***KARIM CITY COLLEGE***

***DEPARTMENT OF PHYSICS***

**GIST OF THE PORTIONS OF THE SYLLABUS COVERED BY**

**Dr. MD. TUFAIL AHMAD**

**SEMESTER - 1**

**SESSION :- 2017 – 2018**

**Fundamentals of Dynamics:**

1. Reference frames. Inertial frames; Review of Newton’s Laws of Motion. Dynamics of a system of particles. Centre of Mass.
2. Principle of conservation of momentum. Impulse. Momentum of variable-mass system: motion of rocket.

**Rotational Dynamics**:

1. Angular momentum of a particle and system of particles. Torque. Principle of conservation of angular momentum. Moment of Inertia.
2. Moment of inertia for rectangular, cylindrical and spherical bodies. Kinetic energy of rotation. Motion involving both translation and rotation.

**Elasticity:**

1. Elastic constants and interrelation between them. Twisting torque on a Cylinder or

Wire and twisting couple.

2**.** Bending of beam, Cantilever.

**Surface Tension:**

1. Ripples and Gravity waves, Determination of Surface Tension by Jaeger’s.
2. Quinke’s methods. Temperature dependance of Surface Tension.

**Fluid Motion:**

1. Kinematics of Moving Fluids,
2. velocity profile: Poiseuille’s Equation for Flow of a Liquid through a Capillary Tube and the corrections.

**Central Force Motion:**

1. Motion of a particle under a central force field. Two-body problem and its reduction to one-body problem and its solution.
2. Kepler’s Laws. Satellite in circular orbit and applications. Geosynchronous orbits. Weightlessness. GPS.

**Oscillations:**

1. Simple Harmonic Oscillations. Differential equation of SHM and its solution.

Kinetic energy, potential energy, total energy and their time-average values.

1. Damped oscillation. Forced oscillations: Transient and steady states; Resonance, sharpness of resonance; power dissipation and Quality Factor.

**Special Theory of Relativity:**

1. Galilean transformations; Galilean invariance. Michelson-Morley Experiment and its outcome. Postulates of Special Theory of Relativity.
2. Lorentz Transformations. Lorentz contraction. Time dilation. Relativistic transformation of velocity,
3. Relativistic addition of velocities. Variation of mass with velocity. Mass-energy Equivalence. Relativistic Doppler effect.
4. Relativistic Kinematics. Transformation of Energy and Momentum. Energy- Momentum

 Minkowski space and Four Vector.