Day : Wednesday   Time : 10:00 AM-01:00 PM
Date 19-01-2022   **W-18293-2021**   Max. Marks: 60

N.B.:
1. All Questions are **COMPULSORY**
2. Figures to the **RIGHT** indicates full marks
3. Draw neat **DIAGRAMS** wherever necessary

Q. 1 Attempt any **TWO** of the following: (12)

   (a) Explain Absorption, spontaneous emission and stimulated emission in details.
   (b) Define packing fraction and how it is related with stability of nucleus?
   (c) Show that the electron cannot rotate in any arbitrary orbit but in certain specified orbits in which radius is proportional to the square of an integral number characterizing that orbit. Hence show that, $r \propto n^2$.

Q. 2 Attempt any **TWO** of the following: (12)

   (a) Write a note on solar energy.
   (b) Explain the term population inversion and optical pumping in details.
   (c) State postulate of Bohr's theory of Hydrogen atom.

Q. 3 Attempt any **TWO** of the following: (12)

   (a) Explain I-V characteristics of solar cell and the expression for Fill Factor (FF) for solar cell?
   (b) Explain any three applications of electromagnetic waves
   (c) What is solar cell? List and explain shortly the different types of solar cell.

Q. 4 Attempt any **THREE** of the following: (12)

   (a) Draw a diagram for electromagnetic waves and explain how electromagnetic waves are produce.
   (b) Explain the term electrostatic potential and potential energy.
   (c) Determine the energy needed to remove a neutron from the nucleus of the $_{28}Ni^{64}$. The mass of Ni is 63.9279 a.m.u. (Given: Mass of proton m_p= 1.007825, Mass of neutron m_n= 1.008665).
   (d) What is mean by LASER? Explain its properties in details

Q. 5 Attempt any **FOUR** of the following: (12)

   (a) Calculate the energy equivalent to 1 a.m.u.
   (b) Explain any three application of LASER.
   (c) Describe the structure of H_α line.
   (d) Find the wavelength of spectral line corresponding to transition in Hydrogen atom n=3 state to n=2 state.
   (e) Explain photovoltaic effect in short.
   (f) Write a short note on (i) radio rays (ii) Microwave rays

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