2007

#	Topic	Comment
1	Kinematics	Position-time equation
2	Kinematics	Velocity-time graph
3	Kinematics	Average velocity
4	Kinematics	Free fall
5	Dynamics	Force and effects
6	Kinematics	Position from velocity-time equation
7	Energy	Comparison of amounts
8	Gravity	Gravitational potential energy
9	System of Masses	Motion of center of mass
10	Rigid Bodies	Rotational analog of Newton's 2nd Law
11	Rigid Bodies	Moments of inertia and energy
12	Dynamics	Statics, balance of torques
13	Collisions	Conservation laws
14	Dynamics	Direction of forces
15	System of Masses	Translational and rotational dynamics
16	Collisions	Conservation laws
17	Kinematics	Acceleration over time in projectile motion
18	Energy	Conservation of energy
19	Energy	Spring and conservation of energy
20	Collisions	Energy, momentum, and velocity
21	Rigid Bodies	Value of moments of inertia
22	Energy	Work, energy, momentum
23	Gravity	Centripetal force
24	Kinematics	Projectile motion
25	Oscillatory Motion	Period in water
26	Dynamics	Kinematics and coefficient of friction
27	Rigid Bodies	Conservation laws, centripetal force
28	Rigid Bodies	Analysis of bicycle, equilibrium
29	Rigid Bodies	Analysis of bicycle, equilibrium
30	Rigid Bodies	Analysis of bicycle, equilibrium
31	Rigid Bodies	Rotational inertia of a rod
32	Oscillatory Motion	Angular frequency
33	Oscillatory Motion	Angular frequency
34	Dynamics	Object winding up around a cylinder
35	Energy	Kinetic energy of object
36	Dynamics	Original length of rope
37	Energy	Ratio of velocities
38	Energy	Ratio of kinetic energies

Kinematics	7
Dynamics	6
Energy	7
Collisions	3
System of Masses	2
Rigid Bodies	8
Oscillatory Motion	3
Gravity	2
Fluids	0
Other	0
	38

2008	Topic	Comment
1	Kinematics	Uniform acceleration equations
2	Kinematics	Displacement
3	Kinematics	Velocity from position-time graph
4	Kinematics	Displacement from velocity-time graph
5	Kinematics	a-t graph from v-t graph
6	Kinematics	Projectile motion and range
7	Collisions	Conservation laws
8	Dynamics	Friction and centripetal force
9	Collisions	Conservation laws
10	Dynamics	Dynamics
11	Dynamics	Dynamics
12	Rigid Bodies	Moments of inertia and kinetic energy
13	Oscillatory Motion	Spring constant and amplitude
14	System of Masses	Angular momentum and energy
15	Dynamics	Statics, balance of torques
16	Dynamics	Spring and acceleration
17	Dynamics	Spring and acceleration
18	Gravity	Potential and kinetic energy
19	Energy	Power and acceleration
20	Other	Young's modulus, elimination of answers
21	System of Masses	Conservation laws
22	Collisions	Conservation laws and circular motion
23	Gravity	Relationship between variables
24	Kinematics	Bouncing ball
25	Gravity	Velocity and orbit

Kinematics	7
Dynamics	6
Energy	1
Collisions	3
System of Masses	2
Rigid Bodies	1
Oscillatory Motion	1
Gravity	3
Fluids	0
Other	1
	25

2009	Topic	Comment
1	Collisions	Impulse and pressure
2	Collisions	Motion after elastic collision
3	Collisions	Motion after inelastic collision
4	Dynamics	Apparent weight
5	Gravity	Comparison after angular momentum
6	Kinematics	Projectile motion, velocity and angle
7	Kinematics	Uniform acceleration equations
8	Kinematics	Rotational motion, ω-t graph
9	Kinematics	Rotational motion, ω-t graph
10	Kinematics	Projectile motion
11	Kinematics	a-x graph, work
12	Energy	Work
13	Dynamics	Statics, torque
14	Collisions	Conservation of energy, momentum
15	Dynamics	Determining coefficient of friction
16	Oscillatory Motion	Angular frequency of oscillation
17	Other	Measure quantities in SI units
18	Oscillatory Motion	Period of pendulum
19	Kinematics	Projectile motion, height and range
20	Collisions	Conservation laws
21	Gravity	Gravitational potential energy
22	Gravity	Period of orbit
23	Oscillatory Motion	Simple harmonic motion, power
24	Dynamics	Tipping over of box
25	Rigid Bodies	Angular velocity, friction

Kinematics	7
Dynamics	4
Energy	1
Collisions	5
System of Masses	0
Rigid Bodies	1
Oscillatory Motion	3
Gravity	3
Fluids	0
Other	1
	25

2010	Topic	Comment
1	Kinematics	Position-time graph
2	Kinematics	Velocity-time graph
3	Kinematics	Acceleration-time graph
4	Kinematics	Free fall
5	Kinematics	Projectile motion
6	Kinematics	Projectile motion, height and range
7	Dynamics	Centripetal force, angular momentum
8	Dynamics	Friction, acceleration
9	Dynamics	Acceleration
10	Dynamics	Acceleration, friction
11	Dynamics	Statics
12	Energy	Kinetic energy and projectile motion
13	Rigid Bodies	Energy and moment of inertia
14	Collisions	Conservation laws, friction
15	System of Masses	Conservation laws
16	System of Masses	Conservation laws
17	Gravity	Potential energy of configuration
18	Energy	Force and potential energy
19	Energy	Potential and position-time graph
20	Energy	Position-time graph, energy
21	Gravity	Gravitational self potential energy
22	Dynamics	Centripetal force
23	Fluids	Cross-sectional area and velocity
24	Rigid Bodies	Determining moments of inertia
25	Gravity	Energy and velocity

