M.Sc. Physics III Semester
Assignment Paper for ATKT (Regular and Private) Students
Paper IV (Advanced Electronics)

*Attempt all the questions and all the questions carry equal marks.

Q 1. Write ideal characteristics of operational amplifier.

Q 2. Explain four to one multiplexer with logic diagram.


Q 4. Write short notes:
   (a) ROMs
   (b) RAM
   (c) TTL memory

Q 5. State De-Morgan theorem and explain NOR, NAND, and XOR gates.
M.Sc. Physics III Semester
Assignment Paper for ATKT (Regular and Private) Students

Paper III (Advanced Quantum Mechanics)

*Attempt all the questions and all the questions carry equal marks.

Q.1 Deduce the Eigen value for angular momentum operator?

Q.2 Evaluate the C-G coefficients for addition of spin half to the arbitrary (l=0) orbital angular momentum and find the corresponding eigen states?

Q.3 Describe the permutation operator for identical particles?

Q.4 Derive the Klein-Gorden equation for relativistic case?

Q.5 Explain the hole theory given by Dirac?
M. Sc. Physics (III Semester)

Assignment Paper for ATKT (Regular) and ATKT (Private) Students

Paper I - 301

(Condensed Matter Physics-I)

*Attempt all the questions and all the questions carry equal marks.

Q.1 Differentiate primitive cell, non-primitive cell and conventional cell from one another. How is a Weigner-Seitz cell constructed?

Q. 2 Obtain Laue’s equations for X-ray diffraction by crystals?

Q. 3 Derive dispersion relation for 1-D atomic crystal and discuss the nature of acoustic and optical modes.

Q. 4 State and prove the Bloch theorem. Discuss its importance in band theory.

Q. 5 Write down the importance of Augmented Plane-Wave method (APW)?
M.Sc. Physics III Semester
Assignment Paper for ATKT (Regular and Private) Students
Paper II (Nuclear Physics)

*Attempt all the questions and all the questions carry equal marks.

Q 1. Write State and assumption involved in the Fermi theory of β- decay.

Q 2. What is the gamma-radiation emission, also define selection rules.

Q 3. Show that the doublet separation due to spin-orbit coupling by

\[ \Delta E \propto 2l+1 \]

Q 4. Find the spin and parity by shell model

\[ _{13}^{27}Al, _{16}^{33}S \]

Q 5. Define two-nucleon problem and ground state of deuteron.