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21BSC5C6PHL

B.Sc. V Semester Degree Examination, Sept./Oct. - 2024

PHYSICS

DSC 6 : Elements of Atomic, Molecular and Laser Physics

(NEP)

Time : 2 Hours Maximum Marks : 60

Answer the following sub-questions. Each sub-question carries **one** mark. **10x1=10**

1. (a) Define Bohr's radius.

(b) State correspondence principle.

(c) State Paulis exclusion principle.

(d) Define Stark effect.

(e) Define rigid rotator.

(f) Define Stoke's lines.

(g) Give one application of Raman effect.

(h) Expand LASER.

(i) Define Stimulated emission.

(j) Define ionisation potential.

Answer **any four** of the following. Each question carries **five** marks. **4x5=20**

2. Write a note on theory of alpha particle scattering.

3. Derive an expression for magnetic dipole moment due to orbital motion of an electron.

4. Write a note on phosphorescence.

5. Give the experimental setup of Raman effect.

6. Write the requisites of LASER.

7. Write the classical theory of normal Zeeman effect.

P.T.O.

Answer **any three** of the following. Each question carries **ten** marks. **3x10=30**

8. (a) Derive an expression for Bohr's radius and total energy of an electron. **7**

(b) Write a note on Frank-Hertz experiment. **3**

9. (a) Explain stark effect with experimental study. **5**

(b) Explain Stern-Gerlach experiment. **5**

10. (a) Derive an expression for classical and quantum theory of Raman effect. **7**

(b) Explain Fluorescence. **3**

11. (a) Write the construction and working of Nd:YAG Laser. **6**

(b) Write four applications of LASER. **4**

12. (a) Derive an expression for Einstein's Co-efficients. **5**

(b) Using Bohr's model calculate the speed of the electron in a hydrogen atom in the n = 1, 2 and 3 levels. **5**

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