Total No. of Questions : 5]

SEAT No. :

P6099

[Total No. of Pages : 2

[6154]-113

T.Y.B.Sc.

PHYSICS

PHY - 354 : Atomic and Molecular Physics

(2019 Pattern) (Semester - V) (35124) (Paper - IV)

Time : 2 Hours] *[Max. Marks : 35*

Instructions to the candidates:

1) *Question 1 is compulsory.*
2) *Attempt any three questions from Q.2 to Q.5.*
3) *Questions 2 to 5 carries equal marks.*
4) *Use of calculator and log table is allowed.*

Q1) Attempt Any Five. **[5]**

a) Write electronic configuration of oxygen.
b) Define anamolous zeeman effect.
c) If l = 3, What are possible values of Ml?
d) Define quantum state of an electron.
e) What is Rayleigh's scattering?
f) What is mean by parahelium?

Q2) a) With neat diagram, explain experimental arrangement to study Normal zeeman effect. **[6]**

b) Explain Quantum theory of Raman effect. **[4]**

Q3) a) State and prove Lande's interval rule. Represent it Graphically for 3D term. **[6]**

b) Determine Ground state of Al atom. (z = 13) Represent it using spectral Notations. **[4]**

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Q4) a) Show that vibrational energy levels of a diatomic molecule are equispaced. **[6]**

b) Find out singlet terms in d-d configuration. **[4]**

Q5) Attempy any four. **[10]**

a) Write Note on Hund's rule.
b) Write applications of zeeman effect.
c) Give three types of molecular spectra.
d) Explain Frank and Condon principle in short.
e) Write spectral series in Bohr's H-atom model.
f) Explain the term phosphorescence.