

Day : Friday
Date : 20/04/2018

S-2018-0622

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

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) ----- discovered neutron particles
(i) Rutherford (ii) Chadwick (iii) Bohr (iv) Newton
- b) In optical pumping _____ is used to raise the atoms from lower energy to higher energy state
(i) light (ii) heat (iii) wind energy (iv) electrical energy
- c) LASER can not emit a _____ colour light
(i) white (ii) red (iii) blue (iv) green
- d) _____ are used in Microwave Oven to cook food items.
(i) Radiowaves (ii) visible light (iii) UV rays (iv) Microwave
- e) is the intermolecular bond
(i) Ionic (ii) Covalent (iii) Metallic (iv) Hydrogen
- f) Solar cell is used to convert energy of
(i) light into electricity (ii) wind into electricity
(iii) electricity into light (iv) light into wind

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

- a) Calculate number of protons and neutrons in ${}_{26}\text{Fe}^{56}$ nucleus.
- b) What is RADAR?
- c) Give the characteristics of electromagnetic waves?
- d) What is population inversion?
- e) What are different types of bonds possible in molecules?
- f) State the different types of renewable energy sources.

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

- a) Explain covalent bond with an example.
- b) Calculate the mass defect and binding energy of nucleus, if the mass of ${}_{3}\text{Li}^7$ is 7.01653 amu. Given: mass of proton = 1.008 amu and mass of neutron = 1.009 amu.
- c) What is Microwave oven? Explain its working.
- d) Explain: (i) Spontaneous emission (ii) Stimulated emission

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

- a) A Microwave oven emits a wave of 2.4 GHz. Calculate the wavelength and energy of the microwave.
- b) Discuss significance of binding energy curve in determining the stability of nuclei.
- c) What is LASER? Give the characteristics of LASER.
- d) Draw a curve of variation of potential energy with inter-atomic distance and explain it.
- e) Calculate packing fraction for ${}_{28}\text{Ni}^{64}$. The mass of Ni^{64} is equal to 63.7279 amu.

P.T.O.

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

- a) Explain the following with an example:
(i) Isotopes (ii) Isotones (iii) Isobars.
- b) Write a note on Hydrogen bond and metallic bond with suitable examples.
- c) What is solar cell? Sketch and explain I-V characteristics of solar cell.

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

- a) Explain in brief Frank and Hertz experiment.
- b) Explain with neat labeled diagram of X-ray radiography.
- c) Write note on Photovoltaic effect.

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