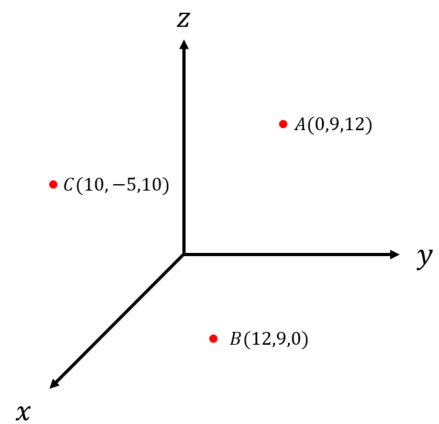


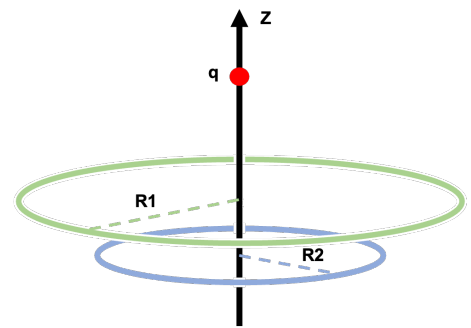
Answers without **supporting work** or **necessary unit** will not be given full credit. If the meaning of the question isn't clear, please ask TA! You have **25mins** to complete this mini-test.

- Q.1** Figure 1. shows three particles with charge  $q_A = -Q$ ,  $q_B = Q$ ,  $q_C = Q$  and thier location, the vacuum permittivity is  $\epsilon_0$ . If there is a point charge  $Q$  at origin, what's the net electrostatic force on this point charge? (Write down the value in each direction) (10 points)



**Figure 1**

- Q.2** In Figure 2, there is a charged particle  $q$  lies on the  $z$ -axis along with the centers of two uniformly charged rings. The location of  $q$  is  $z = 6\text{ m}$ , the center of the green ring is  $z = 0\text{ m}$  and blue ring is  $z = -6\text{ m}$ . The radius of the green ring  $R_1 = 8\text{ m}$  and blue ring  $R_2 = 5\text{ m}$ . If we know the total charge of the green ring is  $-8\pi$  (Coulomb) and the net electric field at  $q$  is zero. What is the linear charge density of the blue ring? (10 points)



**Figure 2**