Please circle the most appropriate answer for each of the following problems. Each problem is worth ten points.

1. Find the limit of the sequence \( \left\{ \frac{(-1)^k k}{k^2 + 4} \right\}_{k=1}^{\infty} \) as \( k \to \infty \).

   (a) 1
   (b) \(-1\)
   (c) 0
   (d) The limit does not exist.
   (e) none of the above.
2. Find the sum of the infinite series

\[ \sum_{k=0}^{\infty} (-1)^k \frac{5}{4^k}. \]

(a) 4  
(b) 20/3  
(c) 13/3  
(d) 11/3  
(e) none of the above.

3. The infinite series

\[ \sum_{k=1}^{\infty} (-1)^k \frac{k^2 3^k}{2^k} \]

(a) converges absolutely  
(b) converges conditionally  
(c) diverges  
(d) is indeterminate  
(e) none of the above.
4. The infinite series

\[ \sum_{k=0}^{\infty} (-1)^{k+1} \frac{k^2 2^k}{k!} \]

(a) converges absolutely
(b) converges conditionally
(c) diverges
(d) is indeterminate
(e) none of the above.

5. The smallest number of terms necessary to estimate the sum of the infinite series

\[ \sum_{k=1}^{\infty} \frac{(-1)^k}{k!} \]

to within 0.00001 of its correct value is

(a) 7
(b) 8
(c) 9
(d) 10
(e) 11.