

**F.Y.B.SC. SEM – I (CBCS - 2016 COURSE) : WINTER - 2017**

**SUBJECT : PHYSICS: MODERN PHYSICS**

Day : Wednesday  
Date : 01/11/2017

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

**W-2017-0544**

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the **RIGHT** indicate full marks.
- 3) Use of electronic calculator/ log table is allowed

**Q.1 A) Attempt all the followings (06)**

- a) The ground state energy of hydrogen atom is .....  
(i) 13.6 eV (ii) 3.4 eV (iii) 1.25 eV (iv) 10.0 eV
- b) If  $N_1$  is the number of atoms in ground state and  $N_2$  is number of atoms in excited state then at population inversion case -----  
(i)  $N_1 = N_2$  (ii)  $N_1 > N_2$  (iii)  $N_1 < N_2$  (iv)  $N_1 < N_2$
- c) ----- discovered neutron particles  
(i) Rutherford (ii) Chadwick (iii) Bohr (iv) Newton
- d) In covalent bond sharing of \_\_\_\_ electron forms single covalent bond  
(i) one (ii) two (iii) three (iv) four
- e) \_\_\_\_\_ energy is the renewable energy source  
(i) solar (ii) coal (iii) petroleum (iv) fossil fuels
- f) According to binding energy ----- nucleus is most stable.  
(i) Fe-56 (ii) C-12 (iii) Pb 208 (iv) U-238

**B) Attempt all of the followings: (06)**

- a) What are the constituent of nucleus?
- b) State the uses of x-ray radiations?
- c) State the characteristics of electromagnetic waves?
- d) Write down any two properties of LASER?
- e) Which bonds are interatomic bond?
- f) Define Fill factor of a solar cell.

**Q.2 Attempt any THREE the followings: (12)**

- a) Calculate the wavelength of 6 MeV energy gamma radiation.
- b) Define following terms :  
(i) Spontaneous emission (ii) Stimulated emission (iii) Optical Pumping  
(iv) Population inversion
- c) Write a note on ionic bond.
- d) What is RADAR? State the factors on which operation of RADAR system depends.

**Q.3 Attempt any FOUR the followings: (12)**

- a) State and explain the postulates of Bohr's theory of hydrogen atom.
- b) What is Microwave oven? Explain its working.
- c) Write note on pyroelectric thermometer.
- d) Explain Hydrogen bond with an example.
- e) What is renewable and non-renewable energy source? Explain with an example.

**P.T.O.**

**Q.4** Attempt any **TWO** the followings: **(12)**

- a) Define Binding energy and draw binding energy curve. Discuss its significance in determining the stability of nuclei.
- b) Draw electromagnetic spectrum and explain in detail
- c) The efficiency of solar cell is 10% and it has  $I_{sc}=500$  mA,  $V_{oc} = 0.5$  V and fill factor = 0.7. Calculate input power.

**Q.5** Attempt any **TWO** the followings: **(12)**

- a) Explain in brief Frank and Hertz experiment.
- b) What are the different types of bonds between molecules and explain covalent bond in details.
- c) Explain in brief construction and working of solar cell.

\* \* \*