B. Tech Sem. I C.S.B.S. Winter. 2019

B. TECH. (COMPUTER SCIENCE & BUSINESS SYSTEMS) (CBCS - 2018 COURSE) B.Tech. (CSBS) Sem - I: WINTER- 2019
SUBJECT: FUNDAMENTALS OF PHYSICS (UE)

Wednesday 27-11-2019 W-20424-2019
10:00 AM-01:00 PM Max. Marks: 60

N.B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use to the non-programmable **CALCULATOR** is allowed.
4) Neat diagrams 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
$N_a = 6.025 \times 10^{23}$ atoms/gm-mole

Q.1 What is forced oscillation? Derive formula for amplitude in case of forced oscillation. **(10)**

OR

Explain the vibration in a spring mass system when two or more springs are connected in series. Prove that the system is performing an SHM. **(10)**

Q.2 In a Newton's rings experiment prove that the diameter of a dark ring is proportional to the square root of natural number. **(10)**

OR

Explain the diffraction of light at a plane diffraction grating. Derive the formula for the principal maxima. Explain the dispersion of light in the grating. **(10)**

Q.3 State the properties of matter waves. **(10)**
The De-Broglie wavelength of mono energetic electron beam is 8.4×10^{-10} m. Calculate the energy of the electron in eV.

OR

Deduce Schrödinger's time independent wave equation. **(10)**

Q.4 Explain the X-ray diffraction. How it can be used for studying the crystal structure? Explain the Laue method. **(10)**

OR

Derive the formula for inter-planar spacing for cubic system. **(10)**
Calculate the inter-planar spacing for (3,2,1) plane in a simple cubic lattice where lattice constant is 4.2×10^{-10} m.

Q.5 With energy level diagram, explain the working of Ruby laser. Why it is a pulsed laser? **(10)**

OR

What is fibre optic? Give its principle and working. Classify the fibre optic on the basis of refractive index interface and mode of propagation. **(10)**

Q.6 What is Carnot engine? Explain different steps in a Carnot cycle. **(10)**

OR

What is entropy? Prove that the entropy increases in irreversible process. **(10)**

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