Sarajevo School of Science and Technology

Sarajevo, June 2014

Entrance Exam

P H Y S I C S

Name: _____

Circle the correct answer.

1. A body of 3 kg mass and 5 g/cm^3 density has the volume:
   a) 600 litres
   b) 6 dm^3
   c) 0.6 litres

2. When a body of 20 g mass reaches velocity of 200 m/s, its kinetic energy becomes:
   a) 400 J
   b) 800 J
   c) 400 W

3. Temperature of -13^{o}C equals:
   a) 276.15 K
   b) -260 K
   c) 260.15 K

4. In order to double the volume of gas, under constant pressure and at starting temperature of 27^{o}C, it should be heated to a temperature of:
   a) 200 K
   b) 200^{o}C
   c) 600 K

5. If a constant force acts on a body, it will:
   a) Stay at rest
   b) Move at constant speed along straight line
   c) Achieve constant acceleration

6. The SI unit for electric charge is:
   a) Coulomb
   b) Farad
   c) Ampere

7. Electrostatic force between charges is:
   a) Always attractive
   b) Always repulsive
   c) Attractive or repulsive depending on the sign of the charges

8. There are 5 moles of a gas in a vessel at 100°C. If the pressure of the gas amounts to 23.114 kPa and the gas constant is R=8.314 J/Kmol, the volume of the gas equals:
   a) 0.06 dm^3
   b) 0.67 m^3
   c) 18.65 dm^3

9. A man walking 5.4 km/hour will travel the following distance each minute:
   a) 0.9 m
   b) 90 m
   c) 9 m

10. A bottle has a mass of 35.00 g when empty and 98.44 g when filled with water. When filled with another liquid, the mass is 88.78 g. What is the density of this other liquid?
   a) 0.8477 g/cm^3
   b) 0,5378 g/cm^3
   c) 0,6344 g/cm^3

11. Gamma rays are:
   a) Fast electrons
   b) High energy photons
   c) Slow neutrinos

12. Electric bulb of 110 W is connected in a circuit with 220 V voltage. The resistance of that bulb is:
   a) 220 Ω
   b) 440 Ω
   c) 50 Ω

13. A sharp image of an object is located 78 mm behind a 65 mm focal-length converging lens. The object distance from the lens is:
   a) 390 mm
   b) 420 mm
   c) 270 mm

14. When electrons are accelerated by 2450 V in an electron microscope, they will have wavelengths of:
   a) 8.113 nm
   b) 0.622 nm
   c) 0.811 nm

15. The radius of a hydrogen atom orbit where n=2 compared to the radius of a hydrogen atom orbit where n=1 is:
   a) Two times larger
   b) Two times smaller
   c) Four time larger

16. Is it possible to form an Ar_2 molecule?
   a) Not at all
   b) Yes, of course

17. How many electrons there are in a molecule of water?
    a) 2
    b) 8
    c) 10

18. Electron mass is 9.1×10^{-31} kg. What is the proton mass?
    a) 9.1×10^{-31} kg
    b) 1.7×10^{-27} kg
    c) 1.7×10^{-31} kg.

19. The charge of the electron is 1.6×10^{-19} C. What is the charge of the proton?
    a) 1.6×10^{-19} C
    b) 9.1×10^{-28} C
    c) 3.2×10^{-16} C

20. How many neutrons are there in the nucleus of ${}_2He^3$?
    a) Two
    b) One
    c) Three

21. Nuclei of certain atoms emit α-particles. What is an α-particle, how would you designate it?
    a) ${}_2He^4$
    b) ${}_2He^{4+}$
    c) ${}_2He^{4++}$

22. What is the origin of the word ATOM?
    a) Little
    b) Light (not heavy)
    c) Indivisible

23. If you were locked in a vacuum with a piano, could you hear the music you play?
    a) Yes
    b) No

24. If you were locked in a vacuum at night with a table lamp and a book. Could you read?
    a) Yes
    b) No

25. If you drop two small balls 1 cm in diameter made of platinum and aluminium at the same instant (simultaneously) from the top of the Leaning Tower of Pisa, they will hit the ground
    a) At the same time
    b) First the platinum ball an then aluminium one
    c) First aluminium ball and then platinum one