F.Y.B.SC. SEM – I (2014 Course) : WINTER - 2018

SUBJECT : PHYSICS : MODERN PHYSICS

Day : Monday
Date : 15/10/2018

Time : **12.00 NOON TO 02.00 PM**
Max. Marks : 40

W-2018-0773

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of logarithmic table / calculator is **ALLOWED**.
4) Draw neat and labeled diagram **WHEREVER** necessary.
5) All the symbols have their usual meaning unless otherwise state.

Q.1 Attempt **ANY TWO** of the following: **[10]**

a) Why solar energy is the best alternative energy source? Explain in detail.

b) State different bonds in molecule. Explain any two in detail.

c) Explain spontaneous emission and stimulated emission in LASER.

Q.2 Attempt **ANY TWO** of the following: **[10]**

a) Explain I – V characteristics of solar cell with V_{oc}, I_{sc} and $P_{max.}$

b) Explain principle and working of LASER. State any two applications of LASER.

c) Calculate the binding energy of $_{26}F6^{56}$, if its mass is 55.975 a.m.u. Also calculate binding energy per nucleon.
Given : $M_p = 1.007825$ a.m.u, $M_n = 1.008665$ a.m.u.

Q.3 Attempt **ANY TWO** of the following: **[10]**

a) Write a note on microwave oven.

b) Write a note on Frank and Hertz experiment.

c) Write a note on Vander Waal's bonds.

Q.4 Attempt **ANY FIVE** of the following: **[10]**

a) Calculate fill factor for solar cell using following data:
$V_{oc} = 600$mV $\quad I_{sc} = 50$ mA
$V_m = 500$ mV $\quad I_m = 40$ mA.

b) Define Isotopes and Isobars.

c) State any two applications of Radio waves.

d) Define hydraulic energy. State any two limitations of it.

e) State Plank's hypothesis for photon.

f) Write any two properties of LASER.

g) Explain covalent bonding in hydrogen molecule.

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