

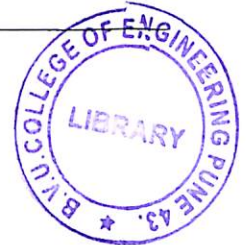
**B. TECH. (COMPUTER SCIENCE & BUSINESS SYSTEMS) (CBCS - 2018
COURSE) B.Tech. (CSBS) Sem - I: WINTER- 2019
SUBJECT: FUNDAMENTALS OF PHYSICS (UE)**

Wednesday 27-11-2019
10:00 AM-01:00 PM

W-20424-2019
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:

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

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

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

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

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

- 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 $8.4 \times 10^{-10} \text{ m}$. 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 $4.2 \times 10^{-10} \text{ m}$.
- 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)