

**MCE4101 Introduction to Robotics**  
**Quiz1 (5%) –SET 4 (ID end with 7,8,9)**

**Name**.....**ID**.....

**Date: 15 July 2021 (9.15-10.00)**

*Note:*

1. *OPEN BOOK.*

2. *There are 2 questions.*

3. *50 Marks equivalent to 5%.*

---

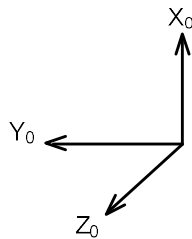
1. (25 Marks). The original frame is given. The following transformation steps for current frames are

- i. Rotate  $90^\circ$  in the current y axis then
- ii. Translate -2 in the current z axis then
- iii. Rotate  $-90^\circ$  in the current x axis then
- iv. Rotate  $90^\circ$  in the current z axis then
- v. Translate 2 in the current x axis

a. (10) List down the all the transformation steps. Find the  $T_5^0$  transformation matrix values.

b. (5) If a point is fixed on the z axis at (0,0,1), obtain the coordinate  $P_5$  with reference to original frame.

c. (10) Plot all the transformation frames and mark  $P_5$  location with reference to origin frame.



Ans:



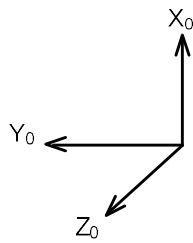
2. (25 Marks). The original frame is given. The following transformation steps for fixed frames are

- i. Rotate  $90^\circ$  in the fixed y axis then
- ii. Translate -2 in the fixed z axis then
- iii. Rotate  $-90^\circ$  in the fixed x axis then
- iv. Rotate  $90^\circ$  in the fixed z axis then
- v. Translate -2 in the fixed x axis

a. (10) List down the all the transformation steps. Find the  $T_5^0$  transformation matrix values.

b. (5) If a point is fixed on the z axis at (0,0,1), obtain the coordinate  $P_5$  with reference to original frame.

c. (10) Plot all the transformation frames and mark  $P_5$  location with reference to origin frame.



Ans:

