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

SUBJECT: FUNDAMENTALS OF PHYSICS

Day: Wednesday **Time:** 10.00 AM To 01.00 PM
Date: 15/05/2019 S-2019-2517 **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:

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

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

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

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

$N_a = 6.025 \times 10^{23}$ 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 on 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 is 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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