Code No. OBS/401/P/2020

M.Sc. IV Semester Main & ATKT Examination September 2020 Subject : Physics Paper-I : Atomic & Molecular Physics

Maximum Marks : 35

- Note : Attempt all questions in about 250 to 300 words. All questions carry equal marks.
- Q.1 Find the expression for the electron density by using Thomas Fermi statistical model.
- Q.2 How are molecules classified according to moment of inertia? Explain in brief symmetrical top, asymmetric top and spherical top molecules by giving examples.
- Q.3 With respect to IR (Infrared spectroscopy) describe the following.
 - (i) Schematic diagram
 - (ii) Source of Radiation
 - (iii) Mono chromates
 - (iv) Detector and recorder.
- Q.4 Compare the spectroscopic techniques for the study of ultra-violet, visible and infrared spectroscopy under the following heads;
 - (i) The sources of excitation,
 - (ii) Prism and grating spectrograph and
 - (iii) Recording system
- Q.5 Explain-
 - (i) L-S coupling interaction energy
 - (ii) Mass bauer spectroscopy.

 $\bullet \bullet \bullet$

Code No. OBS/402/P/2020

M.Sc. IV Semester Main & ATKT Examination September 2020 Subject : Physics Paper II : Physics of Lasers & its Applications

Maximum Marks : 35

- Note : Attempt all questions in about 250 to 300 words. All questions carry equal marks.
- Q.1 What is a Laser rate equation? Obtain the Laser rate equation for four level systems.
- Q.2 Discuss the principle of working of a semiconductor laser with necessary band diagram.
- Q.3 Explain Laser fluorescence and Raman scattering and their application in pollution studies.
- Q.4 Discuss the harmonic generation in non-linear optics. On this basis explain the sum & difference frequency generation.
- Q.5 Determine line pulse duration in case of Q switched or mode locked laser.

 $\bullet \bullet \bullet$

Code No. OBS/403/P/2020

M.Sc. IV Semester Main & ATKT Examination September 2020 Subject : Physics Paper-III : Condensed Matter Physics

Maximum Marks : 35

- Note : Attempt all questions in about 250 to 300 words. All questions carry equal marks.
- Q.1 Explain Josephson effect in detail.
- Q.2 What are point defects in solids? What are colour centers? How canF- Center be produced in ionic solids? Write its important properties.
- Q.3 What are fullerens and tubules? Write any two methods of their formation.
- Q.4 Explain Anderson Model for random systems. Write about electron localization, edge mobility and hopping conduction.

Q.5 Write notes on any two of the following:-

- (i) Properties and definition of nanostructure materials.
- (ii) Disordered materials, order-disorder Transition.
- (iii) Explain classification of liquid crystals.
- (iv) BCS theory, for High temperature super- conductors.



Code No. OBS/404/P/2020

M.Sc. IV Semester Main & ATKT Examination September 2020 Subject : Physics Paper-IV : Electronics-II

Maximum Marks : 35

- Note : Attempt all questions in about 250 to 300 words. All questions carry equal marks.
- Q.1 Explain sampling theorem. What is the difference between natural sampling and flat top sampling.
- Q.2 Explain satellite communication system.
- Q.3 Describe internal architecture of 8086 microprocessor.
- Q.4 Discuss different INTR instructions of 8086.
- Q.5 (i) Write note on QPSK.(ii) Give elementary idea of 80186, 80286 and 80386µp.

 $\bullet \bullet \bullet$