

**PSG COLLEGE OF ARTS & SCIENCE**  
(AUTONOMOUS)  
**BSc DEGREE EXAMINATION MAY 2018**  
(Third Semester)

Branch - **PHYSICS**

**ATOMIC, MOLECULAR AND LASER PHYSICS**

Time : Three Hours

Maximum : 75 Marks

**SECTION-A (20 Marks)**

Answer **ALL** questions

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

- 1 Define Conisation potential.
- 2 What is Pauli's exclusion principle?
- 3 Define Stark effect.
- 4 Write any two applications of Photovoltaic cells.
- 5 Derive Bragg's law for diffraction in crystals.
- 6 Write down about Miller indices.
- 7 Write down the principle of Laser.
- 8 What is called Pumping?
- 9 Write any two applications of UV rays.
- 10 Define the term Mass defect.

**SECTION - B (25 Marks)**

Answer **ALL** Questions

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

- 11 a Explain the phenomenon of large angle scattering of  $\alpha$  - particle and derive the Rutherford's formula for it.  
OR  
b Describe the Frank-Hertz experiment for determining the critical potentials.
- 12 a Describe the vector model of the atom and explain the different quantum numbers associated with it.  
OR  
b Write short notes on (i) Photo emissive cells (ii) Photo voltaic cells.
- 13 a Describe the powdered crystal method of studying crystal structure.  
OR  
b Describe Lawe's method by studying crystal structure.
- 14 a Write down the properties of Laser beam.  
OR  
b Write a short note on Laser induced fusion.
- 15 a Write about the applications of IR Rays.  
OR  
b Write down the characteristics of Raman lines.

**SECTION - C (30 Marks)**

Answer any **THREE** Questions

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

- 16 What is Zeeman effect? Describe the experimental arrangement for studying the Zeeman effect.
- 17 Derive Einstein's photoelectric expression and explain A and B Coefficients.
- 18 Give the theory of Compton effect and briefly explain its experimental verification.
- 19 Explain the following with neat energy level diagram  
(i) Co<sub>2</sub> Laser (ii) He-Ne Laser
- 20 Describe Raman effect with quantum theory.