

C.U.SHAH UNIVERSITY

Winter Examination-2018

Subject Name: Modern Physics

Subject Code: 4SC03PHE1

Branch: B.Sc. (All)

Semester: 3

Date: 12/12/2018

Time: 02:30 To 05:30

Marks: 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1 Attempt the following questions: (14)

- a) Define: Fluorescence
- b) What is Stark effect?
- c) State: Liouville's theorem.
- d) Give Bragg's condition for X-ray diffraction
- e) What do you mean by Microscopic state?
- f) What is the significance of quantum numbers for the case of electrons?
- g) State one application of cantilevers
- h) Give the relation between viscosity and temperature.
- i) State any one postulate of the special theory of relativity
- j) What is Auger Effect?
- k) How is turbulent flow different from streamline flow?
- l) How is Normal Zeeman effect different from Anomalous Zeeman effect?
- m) Show pictorially the concept of absorption and emission in atoms.
- n) Differentiate inertial and non - inertial frame

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all questions (14)

- a) Explain in detail how Michelson and Morley try to prove the existence of aether using interferometry techniques. **07**
- b) Give an account on Gibb's Paradox. **07**

Q-3 Attempt all questions (14)

- a) Enumerate on cantilever, its types and working with suitable figure and equations. **07**
- b) Discuss the importance of micro canonical ensemble in statistical mechanics **07**

Q-4 Attempt all questions (14)

- a) Explain how L-S coupling helps to conceptualize total angular momenta in many electron systems. **06**
- b) 'Auger effect is due to secondary electron emission'. Justify **04**
- c) State and explain Stoke's law. **04**

Q-5 Attempt all questions (14)



- a) Explain each quantum number with their physical interpretation. **07**
- b) How one can comment on the total angular momentum of many electron system using J-J coupling scheme? **07**
- Q-6** **Attempt all questions** **(14)**
- a) Explain in detail Anomalous Zeeman effect. **08**
- b) Discuss the process diffraction using X-rays making use of the Bragg's law. **06**
- Q-7** **Attempt all questions** **(14)**
- a) Explain production of X-rays with suitable diagram. **07**
- b) Give the classical interpretation of Normal Zeeman Effect. **07**
- Q-8** **Attempt all questions** **(14)**
- a) Compare: Optical and X-ray spectra **04**
- b) Write a note on : Absorption spectrum **04**
- c) State how Moseley's law justified the nuclear model of atoms? **06**

