

Seat No.	
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F.Y.B.Tech. (Semester - I) (CBCS)
Examination, June-2025
ENGINEERING PHYSICS (All Branches)
Sub. Code : 71811/72501

Day and Date : Thursday, 05/06/2025

Total Marks : 70

Time : 10:30 a.m. to 01:00 p.m.

- Instructions :**
- 1) Attempt any three questions from each section.
 - 2) Figures to the right indicate full marks.

Physical constants:-

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| i) Avogadro's Number, $N=6,023 \times 10^{26}/\text{kg.atom}$ | ii) Mass of electron $=9.1 \times 10^{-31} \text{ kg}$ |
| iii) Charge of electron $=1.6 \times 10^{-19} \text{ C}$ | iv) Speed of light, $c=3 \times 10^8 \text{ m/s}$ |
| v) Plank's constant, $h=6.63 \times 10^{-34} \text{ J.s}$ | |

SECTION-I

Q1) Answer the following questions.

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| A) Define resolving power of grating and obtain an expression for it. | [6] |
| B) i) With neat diagram explain double refraction phenomenon. | [3] |
| ii) In a plane transmission grating the angle of diffraction for second order maxima for wavelength 5000 \AA is 30° . Calculate the grating constant. | [3] |

Q2) Answer the following questions.

- A) Describe construction and working of Ruby laser. [6]
- B) Explain the principle of operation and cross-sectional view of an optical fibre. [5]

Q3) Answer the following questions.

- A) Explain various factors affecting acoustics of hall with their remedy. [6]
- B) Calculate the reverberation time of a hall having its volume 3000 m^3 and the total sound absorption 80 O.W.U. Find out the additional sound absorption required for an optimum reverberation. [5]
(Given : optimum reverberation time is 1.5 sec).

Q4) Answer any two from the following questions.

- A) Give Huygens's theory of double refraction in uniaxial crystals and distinguish between positive and negative crystals. [6]
- B) State and explain applications of LASER. [6]
- C) Explain any six basic requirements for acoustically good hall. [6]

SECTION-II**Q5) Answer the following questions.**

- A) State and prove Bragg's law of X ray diffraction. [6]
- B) i) Obtain number of atoms per unit cell for SC, BCC and FCC lattice. [3]
- ii) Copper has FCC structure and the atomic radius is 1.278 \AA . [3]
Calculate its density. Given : Molecular weight of copper is 63.54.

Q6) Answer the following questions.

- A) Explain top down and bottom-up approach of synthesis of nano material. [6]
- B) Discuss the applications of nano material. [5]

Q7) Answer the following questions.

- A) What is dual nature of radiation? Derive an expression for de Broglie wavelength in terms of kinetic energy (E). [6]
- B) In Compton scattering, X-ray photon is found to have doubled its wavelength on being scattered by 90° . Find the wavelength and energy of incident X-ray photon. [5]

Q8) Answer any two from the following questions.

- A) Define atomic radius and find its values for SC, BCC and FCC Structure. [6]
- B) With neat diagram explain construction and working of scanning tunnelling Microscope. [6]
- C) Write note on properties of matter waves. [6]
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