36529

B.Sc. V - Semester (CBCS) Degree Examination, Nov./Dec. - 2018

# PHYSICS

## (Atomic And Molecular Physics)

### Paper - 5.1

Time : 3 Hours                                                    Maximum Marks : 70

**Instructions to Candidates:**

    1.    Answer **ALL** questions from Section A.

    2.    Answer any **FIVE** from section B and any **THREE** from section C.

## SECTION - A

(15×1=15)

1. What is impact parameter?
2. Give one application of mass spectrograph.
3. How many electrons are there in $1.6 \times 10^{-19}$ C.
4. Who discovered the presence of nucleus in an atom.
5. Write the relation for energy of an electron in $n^{th}$ Bohr's orbit.
6. What is continuum?
7. What is the value of second energy level of $H_2$ atom?
8. Define wave number of a Spectral line.
9. What is fine structure of a Spectral line?
10. State Paule's exclusion principle.
11. What is LS coupling?
12. What is Zeeman effect?
13. What is phosphorescence?
14. What is Rayleigh scattering?
15. What are Anti stoke's lines?

[P.T.O

## SECTION - B

(5×5=25)

16. Discuss Thompson's and Rutherford's models of an atom.

17. Explain the constitution of an atom and its properties.

18. Describe Frank - Hertz experiment to determine the critical potentials.

19. Explain the salient features of vector atom model.

20. Derive an equation for pure rotational energy of a diatomic molecule.

21. Explain Raman effect using quantum theory.

22. Explain the construction and working of semiconductor laser.

## SECTION - C

(3×10=30)

23. a) With necessary theory explain J.J Thomson's method to determine the specific charge of an electron.

    b) A water droplet of radius $10^{-6}$ m is charged with one electron. Calculate the electric field required to keep it stationary.

    $\rho$ *of* water = 1000 kgm$^{-3}$

    e = $1.6 \times 10^{-19}$C.

    (8+2)

24. a) Explain Bohr's theory of $H_2$ atom and its inadequacies.

    b) Discuss sommerfield model of an atom.

    (5+5)

25. Describe stern - gerlach experiment with theory to prove that electron has spin.

    (10)

26. a) Write a note on classification of molecular spectra.

    b) With Neat diagram explain the experimental set up to study Raman effect.

    (5+5)

27. a) Describe the principle and working of a laser.

    b) Write a note on Holography

    (5+5)