

**Syllabus
for
Geophysics (SCQP15)**

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Note:

- i. *The Question Paper will have 75 questions.*
- ii. *All questions will be based on Subject-Specific Knowledge.*
- iii. *All questions are compulsory.*
- iv. *The Questions will be Bilingual (English/Hindi).*

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PHYSICS:

• **Mechanics and wave Motion: -**

Gallilean invariance, Inertial, noninertial and accelerated frame. Principle of equivalence, Various forces and energy considerations in motions of planets and satellites, conservation of linear momentum, variable mass, Moment of Inertia, Kinetic energy, Radius of gyration, Conservation of Angular momentum, Beats, Lissajous figures LCR circuits, Resonance, Fourier series.

• **Electromagnetic Theory and Electronics: -**

Maxwell's equations, Displacement current, travelling waves, E M Fields in coaxial cable, Poynting vector, Propagation of e.m. waves. Semiconductors, P-n junction, transistor, Rectifiers, Filters, Common Emitter voltage amplifier.

• **Optics: -**

Newton's rings, Michelson's interferometer, coherence, Laser, Fresnel and Fraunhofer diffraction, and diffraction patterns, Polarisation, Brewster's Law, Optic axis, Nicol Prism, Huygen's theory of double diffraction.

• **Thermodynamics and statistical Mechanics: -**

Entropy, Reversible and irreversible process, S.T. diagram, Enthalpy, Helmholtz and Gibbs' functions, Maxwell's and T-ds equations, Energy and Heat capacity equations, Clausius-Clapeyron equations, specific heat, Thermodynamics, Black body radiations, Laws of radiation, Temperature of the Sun, Planck's radiation formula, Photoelectric effect, Compton effect, Raman Effect, Duality, Michelson-Morley experiment.

MATHEMATICS:

Algebra:

- Partial fractions, inequalities, Theory of equations, algebra of matrices, properties of determinants and its application to solve linear simultaneous equations,

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Trigonometry:

- De Moivre's theorem, logarithms of complex quantities and expansion of functions.

Calculus:

- Successive differentiation, asymptotes, curve tracing, curvature, maxima and minima, partial differentiations in determinate forms, mean value theorems, integration and reduction formulae and evaluation of area. Volume, surface and lengths.

Geometry:

- Hyperbola in rectangular coordinates, polar equation of a conic, general equation of second degree, confocal and system of conics, straight lines, plane, sphere, cone, cylinder and central conoids in three dimensions.

Vectors:

- Divergence, gradient and curl of vectors, Gauss, Stokes and Green's theorems with their applications,

Differential equations:

- Linear differential equations with constant coefficients, orthogonal trajectory, simple non linear differential equations, Integral equations and solution of linear differential equations using Laplace transform.

Mechanics:

- Forces in two dimensions, Virtual work, catenary, Center of gravity, friction, S H M, Projectiles, constrained motion, moments and product of inertia, equation of motion of a rigid body, D'Alembert's principle, compound pendulum, conservation of energy and momentum, centre of pressure and laws of floatation.