture is separated into its components.

10. A particular element is shiny, malleable and a good conductor of electricity. In which section of the periodic table would this element not be found?
    A. transition elements
    B. Group I
    C. Group III
    D. Group VI

11. Which of the following lists contains only compounds?
    A. water (H₂O), glucose (C₆H₁₂O₆), carbon dioxide (CO₂)
    B. tungsten (W), phosphorus (P), chlorine (Cl₂)
    C. Vegemite, limewater (Ca(OH)₂), plutonium (Pu)
    D. salt (NaCl), air, iron (Fe)

12. Moving down Group I in the periodic table, which property would be expected to decrease?
    A. the reactivity
    B. the number of outer-shell electrons in each atom
    C. the size of atoms
    D. the melting point

13. The terms speed and velocity are used to describe objects which are moving. They:
    A. mean exactly the same thing and are measured with the same units.
    B. are similar terms, measured with the same units, but are not exactly the same.
    C. both involve measurements of distance, time and direction.
    D. are used in different situations, with velocity being used only when the values are very large.

14. A car is slowing down on a level road. There must be:
    A. no force acting on it
    B. a large upwards force acting on it
    C. a small backward force acting on it
    D. a small positive acceleration acting on it

15. A train travels at a speed of 18 m/s. This is equivalent to a speed of:
    A. 6.48 km/h
    B. 64.8 km/h
    C. 64 800 km/h
    D. 0.005 km/h
16. Inertia can be defined as:
   A. the amount of matter in an object
   B. a tendency of an object to resist a change in its motion
   C. the force of gravity on an object
   D. when a force makes something move

17. When we use the term 'a force' we mean:
   A. something that always causes something else to move.
   B. an occurrence that always causes major damage.
   C. simply a ‘push’ or a ‘pull’ on something.
   D. a ‘push’ being applied to an object which moves as a result.

18. Which one of the following statements about friction is INCORRECT?
   A. Friction operates in the same direction as a moving object.
   B. Friction is a contact force.
   C. Friction between two moving objects produces heat.
   D. Without friction you could not grip an object or walk.

19. A 90 N force is applied to a 65 kg mass. The mass will accelerate at:
   A. 0.72 m/s²
   B. 1.38 m/s²
   C. 1.77 m/s²
   D. 5850 m/s²

20. If the acceleration due to gravity on the moon’s surface is 1.6 m/s² then a mass of 60 kg has
    a weight on the moon of:
    A. 96 Newtons
    B. 60 Newtons
    C. 588 Newtons
    D. none of the above

21. Which of the following is best explained by Newton’s third law?
    A. Unbelted passengers will be thrown forward when a car stops suddenly.
    B. A gun recoils when a shot is fired.
    C. The acceleration of an object when a force is applied depends on the mass of the object.
    D. The weight of an object varies from planet to planet.

22. Which of the following best describes the energy changes occurring when an apple falls
    from a tree branch to the ground below?
    A. gravitational potential → kinetic → heat and sound
    B. elastic potential → kinetic → heat and sound
    C. gravitational potential → heat → kinetic
    D. elastic potential → heat → kinetic
23. Three students, Jane, Indira and Charlotte run in a 100 m sprint on a school sports day. The displacement (or distance) / time graph of their motion is shown below.

Select the alternative below that correctly orders their finish places in the race.

A. Jane wins, Indira is second and Charlotte is third.
B. Indira wins, Jane is second and Charlotte is third.
C. Charlotte wins, Indira is second and Jane is third.
D. Charlotte wins, Jane is second and Indira is third.

24. “All bodies remain in a state of rest or uniform motion unless acted upon by an external unbalanced force.” This property of bodies is called:

A. mass
B. inertia
C. density
D. weight

25. A cyclist rides a hilly course between points P and U, as shown in the diagram.

The most likely regions where he would accelerate are between points:

A. (i) R and S, and (ii) T and U.
B. (i) R and S, and (ii) S and T.
C. (i) P and Q, and (ii) T and U.
D. (i) S and T, and (ii) T and U.

END OF MULTIPLE CHOICE SECTION