

**B. Tech. SEM -I (Computer Science & Business Systems) (CBCS 2018.
Course) : SUMMER - 2019**

SUBJECT: FUNDAMENTALS OF PHYSICS

Day: Wednesday
Date: 15/05/2019

S-2019-2517

Time: 10.00 AM To 01.00 PM
Max. Marks: 60

NB.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use to the non-programmable **CALCULATOR** is allowed.
- 4) Neat diagram must be draw **WHEREVER** necessary.
- 5) Assume suitable data wherever necessary.

Constants:

$$e=1.6 \times 10^{-19} \text{ C}$$

$$m_e=9.1 \times 10^{-31} \text{ kg}$$

$$h=6.63 \times 10^{-34} \text{ J-s}$$

$$m_p=1.66 \times 10^{-27} \text{ kg}$$

$$N_a=6.025 \times 10^{23} \text{ atmos/gm-mole}$$

Q.1 From the differential equation for forced oscillation. Solve the differential equation for amplitude resonance. **(10)**

OR

- a) Define the terms related to the simple harmonic oscillations **(06)**
 - i) Amplitude
 - ii) Time period
 - iii) Initial Phase
- b) What will be the resultant stiffness (k) when two springs of stiffness k_1 and k_2 are connected in series? **(04)**

Q.2 What is double refraction? Explain it on the basis Huygen's theory. **(10)**

OR

- a) Give the deference between Fresnel's and Fraunhofer's diffraction. **(06)**
- b) In Newton's rings experiment what will be the order of the dark ring which will have double the diameter of that of 10^{th} dark ring? **(04)**

Q.3 a) State and explain Heisenberg's uncertainty principle. Give One illustration of it. **(06)**

- b) Give the physical significance of ψ . **(04)**

OR

- a) Derive the energy Eigen value of particle trapped in an infinite potential well of length L. **(06)**
- b) If the uncertainty in location of a particle is equal to the De-Broglie wavelength prove that the uncertainty in the velocity is equal to its velocity. **(04)**

P.T.O.

- Q.4** a) Define the following terms (06)
- i) Lattice
 - ii) Basis
 - iii) Unit Cell

- b) Calculate the number of atoms per unit cell in, (04)
- i) Simple Cubic
 - ii) BCC
 - iii) FCC

OR

What are miller indices of a crystal? Obtain an expression for the spacing between consecutive planes for simple cubic. (10)

- Q.5** a) Give the principle construction and working of optical fibre. (06)
- b) What are laser speckles? Give its application in industry. (04)

OR

With energy level diagram explain the construction and working of Neodymium laser. (10)

- Q.6** State the first law of thermodynamics. How J can be determined by Joule's method? (10)

OR

- a) What are the Maxwell's equations? Give significance of each equation. (06)
- b) State and explain third law of thermodynamics. (04)

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