This question paper contains **2** printed pages]

B—104—2019

FACULTY OF SCIENCE

B.Sc. (Sixth Semester) EXAMINATION

MARCH/APRIL, 2019

(CGPA Pattern)

PHYSICS

Paper-XIV (PHY-304)

(Atomic, Molecular and Nuclear Physics)

(Saturday, 30-3-2019) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Figures to the right indicate full marks.

(*iii*) Symbols have their usual meaning.

1. Attempt any *four :* 8

(*a*) State Pauli's exclusion principle.

(*b*) Give the permissible values of magnetic orbital quantum number and magnetic spin quantum number.

(*c*) Draw well labelled diagram of electromagnetic spectrum.

(*d*) State conservation law of angular momentum in nuclear reaction.

(*e*) Draw well labelled diagram of experimental setup of stark effect.

(*f*) State the total energy expression for a diatomic molecule.

2. (*a*) Explain in detail normal Zeeman effect. 8

(*b*) Give the theory of pure rotational spectra for diatomic molecule.

Or

(*x*) State and explain Raman effect.

(*y*) Explain spatial quantisation in vector atom model.

3. (*a*) Explain selection rule for occurrence of spectral lines in an atom. 8

(*b*) Explain energy production in stars.

P.T.O.

Or

(*x*) Explain L-S and J-J coupling.

(*y*) Explain discovery of nuclear fission in brief.

4. (*a*) Explain anomalous Zeeman effect. 8

Or

(*b*) Obtain Q value equation for a nuclear reaction.

5. Write notes on any *two* :

(*a*) Nuclear fission as source of energy.

(*b*) Energy realeased in fission.

(*c*) Kinds of nuclear reactions.

(*d*) Controlled thermonuclear reactions.