question 3

1. A vector's degree of freedom depends upon the indepedent basis vector. Hence a vector having n independent basis has n degree of freedom

2

1 We take a cross product of a and b. With the right hand rule we know that the resulting cross vector of $\vec{a}$ and $\vec{b}$ will be a vector orthogonal to A and B. Lets assume the resulting vector of aXb to be $\vec{d}$. For $\vec{c}$ to be parallel to vector $\vec{a}$ and $\vec{b}$ the vector $\vec{c}$ has to be perpendicular to $\vec{d}$

Hence the constrant equation for c is $\vec{c} \cdot \vec{d}$ = 0

or $\vec{c} \cdot (\vec{a} \times \vec{b})$ = 0

Degree of Freedom= $\vec{c}$ has two degree of freedoms as it can move in two directons perpendicular to $\vec{d}$

2 Similar to previous answer for previous question for vector $\vec{c}$ to be perpendicular, $\vec{c}$ has to be parallel to $\vec{d}$ Hence $\vec{c} \times (\vec{a} \times \vec{b})$ = 0

Degree of Freedom= $\vec{c}$ has one degree of freedom as it can only move in the direction of $\vec{d}$ which is perpendicular to $(\vec{a} \times \vec{b})$