Enrollment No.....

Master of Science (Physics)
Third Semester Main Examination, December-2021
Atomic & Molecular Physics-II [MSP303T]

Time: 3:00 Hrs **Max Marks 85**

Note: Attempt all questions. Question no. 1 to Q no. 4 has two parts. Part A is 10 marks & part B in 7 marks.

Q.1 (a) Discuss the Application of Nuclear magnetic Resonance techniques.
(b) What is relaxation processer spin & spin interaction .

OR

(a) Explain the interaction between nuclear spin and magnetic field.
(b) Brief explain spin –spin coupling between two and more nuclei.

Q.2 (a) Discuss and explain vibrational Couse structure of electronic spectra (bands progression and sequence).
(b) What is Frank condon factor.

OR

(a) Discuss the frank condon principle.
(b) What is dissociation & pre dissociation .

Q.3 (a) Explain the vibrational Raman spectra.
(b) Write the application of Raman effect.

OR

(a) Explain Raman spectra of Diatomic molecular.
(b) What is the infrared spectroscopy.

Q.4 (a) Explain the Mossbauer spectroscopy.
(b) What is Quadra pole splitting magnetic field effect.

OR

(a) Explain Line width a resonance absorption.
(b). What do you mean by Gamma emission.

Q.5 Write note on (any four)-
(a) G-values
(b) Hyper fine coupling
(c) ESR spectrometer
(d) An isotropic system
(e) Principle of ESR

Enrollment No.....

Master of Science (Physics)
Third Semester Main Examination, December-2021
Digital Electronics [MSP304T]

Time: 3:00 Hrs **Max Marks 85**

Note: Attempt all questions. Question no.1 to Q no. 4 has 2 parts Part A is 10 marks and part B is 7 marks.

Q.1 (a) Solve using 2's complement method
If A = $(1001)_2$ & B = $(1100)_2$ find
(i) A+B (ii) A-B
(b) Convert as directed -
(i) Add $(A3E)_{16}$ to $(12B)_{16}$
(ii) $(10101011)_2$ binary to $(?)_8$ octal

OR

(a) What is 1's and 2's complement of Binary number?
(b) Explain signed and unsigned binary number with example.

Q.2 (a) Prove that given Boolean expression using Boolean laws and draw the circuit for it using NAND gate only
A.B+A'B'+A'+B' = A'+B
(b) Draw the symbol and truth table for following gates
(i) AND (ii) OR (iii) NOR (iv) NAND

OR

(a) Reduce the given sop equation using K- map and draw the circuit using NAND network
$ABC + ABC' + AB'C' + A'BC$.
(b) Define Adder? Draw logic circuit diagram and explain it .

Q.3 (a) What in Encodes? Explain Decimal to BCD encodes.
(b) Draw and explain 4 bit shift register .

OR

(a) Draw the logic diagram of 4 to 1 multiplexer. Explain its working.
(b) Explain multiplexer in detail

Q.4 (a) Explain the working of asynchronous counter.
(b) Write note on MOD-5 counter.

OR

(a) Explain ripple counter with suitable diagram. Give the truth table and timing diagram also.
(b) Write short note on four bit Up/Down counter.

Q.5 Write short note on- (any four)
(i) R-2R ladder Network
(ii) D/A Converter
(iii) A/D Converter
(iv) D- flip flop
(v) Binary weighted Gagster

Enrollment No.....

Master of Science (Physics)
Third Semester Main Examination, December-2021
Condensed Matter Physics [MSP301T]

Time: 3:00 Hrs **Max Marks 85**

Note: Attempt all questions. Question 1 to question 4 has two part. Part A is 10 marks and part B is 7 marks.

Q.1 (a) Explain bravis lattice in two and three dimension.
(b) Explain the diamond structure.

OR

(a) What is simple crystal structure and explain Hexagonal close packed structure.
(b) Explain cesium chloride structure.

Q.2 (a) Explain crystal diffraction by X-ray reciprocal lattice.
(b) Write the relation between crystal lattice axes and crystal reciprocal lattice axes.

OR

(a) Explain the Reciprocal lattice of bee and fee lattice.
(b) Explain brillovin zones.

Q.3 (a) Explain Elastic properties of solids.
(b) What in elastic energy density.

OR

(a) Describe experimental determination of elastic constants.
(b) What is elastic compliance and shift ness contants.

Q.4 (a) Describe lattice vibrational spectrum.
(b) What is inelastic scattering of photons .

OR

(a) Explain lattice dynamic of a diatomic liner lattice.
(b) What in lattice vibration and phonons.

Q.5 Write a short note on (any four)
(i) Concept of effective mass
(ii) Anomalous skin effect
(iii) Magneto resistance
(iv) Band theory of solids
(v) De Hass Van alphen effect

Enrollment No.....

Master of Science (Physics)
Third Semester Main Examination, December-2021
Nuclear and Practice [MSP302T]

Time: 3:00 Hrs **Max Marks 85**

Note: Attempt all questions. Question no.1 to Question no 5 has 2 parts. Part A is 10 marks & part B is 7 marks.

Q.1 (a) Explain Meson theory of Nuclear forces. (10)
(b) Write a short note on Reciprocity Theorem. (7)

OR

(a) Describe Low-energy N-p Scattering.
(b) Elaborate direct and compound nuclear reaction mechanism.

Q.2 (a) Explain the constructions and working of Cyclotron. (10)
(b) Define electron synchrotron. (7)

OR

(a) What is betatron explain in detail.
(b) Write a short note on Liner Accelerator.

Q.3 (a) Explain the postulates of the liquid drop model in detail. (10)
(b) Describe nuclear quadrupole moment. (7)

OR

(a) Explain Bohr-wheeler's theory of nuclear hassion shell model.
(b) Write a short note on spin orbit interaction.

Q.4 (a) Write down general feature of B ray spectrum. (10)
(b) Give brief notes of internal conversion. (7)

OR

(a) Explain Fermi theory of B decay in detail.
(b) Write a short note on multipole Radiation.

Q.5 (a) Classified the elementary particles in detail. (10)
(b) Define fundamental interaction. (7)

OR

(a) Explain symmetry scheme of elementary particles.
(b) Write a short note on Symmetry and conservation laws.