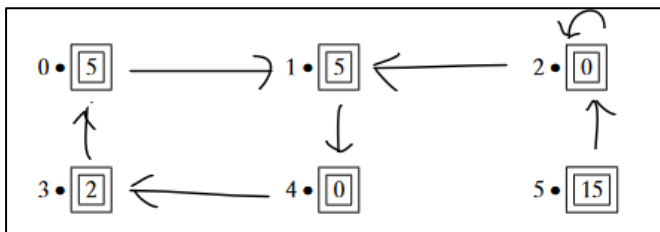


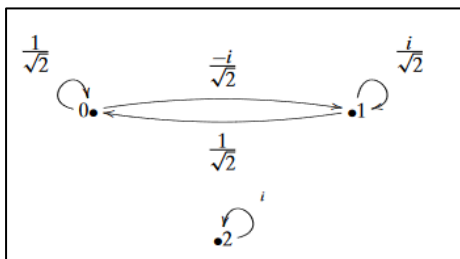
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Clause No.: 9.1		Date of Rev.: 01/01/2018
Department: Physics	Name of Internal Examination: TA-2 Session: 2022-23 Semester: II [CSE] [A,B]	Page 1/1
Course Code: PHT159 Course Name: Introduction to Quantum Computing		Date of Exam: 14-7-2023 Timing: -
Maximum Marks: 15		Duration: Submission on 17-7-2023

Cos mapped: CO-4 and CO-5.

- For the following system, write (i) Initial state vector (ii) Final state vector after given transformations. The number of marbles is shown in the boxes [3M].



- Discuss the problem of classical stochastic Billiard ball. [3M]
- Refer the following graph. Write adjacency matrix for it. What type of matrix is it? Prove the same. What is significance of this matrix? [3M]



- Normalize the ket, [1M]

$$|\psi\rangle = [3 - i, 2 + 6i, 7 - 8i, 6.3 + 4.9i, 13i, 0, 21.1]^T.$$

- Find the transition amplitude for state changing from

$$|\psi\rangle = [2-3i, 5i]^T \text{ to } |\phi\rangle = [1+i, 1-2i]^T. [1M]$$

- Using spin observables S_z , find the values of spin up and spin down states. [1M]
- Write about: (i) observables, expectation value and variance. [3M]

Dr. Shilpa Kulkarni.