

**PSG COLLEGE OF ARTS & SCIENCE**  
(AUTONOMOUS)  
**BSc DEGREE EXAMINATION MAY 2017**  
(Third Semester)

Branch - **PHYSICS**

i

**ATOMIC MOLECULAR & LASER PHYSICS**

Time : Three Hours

Maximum : 75 Marks

**SECTION-A(120 Marks)**

Answer **ALL** questions

**ALL** questions carry **EQUAL** marks (10 x 2 = 20)

- 1 State Pauli's exclusion principle.
- 2 Distinguish between excitation and ionization potential of a gas.
- 3 Write Einstein's photoelectric equation.
- 4 Write the principle of photo electric cells.
- 5 Explain the term lattice constant.
- 6 State down Bragg's law.
- 7 Give an example for semiconductor laser.
- 8 Write any two properties of laser beam.
- 9 Write down the condition for getting SR spectra.
- 10 Write down any two applications of Raman spectroscopy.

**SECTION - B (25 Marks)**

Answer **ALL** Questions

**ALL** Questions Carry **EQUAL** Marks (5 x 5 = 25)

- 11 a Give an account of Bohr's theory of Hydrogen spectrum taking into account the finite mass of  $H_2$  nucleus.  
OR  
b State Larmor's theorem. Explain and obtain the change in Kinetic energy due to Larmor precession.
- 12 a Write down the applications of photoelectric cells.  
OR  
b Explain any two types of photoelectric cells.
- 13 a Describe the powdered crystal method of studying crystal structure.  
OR  
b Give the theory of Compton effect and briefly explain the experimental verification.
- 14 a Write a note on properties of a laser beam and its applications.  
OR  
b Explain briefly on various steps involved in fusion process.
- 15 a Write down the applications of Raman effect and characteristics of Raman lines.  
OR  
b Write down the applications of IR.

**SECTION - C (30 Marks)**

Answer any **THREE** Questions

**ALL** Questions Carry **EQUAL** Marks (3 x 10 = 30)

- 16 Describe the experimental arrangement for studying the zeeman effect and show the zeeman shift  $d\lambda$ .
- 17 Describe Millikan's experiment to verify Einstein's photoelectric equation. Explain how Millikan calculated the value of the Planck's constant and work function of the material.
- 18 Derive Bragg's law for x-ray diffraction in crystals. How is it verified? Describe and explain the x-ray spectrometer method of determining wavelength of x-rays.
- 19 Explain about (1) Ruby laser (2) He-Ne laser.
- 20 Explain in detail about VV spectroscopy.