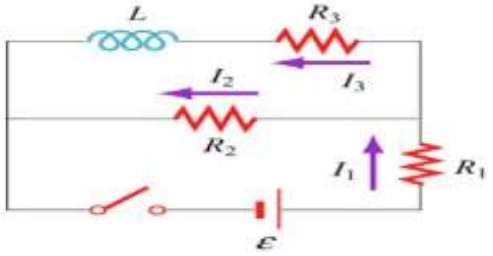
Department of Physics
Sample of MS/PhD Entry Test

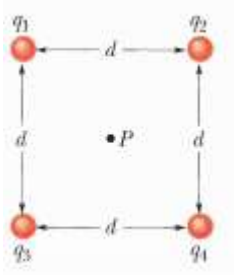
Name: _____ Roll No. _____

Subject GRE:

1. According to the theory of Bohr, the energy values of the electron in a hydrogen atom is given by:
   (a). $E_n = \frac{13.58}{n}$ eV
   (b). $E_n = \frac{13.58}{n^2}$ eV
   (c). $E_n = -\frac{13.58}{n^2}$ eV
   (d). $E_n = \frac{13.58}{n^2}$ J
2. A toroid consists of N turns and has a rectangular cross section, with inner radius a, outer radius b and height h. What is the total magnetic energy stored in the toroid.
   (a). $U_B = \frac{\mu_o N^2 I^2 h}{8\pi} ln(\frac{b}{a})$
   (b). $U_B = \frac{\mu_o N^2 I^2 h}{4\pi} ln(\frac{b}{a})$
   (c). $U_B = \frac{\mu_o N^2 I^2 h}{8\pi} ln(\frac{a}{b})$
   (d). *None*
3. Consider the circuit shown in Figure. What will be the current through each resistor immediately after the switch is closed?
   a. $I_1 = I_2 = \frac{4\epsilon}{R_1+R_2}$
   b. $I_1 = I_2 = \frac{\epsilon}{R_1-R_2}$
   c. $I_1 = I_2 = \frac{R_1+R_2}{\epsilon}$
   d. $I_1 = I_2 = \frac{\epsilon}{R_1+R_2}$



4. What is the electric potential at point P,located at the center of the square of point charges shown in Figure. The distance d is 1.3 m, and the charges are q1=12nC,q2=31nC, q3=-24nC, q4=17nC
   a. $\approx 550V$
   b. $\approx 650V$
   c. $\approx 450V$



5. A family of directions is represented by
   a. (hkl)
   b. <uvw>
   c. {hkl}
   d. [uvw]
6. On the basis of length and interfacial angles of a unit cell, the crystal have been divided into
   a. Seven structures
   b. Fourteen structures
   c. Thirteen structure
7. Atomic packing factor is

a. *Distance between two adjacent atoms*
b. *Projected area fraction of atoms on a plane*
c. *Volume fraction of atoms in cell*
d. The fraction of volume in a crystal structure that is occupied by constituent particles.

8. If the periodic array of atoms occur in a three dimensional crystal, it is called
   a. *Plane lattice*
   b. *Space lattice*
   c. *Basis*
   d. *None*
9. Plank's constant has units
   a. *J*
   b. *s*
   c. *J/s*
   d. *Js*
10. Characteristic properties of waves are
    a. *reflection*
    b. *refraction*
    c. *interference*
    d. *all of above*
11. For a particle in one dimensional box, the wave function is given by $\psi(x) = N\sin\left(\frac{3\pi x}{L}\right)$ $0 < x < L$ and $\psi(x) = 0$ $x < 0$ and $x > L$ the normalization constant is given by:
    a. $N = \sqrt{\frac{1}{L}}$
    b. $N = \sqrt{\frac{2}{L}}$
    c. $N = \sqrt{\frac{3}{L}}$
    d. $N = \sqrt{\frac{4}{L}}$

GRE General:

12. Aslam is now 3 times as old as Javed, but 5 years ago, he was 5 times as Javed was. How old is Aslam now?
    a. *10*
    b. *12*
    c. *24*
    d. *30*
    e. *36*
13. A father is three times as old as his son. After fifteen years the father will be twice as old as his son's age at that time. Hence the father's present age is
    a. *36*
    b. *42*
    c. *45*
    d. *48*
    e. *None of the above*
14. TLRIA is related to WOULD in the same way as YBVLKA is related to:
    a. MATTER
    b. BEFORE

c. BEYOND
d. NORMAL

During the first half of the year, from January through June, the chairperson of the mathematics department will be on sabbatical. The dean of the college has asked each of the six professors in the department --- Arkes, Borofsky, Chang, Denture, Hobbes, and Lee--- to serve as acting chairperson during one of those months. The mathematicians can decide the order in which they will serve, subject only to the following criteria established by the dean.

(i). Chang will serve as chairperson in February.
(ii). Arkes will serve as chairperson before Hobbes does.
(iii). Borofsky and Dexter will serve as chairpersons in consecutive months.

15. Which of the following professors could serve as chairperson in January?
    a. Borodfsky
    b. Chang
    c. Dexter
    d. Hobbes
    e. Lee
16. In how many ways can the schedule be made up if Lee has to serve as chairperson in May?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 6
17. If Lee serves in April, all of the following could be true EXCEPT
    a. Arkes serves in January
    b. Hobbes serves in march
    c. Borofsky serves in may
    d. Borofsky serves in June
    e. Hobbes serves in June
18. If Borofsky serves in May, what is the latest month in which Arkes could serve?
    a. January
    b. February
    c. March
    d. April
    e. June
19. Which of the following CANNOT be true?
    a. Arkes and Lee serve in consecutive months.
    b. Lee and Hobbes serve in consecutive months.
    c. Hobbes and Dexter serve in consecutive months.
    d. Arkes and Chang serve in consecutive months.