



Name: _____

Circle the correct answer.

1. A car traveling with an initial speed v comes to a stop in a time interval t . If the deceleration during this time t is constant, which of the following statements is correct for that time interval?
 - a) The distance covered is $(vt)/2$.
 - b) The average speed is v/t .
 - c) The acceleration is $-v/2$.
 - d) The distance covered is $(vt^2)/2$.

2. A small plane is on a compass heading of due north. Its airspeed is 80 km/h. A strong wind is blowing from the northeast to the southwest also at 80 km/h. The ground speed of the plane
 - a) is 80 km/h
 - b) is greater than 80 km/h
 - c) is less than 80 km/h
 - d) cannot be determined from the information given.

3. Two planets are made from the same material. Consequently, their masses are proportional to the cube of their radii, designated r_1 and r_2 . It follows that g_1/g_2 , the ratio of the acceleration of gravity at the surfaces of the two planets, is
 - a) r_1/r_2
 - b) r_2/r_1
 - c) $(r_1/r_2)^2$
 - d) $(r_2/r_1)^2$

4. An object of uniform density floats on water with three-fourths of its volume submerged. Its specific weight is

- a) $1/4$
- b) $3/4$
- c) 1
- d) $4/3$

5. Two containers hold equal amounts of the same gas at STP. The gas in one container is compressed to half its initial volume in an isothermal process; the gas in the other container is compressed to half its volume adiabatically. The pressure of the gas that is compressed adiabatically is

- a) greater than that of the gas that is compressed isothermally.
- b) is the same as that of the gas that is compressed isothermally.
- c) is less than that of the gas that is compressed isothermally.
- d) the answer depends on the nature of the gas, whether it is monoatomic or polyatomic.

6. A traveling wave passes a point of observation. At this point the time interval between successive crests is 0.2 s.

- a) The wavelength is 5 m.
- b) The wavelength is 0.2 m.
- c) The velocity of propagation is 5 m/s.
- d) The frequency is 5 Hz.
- e) There is not enough information to justify any of these statements.

7. Two charged particles attract each other with a force F . If the charge of one of the particles is doubled and the distance between them is also doubled, then the force will be

- a) F
- b) $2F$
- c) $F/2$
- d) $F/4$

8. When two identical resistors are connected in parallel across a battery, the total power dissipated by them is 40 W. If these resistors are now connected in series across the same battery, the total power dissipated will be

- a) 10 W
- b) 20 W
- c) 40 W
- d) 80 W
- e) 160 W

9. If the voltage across an X-ray tube is doubled, the energies of the characteristic X-rays emitted by this tube will

- a) double
- b) quadruple
- c) halve
- d) remain constant

10. In the nuclear reaction ${}_{92}\text{U}^{235} + \text{X} \rightarrow {}_{93}\text{Np}^{236}$, the particle X is

- a) a proton
- b) a neutron
- c) an alfa-particle
- d) an electron
- e) a deuteron

11. Two wires of equal length are made of the same material. Wire A has a diameter that is twice as great as that of wire B. If identical weights are suspended from the ends of these wires, the increase in length is

- a) one-fourth as great for wire A as for wire B.
- b) half as great for wire A as for wire B.
- c) twice as great for wire A as for wire B.
- d) four times as great for wire A as for wire B.

12. A neutrino

- a) always accompanies β decay.
- b) is a neutral particle of zero spin angular momentum.

- c) has never yet been detected experimentally.
- d) accompanies all radioactive decay.
- e) is among the most dangerous emissions following fissions.

13. The Bohr's model for the hydrogen atom led to the conclusion that the magnitude of the energies of the electron in the stationary orbits about the proton are proportional to

- a) n^2
- b) n
- c) a constant and independent of n
- d) $1/n$
- e) $1/n^2$

where n is the principal quantum number.

14. In photoelectric emission the number of electrons ejected per second

- a) is proportional to the intensity of the light.
- b) is proportional to the wavelength of the light.
- c) is proportional to the frequency of the light.
- d) is proportional to the work function of the material.
- e) none of the above is correct.

15. Two monochromatic light sources emit the same number of photons per second. Source A emits green light, and source B emits red light. The power radiated by source A is

- a) less than that radiated by source B.
- b) the same as that radiated by source B.
- c) greater than that radiated by source B.
- d) there is not enough information provided to select between a), b) and c).

16. When ${}_{83}\text{Bi}^{215}$ decays to ${}_{84}\text{Po}^{215}$ the following is released:

- a) a proton
- b) a neutron
- c) positron
- d) an electron
- e) an alfa-particle