

1. Describe briefly the inherent difference between elastic and inelastic neutron scattering using thermal neutrons for condensed matter studies.
2. What is the definition of atomic form factor and how it affects a diffraction experiment?
3. What is the inherent difference in neutron scattering instruments at a nuclear reactor and at a spallation neutron source ?
4. If a 'Q' range of 0 to 0.1 \AA^{-1} needs to be covered in a Small Angle Neutron Scattering (SANS) instrument, what should be the angular range for a 4 \AA neutron?
5. What is the definition of scattering law $S(Q,\omega)$ and what is its relationship with pair correlation function $G(r,t)$?
6. What is a neutron guide and what is its role in neutron transport?
7. What is quasi-elastic scattering and what physical property can be obtained using this technique?
8. Why time-of-flight (ToF) is a natural choice in a pulsed neutron source?
9. If a detector is located at 30 degree with respect to the direct beam of neutrons within a wavelength band of 1 \AA to 5 \AA , what will be the 'Q' range covered by it for a ToF experiment?
10. If an experiment has a band of polychromatic neutrons in the range of 3 \AA - 7 \AA , what should be the total ToF for an elastic experiment so that no frame overlap occurs when the time gap between the neutron pulses is 20 msec?