Electromagnetism MC1 2002/3 – Multiple choice.

MC1.1) An electron in a vacuum is placed at the position (5,-2,5) m. What is the direction of the resultant electric field at the position (-1,1,2) m?

a) $\begin{pmatrix} -2 \\ +1 \\ -1 \end{pmatrix}$ b) $\begin{pmatrix} +2 \\ -1 \\ -1 \end{pmatrix}$ c) $\begin{pmatrix} +2 \\ -1 \\ +1 \end{pmatrix}$ d) $\begin{pmatrix} -2 \\ +1 \\ +1 \end{pmatrix}$ e) None of the previous

MC1.2) What is the magnitude of the resultant electric field for the situation described in the previous question (to 2 sig. figs.)?

a) 2.7×10^{-11} Vm^{-1}
b) 3.2×10^{-11} Vm^{-1}
c) 4.1×10^{-11} Vm^{-1}
d) 4.9×10^{-10} Vm^{-1}
e) None of the previous

MC1.3) A current of 1 amp is flowing along an infinite straight wire in a vacuum along the *x* axis (in the +ve direction). What is the direction of the resultant $\underline{B}$ - field at the point (4,2,3) m?

a) $\begin{pmatrix} 0 \\ -3 \\ +2 \end{pmatrix}$ b) $\begin{pmatrix} +3 \\ 0 \\ -2 \end{pmatrix}$ c) $\begin{pmatrix} 0 \\ +2 \\ +3 \end{pmatrix}$ d) $\begin{pmatrix} 0 \\ +3 \\ -2 \end{pmatrix}$ e) None of the previous

MC1.4) What is the magnitude of the resultant $\underline{B}$ – field for the situation described in the previous question (to 2 sig. figs.)?

a) 4.5×10^{-8} T
b) 3.5×10^{-7} T
c) 6.5×10^{-7} T
d) 5.5×10^{-8} T
e) None of the previous

MC1.5) A circular loop (radius 0.2 m) of wire in the *xy* plane is placed in a uniform magnetic field, alternating with time, *t*, in the *z* direction: $B_z(t) = 1.5 \cos(10^6 \text{ s}^{-1} t)$ T. What is the amplitude of the *e.m.f.* induced in the loop of wire?

a) 1.5×10^4 V
b) 1.9×10^5 V
c) 2.3×10^6 V
d) 4.0×10^7 V
e) None of the previous