

**F.Y.B.Sc. SEM – I (CBCS 2018 COURSE) : SUMMER - 2019**  
**SUBJECT : PHYSICS : MODERN PHYSICS**

**Day** : Monday  
**Date** : 15/04/2019

**S-2019-0771**

**Time** : 03.00 PM TO 06.00 PM  
**Max. Marks** : 60

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**N.B.**

- 1) All questions are **COMPULSORY**.
  - 2) Figures to the **RIGHT** indicate **FULL** marks.
  - 3) Draw neat diagrams, **WHEREVER** necessary.
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- Q 1. Attempt any **Two** of the following. **(12)**
- (a) Explain Frank and Hertz experiment in details.
  - (b) Explain the use of solar energy as an alternative source of energy.
  - (c) How electromagnetic waves are produced? Explain characteristic of electromagnetic waves.
- Q 2. Attempt any **Two** of the following. **(12)**
- (a) Write a short note on (i) Spontaneous emission (ii) Stimulated emission.
  - (b) State and explain Bohr's correspondence principle.
  - (c) Explain properties and uses of x-rays.
- Q 3. Attempt any **Two** of the following. **(12)**
- (a) Explain electromagnetic spectrum in details.
  - (b) Describe basic properties of the nucleus in details.
  - (c) What are the characteristics of a LASER beam? Explain.
- Q 4. Attempt any **Three** of the following. **(12)**
- (a) Describe the construction and working of p-n junction solar cell.
  - (b) Calculate the binding energy and binding energy per nucleon in the case of  ${}_{30}\text{Zn}^{64}$ , whose mass is 63.9291 a.m.u.
  - (c) Calculate input power of solar cell using the following data, Efficiency of cell = 12 % ,  $V_{OC} = 450$  mV,  $I_{SC} = 30$  mA , Fill Factor = 0.7
  - (d) What is pumping process? Explain optical pumping in details.
- Q 5. Attempt any **Four** of the following. **(12)**
- (a) Find the packing fraction of  ${}_{29}\text{Cu}^{64}$  whose mass is 63.9297 a.m.u.
  - (b) Explain Planck's hypothesis of photon.
  - (c) Discuss in details: Renewable energy sources.
  - (d) Write a short note on covalent bonds with example.
  - (e) Define isotope, isotone and isobar. Give their example.
  - (f) Explain variation of potential energy with inter-atomic distance.

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