

PARUL UNIVERSITY
FACULTY OF APPLIED SCIENCE
M.Sc./Winter October- 2018-19 Examination

Semester: 3**Subject Code: 11204201****Subject Name: Nuclear Physics-I, Advanced Quantum Mechanics-I and Instrumentation****Date: 23/10/2018****Time: 10:30to 01:00pm****Total Marks: 60****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1. A) Brief note (4x2) (Each of 04 marks) (08)**
 (a) Explain Magnetic Moments.
 (b) Explain Electric Moments.
- Q.1. B) Answer the following questions (Any two)**
 (a) Short note/ Brief note (2x2)/ Schematically label the figures (2x2) (Each of 02 marks) (04)
 1. Explain Hyperfine structure of Atomic Spectra.
 2. Describe the effect of external magnetic field on hyperfine structure.
 (b) Explain Molecular beam Experiments on Hydrogen. (04)
 (c) Explain Deuteron in brief. (04)
- Q.2. A) Answer the following questions.**
 (a) Short note/ Brief note (2x2)/ Fill in the blanks. (Each of 02 marks) (04)
 1. Explain Neutron-Proton Scattering at low energies.
 2. Explain Scattering length.
 (b) Explain spin dependence on n-p scattering. (04)
- Q.2. B) Answer the following questions (Any two)**
 (a) Short note/ Multiple choice questions. (Each of 01 marks) (03)
 1. What is singlet state?
 2. What do you mean by kinematics of scattering?
 3. Write the equation of Green's function.
 (b) Explain Kinematics of the scattering Process. (03)
 (c) Explain Wave mechanical Picture of scattering. (03)
- Q.3. A) Brief note (4x2) (Each of 04 marks) (08)**
 (a) Explain the Born Series
 (b) Explain the Eikonala approximation.
- Q.3. B) Answer the following questions (Any two)**
 (a) Short note/ Brief note (2x2)/ Schematically label the figures (2x2) (Each of 02 marks) (04)
 1. Explain elastic and inelastic scattering.
 2. Explain molecular band spectra.
 (b) Discuss Born Approximation and its validity.. (04)
 (c) Explain Desired characteristic of transducer. (04)
- Q.4. A) Answer the following questions.**
 (a) Short note. (Each of 02 marks) (04)
 1. What is transducer? Give at least two example.
 2. Write types of noise.
 (b) Explain Signal to noise ratio. (04)
- Q.4. B) Answer the following questions (Any two)**
 (a) (03)
 1. Is Speaker work as a transducer?
 2. LED works as transducer. This LED converts _____ energy in to _____ energy
 3. What is piezoelectric effect?
 (b) Explain Pyrometer. (03)
 (c) What should you do to enhance signal to noise ratio? (03)