PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2024
(Third Semester)

Branch – PHYSICS

ATOMIC, MOLECULAR & LASER PHYSICS

Time: Three Hours   Maximum: 50 Marks

SECTION-A (5 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (5 x 1 = 5)

1   What is the radius of 1st orbit of hydrogen atom (in A^0)?
   (i)   0.529   (ii) 5.29
   (iii) 52.9   (iv) 529.0

2   Find the value of spin angular momentum.
   (i) s=i$\hbar$/2   (ii) s=$\hbar$/2
   (iii) s=$\hbar$ (iv) s=i

3   Identify the ray produced by Coolidge tube.
   (i)   Microwave   (ii) UV
   (iii) X-ray   (iv) Radio

4   IR is also known as___.
   (i)   Normal waves   (ii) Gas waves
   (iii) Nodal waves   (iv) Heat waves

5   LASER stands for?
   (i)   Light Amplification Stimulated Emission of Radiation
   (ii) Light Amplification Stimulated Emission of Radiator
   (iii) Light Amplification Spontaneous Emission of Radiation
   (iv) Light Amplification Spontaneous Emission of Radiator

SECTION - B (15 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks   (5 x 3 = 15)

6   a   Outline the features of Bohr atom model.
         OR
   b   State and explain Larmor's theorem briefly.

7   a   Describe Stark effect shortly.
         OR
   b   Explain the JJ coupling mechanism.

8   a   Narrate the concept of continuous X-ray spectra.
         OR
   b   Explain the Bragg's law of diffraction.

9   a   Prepare a note on Electromagnetic spectrum.
         OR
   b   Explain the Beer-Lambertz law shortly.

10 a   State and explain the principles of laser.
         OR
   b   Sketch laser induced fusion process shortly.

SECTION -C (30 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks   (5 x 6 = 30)

11 a. Determine critical potential by using Frank - Hertz method.
OR
  b Highlight the quantum mechanical aspects for normal and anomalous Zeeman Effect.

12 a Enumerate the quantum numbers associated with vector atom model.
OR
  b Discuss the working of photovoltaic cell and photoconductive cell in detail.

13 a Analyse the theory of Compton scattering with experimental verification.
OR
  b Summarize the construction and working of diffraction of X-ray by Laue's Method.

14 a Outline the principle, construction and working of IR spectrometer.
OR
  b Discuss the quantum theory of Raman spectroscopy in detail.

15 a Infer the working of He-Ne Laser with neat diagram.
OR
  b Elucidate the construction and working of Ruby Laser.

Z-Z-Z   END