F.Y.B.SC. SEM – I (CBCS - 2016 Course) : SUMMER - 2019
SUBJECT: PHYSICS: MODERN PHYSICS

Day : Saturday
Date : 04/05/2019

Time : 11.00 A.M TO 02.00 PM
Max. Marks :60

S-2019-0801

N.B.

1) All questions are **COMPULSORY**.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Draw neat diagrams **WHEREVER** necessary.

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

(a) Explain energy level diagram of Hydrogen atom.
(b) Explain the term population inversion and optical pumping in details.
(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 a.m.u., Mass of neutron = m_n= 1.008665 a.m.u.).

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

(a) Explain Absorption, spontaneous emission and stimulated emission in details.
(b) Describe the construction and working of p-n junction solar cell.
(c) Calculate input power of solar cell using the following data,
Efficiency of cell = 10% , V_{OC} = 400 mV, I_{SC} = 20 mA, Fill Factor = 0.5

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) Draw a diagram for electromagnetic waves and explain how electromagnetic waves are produced.
(c) Calculate the energy equivalent to 1 a.m.u.

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

(a) Discuss in details: Renewable energy sources.
(b) Explain Planck's hypothesis of photon.
(c) State and explain Bohr's correspondence principle.
(d) Write a short note on covalent bonds with example.

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

(a) Define isotopes, isotones and isobars.
(b) State postulate of Bohr's theory of Hydrogen atom.
(c) Explain the term electrostatic potential and potential energy.
(d) Describe the basic properties of nucleus.
(e) Find the wavelength of spectral line corresponding to transition in Hydrogen atom from n=3 state to n=1 state.
(f) Explain any three application of LASER.

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