**Physics 3 – Midterm – November 2023**

**Q1:**

The electric field will be zero inside a spherical shell no matter if it is conducting or nonconducting, according to Gauss’s law.

Thus, the net electric field at the origin is:

5 points for correct use of shell theorem

5 points for remembering kq/r^2

5 points for correct number +

5 points for unit-vector notation

**Q2:**

From the formula for electric potential of a charged sphere:

5 for correct formula of electric potential (kq/r)

5 points for correct formula of potential difference (VO-VA)

10 points for correct answer

Alternatively, the formula for electric potential difference:

5 points for correct formula of potential difference (VO-VA)

5 for correct formula of electric field (kQ/r^2)

10 points for correct answer

**Q3:**

5 points for realizing the rotation is adding 180 degrees

5 points for remembering p = qd

10 points for correct answer

**Q4:**



**A computer screen shot of a diagram

Description automatically generated**



1. We have the a set of equations:

a) 5 points for illustration

5 points for correct current values

b) 5 points for correct formula P=Ri^2

5 points for correct power value

That is:

The solution is:

1. The power at is:

**Q5:**

The formula for the voltage across the capacitor is:

5 points for unit conversion

5 points for correct substitution

10 points for correct solution