AMRIT CAMPUS

Mid-Term Exam-2075

BSc CSIT/Frist Semester/Physics

Candidates are required to answer the questions in their own words as far as practicable

Full Marks: 60
Pass Marks: 24
Time: 3 hrs.

Set "A"

Group A

Attempt any Two questions this group ***(2X10=20)***

1. Find an expression for the total energy of a particle in SHM and show that the particle obeys the law of conservation of energy.
2. Discuss how an Astable – multivibrator produces the periodic pulses with appropriate circuit diagram.
3. What are Bohr's atom model postulates? Discuss the spectral series of hydrogen atom. Write down the limitation of it.

Group B

Attempt any Eight questions from this group ***(8X5 =40)***

4. Define electric potential and potential difference. Find an expression for electric potential at a point due to a point charge.
5. What is RS flip flop? Explain its operation.
6. Describe about how it is possible to solve black body radiation spectrum quantum mechanically.
7. A linear spring whose force constant is 0.2N hangs vertically downwards supporting a 1Kg mass at rest. The mass is pulled down through a distance of 0.2m and then released. What will be its maximum velocity? Also find the frequency of vibration.
8. Suppose the body of an Ice skater has a moment of inertia 4kg-m^2 and her arm has a mass of 5kg each with the center of mass at 0.4m from her body. She starts to turn at 0.5 rev/sec on the point of her skate with her arms outstretched. She then pulls her arms inward so that their centre of mass is at the axis of her body ,r=0. What will be her speed of rotation?
9. Make the appropriate truth table to prove the following distributive law of Boolean algebra:

   A(B+C) = AB +AC.
10. Prove De Morgan's theorems using the truth table.
11. What are the values of energy, momentum and wavelength of the photon that is emitted when a hydrogen atom makes a transition from the state n = 4 to the state n= 2.
12. Calculate the shorter and longer wavelength of the Balmer series of hydrogen.