Assignment 1

1. ans (c);

we know k is scalar here, so |kB|=|k|\*|B|;

And |B| can 0.be evaluated as ( 3^2+(-4)^2)^.5=5;

Here,in the question it is given |kB|=2;therefore, using the above

Formula |k|\*5=2;

Hence k=+2/5;-2/5;

K=+.4,-.4;

2. Answer (a);

We have to evaluate the given expression .

=;

After using vector multiplication ,we get the following result

i.e =

3. answer (c)

Since the vectors are in same line i.e parallel or anti parallel ,their cross product will result in null vector.using this concept we can write :

==0;

Solving,we get;

=0;

Gy=-3;

4.Answer ( c )

After substituting the vectors in the equation ,we get

as a resultant vector ;

Therefore the unit vector in the direction of resultant vector is

/||=;

The required vector obtained is =()/15.937=0.96;

5.answer (a );

;

Thus unit vector in the direction of is ;

So ()/;

Therefore =5\*;

=;

6. answer (c );

The component of along is

{().)}/=3 ;

7.answer(b);

This is theoretical question ,based on the fact that all the points of the space can be located In the cartesian coordinate;

8.Answer (b);

Substituting the value of x,y,z in the as x=-2,y=6,z=3;

We get = and unit vector along it is ;

Thus =/ as ==

9. Answer(a)

The electric field at the point can be calculated as the vector sum of electric field due to individual charges other than the 10 nc ;

Thus electric field due to q nc charge at a separation r is ;

Thus applying the above formula

The electric field due to 3 mc is and due to - 2 mc is

and due to -4 mc is we can find the answer;

10. answer (d)

The force between two charge particles is given by coulombs law which can be mathematically stated as;

Where q1 ,q2 are charges and r is the separation distance.

Thus ,as distance decreases force increases as inverse of square of distance between them.

11. answer (b )

Suppose the separation of the new charge from +Q is x then using equilibrium condition i.e electric field near new charge should vanishes we can write

solving the equation we get x nearly 0.5 and by using the fact that for the system to be in equilibrium the nature must be unstable equilibrium so the new charge must be negative.

12.answer (c)

d

The force after changing distances is which is 16 times the original forces.

13. answer (d)

The net electric field at the centre of the square is zero due to symmetry reason.Thus net force on the point charge is zero.

14.

a. the initial charge on one of the sphere is 20c and the final charge is (20-5)/2 i.e 7.5 so the charge transferred is 12.5.

b. the force when they are 25 cm are apart can be calculated using coulombs law i.e using the formula

15. answer (d)

The weight of 1 kg mass is 10N and this force must be equal to the repulsive force between 1 charges.

So using coulombs law ,the required separation is

Hence r=.03m