PHYSICS   PRACTICE TEST

Part I.   In the following 15 multiple choice questions, there is always one correct answer. Each of these correct answers is evaluated by one point. Indicate your choice by writing a letter (A), (B), etc…

1. If you plot a graph of centripetal (center-seeking) acceleration against frequency for the case of uniformly rotation motion, i. e. ac = f (f) , it is:
  A. a straight-line parallel to the frequency axis
  B. a straight-line non-parallel to the frequency axis
  C. a curve of hyperbolic shape
  D. a curve of parabolic shape
              Correct answer: D

2. The main SI unit of energy is:
  A. watt
  B. calorie
  C. joule
  D. horsepower
              Correct answer: C

3. X-rays (Roentgen´s radiation) are:
  A. electrons
  B. positrons
  C. photons
  D. neutrons
              Correct answer: C

4. Find the correct equation for potential energy (W_p) of the body:
(m = mass, v = velocity, h = height, g = gravitational acceleration)
  A. Wp = m v h
  B. Wp = 1/2 m v^2
  C. Wp = m g h
  D. Wp = m g v
              Correct answer: C

Part II. In the following 5 multiple choice questions there are two correct answers. Each of these questions is evaluated by two points. Indicate your choice by writing two letters, e. g. (A, B), (B, C). To reach two points you must give correctly both of them.

5. Which of the following are the kinds of electromagnetic radiation:
  A. cathode rays
  B. ultraviolet radiation
  C. alpha rays
  D. beta rays
  E. gamma rays
  F. ultrasound
              Correct answers: B, E

6. Which of the following statements are correct: Water (when considered as an ideal liquid)
    A. has a boiling point at 100 $^{\circ}$C
    B. has no electric conductivity
    C. has maximum density at 0 $^{\circ}$C
    D. is absolutely incompressible
    E. has no viscosity (is without viscous friction)
    F. has a triple point at 273.16 K
                Correct answers: A, F

7. Which of the following elements are most able to create positively charged ions:
    A. F – fluorine
    B. Cl – chlorine
    C. H – hydrogen
    D. J – iodine
    E. Na – sodium
    F. O – oxygen
                Correct answers: C, E

Part III. In the following 5 questions, you should write the direct answer. The correct answers are evaluated by one or two points.

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8. When a wave of light enters one medium from another the direction of propagation of the wave in the new medium is changed. Write the name of this phenomenon.
                 Correct answers: refraction of light

Part IV. In the following questions there are 10 physical problems. The answer should consist of the brief and concise solution (including used relationships), the final result and the appropriate SI unit. Each of these correct answers is evaluated by one or two points.

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9. The focal length of the simple converging (biconvex) lens is 12.5 cm (centimeters). Give the focussing power (in diopters) of this lens.
               Correct answer: + 8 D

10. The football player kicks the ball of mass m = 700 g with velocity v = 12 m/s. The time (t) of contact (moment joint) between the foot and the ball is 0.03 second (30 milliseconds). Calculate the value of the force F acting on the ball.
               Correct answer: 280 N