Tutorial Sheet 6 (15B11PH111)
Physics-1 (2021-2022)

Assignment 3: Bi-quartz polarimeter

Q. 1 A 5 % solution contained in 10 cm of tube causes the optical rotation of 20^0. How much length of 10% solution of the same substance will cause of 35^0 rotations?   [CO2]

Q. 2 A 10 g sugar and 15 g of another optically active substance are dissolved in 100 cc of water. The solution is filled in a polarimeter tube of 20 cm length and it gives 7^0 rotation. Find the specific rotation of unknown substance? (Specific rotation of sugar is +66.54 deg. cm^3/ g dm)   [CO3]

Q.3 If 20 cm length of a certain solution causes right handed rotation of 42^0 and 30 cm length of another solution causes left handed rotation of 27^0. What optical rotation will be caused by 30 cm length of a mixture of the above solutions in the volume ratio 1: 2. The solutions are not chemically active.   [CO3]

Q.4 Show that velocity is variant, while acceleration is invariant under Galilean transformation?   [CO2]

Q.5 A circular lamina moves with its plane parallel to the x-y plane of a reference frame S at rest. Assuming its motion to be along the axis of x (or y), calculate the velocity at which surface area would appear to be reduced to half to an observer in frame S?   [CO3]

Q.6 Calculate the percentage contraction of a rod moving with a velocity 0.8 times the velocity of light in a direction at 60^0 to its own length.   [CO2]

Q.7 At what speed should a clock be moved so that it may appear to lose 1 minute in each hour?   [CO3]

Q.8 Half life of a particle at rest is 17.8 nano second. What will be the half life when its speed is 0.8c?   [CO2]

Q.9 A women leaves the earth in spacecraft that makes a round trip of nearest star at 4 light year distance with a speed of 0.9c. How much younger is she upon her return than her twin sister who remained on the earth.   [CO2]