Subject : Mathematics

Teacher name: Rashminder Semester 4th

Name of the Paper : Paper 5

Class: MSc(Mathematics)

April 2021

|  |
| --- |
| General form of progressive waves, Harmonic waves, Plane waves, the wave equation. Principle of superposition. Special types of solutions: Progressive and Stationary type solutions of wave equation. Equation of telegraphy. Exponential form of harmonic waves. D’ Alembert’s formula. Inhomogeneous wave equation. Dispersion: Group velocity, relation between phase velocity and group velocity. |

May 2021

|  |
| --- |
| Reduction of equation of motion to wave equations. P and S waves and their characteristics. Polarisation of plane P and S waves. Snell’s law of reflection and refraction. Reflection of plane P and SV waves at a free surface. Partition of reflected energy. Reflection at critical angles. Reflection and reflection of plane P,SV and SH waves at an interface. Special cases of Liquid-Liquid interface, Liquid-Solid interface and Solid-Solid interface. Rayleigh waves, Love waves and Stoneley waves. |

June 2021

|  |
| --- |
| Two dimensional Lamb’s problems in an isotropic elastic solid: Area sources and Line Sources in an unlimited elastic solid. A normal force acts on the surface of a semi-infinite elastic solid, tangential forces acting on the surface of a semi-infinite elastic solid. Three dimensional Lamb’s problems in an isotropic elastic solid: Area sources and Point sources in an unlimited elastic solid, Area source and Point source on the surface of semiinfinite elastic solid. Haskell matrix method for Love waves in multilayered medium |

July 2021

|  |
| --- |
| Spherical waves. Expansion of a spherical wave into plane waves: Sommerfield’s integral. Kirchoff’s solution of the wave equation, Poissons’s formula, Helmholtz’s formula. (Relevant articles from the book “Mathematical Aspects of Seismology” by Markus Bath). Introduction to Seismology: Location of earthquakes, Aftershocks and Foreshocks, Earthquake magnitude, Seismic moment, Energy released by earthquakes, observation of earthquakes, interior of the earth. |