Assignment week - 9

1) Gravitational force components along the x, y and z axes respectively can be written as \((\psi, \theta and \phi are Euler angles)\)?
   - \(-mg \sin \theta, mg \cos \theta \sin \phi\) and \(mg \cos \theta \cos \phi\)
   - \(mg \cos \theta, mg \cos \theta \sin \phi\) and \(mg \cos \theta \cos \phi\)
   - \(-mg \sin \theta, mg \cos \theta \sin \phi\) and \(mg \cos \theta \cos \phi\)
   - \(-mg \sin \theta, mgsin \theta \sin \phi\) and \(mg \cos \theta \cos \phi\)

   **Accepted Answers:**
   - \(-mg \sin \theta, mg \cos \theta \sin \phi\) and \(mg \cos \theta \cos \phi\)

2) In the following figure \((X_b,Y_b,Z_b)\) are three axes of aircraft body frame, \((X_i,Y_i,Z_i)\) are three axes of inertial frame, \((X',Y',Z')\) are three axes of intermediate frame and \(V\) is the velocity vector. Which of the three constitute the stability axes?

   - \((X_b,Y_b,Z_b)\)
   - \((X',Y',Z')\)
   - \((X_i,Y_i,Z_i)\)
   - \((X_b,Y_i,Z_i)\)
3) Let U, V, W are velocity components in stability axes X, Y, Z respectively, Then which of the following statement is correct?

- U=0, V≠0, W≠0
- U≠0, V=0, W≠0
- U≠0, V=0, W=0
- U=0, V=0, W=0

4) During process of determining Euler angles, the rotation $\psi$ about the x axis $R_x(\psi)$ is defined as?

- Null Matrix
- Identity matrix
- Zero Matrix
- Some Random Matrix

Accepted Answers:
Identity matrix

5) For above rotation what is the value of $R_x(\psi). R_x^T(\psi)$, where $R_x^T(\psi)$ is transpose matrix

- Null Matrix
- Identity matrix
- Zero Matrix
- Some Random Matrix

Accepted Answers:
Identity matrix