Seat No.

OCT-NOV 2025 WINTER EXAMINATION

12609 Bachelor of Technology (NEP-2.1)

Sub. Name: Engineering Physics

Sub. Code: 114847

Day and Date: Monday ,19-01-2026 **Total Marks: 60**

Time: 10:30 AM To 12:30 PM

Instructions:
1. **Draw neat labelled diagrams wherever necessary**
2. **Figures to the right indicate full marks**
3. **Use of Scientific calculator is allowed**

Special Inst.:
1. **Question No. 1 is Compulsory.**
2. **Attempt Any THREE Questions from Question No. 2 to 5.**
3. **Given: - Avogadro's number = 6.02×10^(26) /kg.mole**
Planck's constant h = 6.62×10^(-34) J.s
Electronic charge e = 1.6×10^(-19) C
Electron mass m= 9.1×10^(-31) kg
Speed of light, c = 3×10^(8) m/s

Q1) Choose the correct alternative and rewrite the sentence. **[6]**

i. The property of rotating the plane of vibration of a plane polarized light about its direction of travel possessed by certain substances is called……
A. birefringence
B. optical activity
C. chemo luminescence
D. None of the above

ii. Which are the active centers in ruby laser…….
A. Chromium ions
B. Aluminium ions
C. Neon atoms
D. Oxygen atoms

iii. Which of the following alternative represents Sabine's formula for reverberation time?
A. $T = \frac{0.651V}{\sum aS}$
B. $T = \frac{0.165V}{\sum aS}$
C. $T = \frac{\sum aS}{0.651V}$
D. $T = \frac{\sum aS}{0.165V}$

iv. If the certainty in the position measurement of a particle increases, then the

certainty in the momentum measurement of the same particle during simultaneous measurement…….

A. increases
B. is not affected
C. decreases
D. None of these

v. What is the interplanar spacing for (132) plane in a SC lattice, where the lattice constant is 4.2 A.U?

A. 1.40 A.U.
B. 2.40 A.U.
C. 1.90 A. U.
D. 1.12 A.U.

vi. Scanning tunneling microscope can be used to see image of…….

A. Conducting samples
B. Non conducting samples
C. Both conducting as well as non-conducting samples
D. None of the above

Q2) Answer the following questions **[18]**

a. Explain construction and working of Laurent's half shade polarimeter. **[6]**

b. The monochromatic light of wavelength 6000 Å falls normally on a grating 2 cm wide. The first order spectrum is produced at an angle of 30° from the normal. What is the number of lines on the grating? **[6]**

c. What is the long form of LASER? State and explain properties of laser.(Any five) **[6]**

Q3) Answer the following questions **[18]**

a. Define reverberation, reverberation time and absorption coefficient. State and explain Sabine's formula. **[6]**

b. An amphitheatre has the following important specifications: Volume = 500 m3, wall area = 100 m2, floor area = 50 m2, ceiling area = 50 m2 and the sound absorption coefficient for (i) wall = 0.01, (ii) ceiling = 0.4, (iii) floor = 0.03. Calculate average absorption coefficient and reverberation time. **[6]**

c. State and explain Heisenberg's Uncertainty Principle. **[6]**

Q4) Answer the following questions **[18]**

a. Explain centre of symmetry and plane of symmetry in a cubic crystal system. **[6]**

b. Draw (101), (111) and (100) planes in cube. The atomic radius of BCC crystal is 10^(-8) cm. What will be the volume of unit cell? **[6]**

c. Define nanomaterial. Explain the colloidal method for synthesis of nanomaterials. **[6]**

Q5) Answer the following questions **[18]**

a. The refractive indices of core and cladding of an optical fiber are 1.48 and 1.39 respectively. Determine the critical angle, numerical aperture and acceptance angle of an optical fiber. **[6]**

b. State and explain Compton Effect. Define Compton shift. Write formula for Compton Shift and explain the terms involved in it. **[6]**

c. With neat diagram, explain the construction and working of Atomic Force Microscopy. **[6]**

End Of Question Paper

Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -
This Question Paper may be distributed for following Subjects as common code.
सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

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