Kinematics	6
Dynamics	6
Energy	4
Collisions	1
System of Masses	2
Rigid Bodies	2
Oscillatory Motion	0
Gravity	3
Fluids	1
Other	0
	25

2011	Topic	Comment
1	Kinematics	Average speed and displacement
2	Kinematics	Velocity-time graph
3	Kinematics	Velocity-time graph
4	Kinematics	Velocity-time graph
5	Gravity	Centripetal acceleration
6	Collisions	Conservation laws
7	Rigid Bodies	Angular momentum, energy
8	Fluids	Fraction of block floating
9	Dynamics	Force on length of spring
10	Oscillatory Motion	Factors that increase period
11	Fluids	Water level - time graph
12	Gravity	Compressive force
13	Rigid Bodies	Statics, balance of torques
14	Kinematics	Free fall
15	Oscillatory Motion	Determination of spring constant
16	Dynamics	Statics, friction
17	Dynamics	Acceleration
18	Energy	Friction, conservation laws
19	Oscillatory Motion	Return to origin
20	Oscillatory Motion	Amplitude
21	Other	Same units
22	Energy	Torque, rotation frequency, and power
23	Gravity	Kepler's laws
24	Rigid Bodies	Rotation, power, friction
25	Rigid Bodies	Comparison of motion down a plane

Kinematics	5
Dynamics	3
Energy	2
Collisions	1
System of Masses	0
Rigid Bodies	4
Oscillatory Motion	4
Gravity	3
Fluids	2
Other	1
	25

2012	Topic	Comment
1	Kinematics	Free fall
2	Kinematics	Projectile motion, height and range
3	Dynamics	Angle for toppling
4	System of Masses	Conservation laws
5	Collisions	Loss of kinetic energy
6	Kinematics	Free fall
7	Kinematics	Free fall
8	Energy	Friction, conservation of energy
9	Gravity	Escape velocity
10	Rigid Bodies	Comparison of acceleration down a plane
11	Dynamics	Change in forces over time
12	Dynamics	Change in forces over time
13	Energy	Work and velocity
14	Rigid Bodies	Torque, moments of inertia
15	Energy	Power and velocity
16	Oscillatory Motion	Vibration frequency of spring
17	Oscillatory Motion	Period-amplitude graph
18	Oscillatory Motion	Relationship between variables
19	Fluids	Energy, power, velocity
20	Fluids	Buoyancy, apparent weight
21	Dynamics	Change in height of springs
22	Other	Equivalent units
23	Other	Equipments used to determine constants
24	Dynamics	Determining spring constant
25	Gravity	Comparison of velocities and orbits

Kinematics	4
Dynamics	5
Energy	3
Collisions	1
System of Masses	1
Rigid Bodies	2
Oscillatory Motion	3
Gravity	2
Fluids	2
Other	2
	25

2013	Topic	Comment
1	Kinematics	Uniform acceleration equations
2	Kinematics	Elastic collision with wall
3	Kinematics	Projectile motion
4	Dynamics	Statics, balance of torques
5	Dynamics	Aparent weight, velocity
6	Dynamics	Aparent weight, velocity
7	Energy	Comparison of momentum and energy
8	Energy	Conservation laws
9	Energy	Conservation laws
10	Rigid Bodies	Solid and hollow spheres
11	System of Masses	Normal force of system to table
12	Rigid Bodies	Acceleration and moments of inertia
13	Gravity	Velocity and distance
14	Collisions	Velocity of center of mass
15	Fluids	Fraction of rod above water
16	Other	Same units
17	Dynamics	Change in forces over time
18	System of Masses	Conservation laws
19	Dynamics	Tension, pendulum
20	Dynamics	Tension, pendulum
21	Oscillatory Motion	Determination of period
22	Dynamics	Statics, balance of torques
23	Energy	Determination of spring constant
24	Energy	Extension of cord
25	Dynamics	Power and velocity

Kinematics	3
Dynamics	8
Energy	5
Collisions	1
System of Masses	2
Rigid Bodies	2
Oscillatory Motion	1
Gravity	1
Fluids	1
Other	1
	25

2014	Topic	Comment
1	Dynamics	Angular momentum & acceleration vectors
2	Rigid Bodies	Direcction of force
3	Fluids	Floating object
4	System of Masses	Conservation laws
5	Dynamics	Torques, centripetal force
6	Collisions	Coefficient of restitution
7	Dynamics	Statics, balance of torques
8	Oscillatory Motion	Determining period
9	Energy	Impulse, velocity
10	Dynamics	Tension, centripetal force
11	Energy	Energy graphs
12	Other	Same units
13	Other	Same units
14	Rigid Bodies	Translational and rotational kinetic energy
15	Energy	Power and velocity
16	Collisions	Speed ratio
17	Gravity	Determining gravitational acceleration
18	Dynamics	Tension, pulley system
19	Dynamics	Air resistance
20	Energy	Centripetal force
21	Dynamics	Moments of inertia, pulley system
22	Gravity	Relationship between variables
23	System of Masses	Impulse, conservation laws
24	System of Masses	Velocity turns through an angle
25	Energy	Friction, conservation laws

Kinematics	0
Dynamics	7
Energy	5
Collisions	2
System of Masses	3
Rigid Bodies	2
Oscillatory Motion	1
Gravity	2
Fluids	1
Other	2
	25

2015	Topic	Comment
1	Kinematics	Addition of velocities
2	Kinematics	Average speed
3	Energy	Force and power
4	Dynamics	Graph analysis of motion
5	Kinematics	Projectile motion
6	Collisions	Conservation of momentum
7	Collisions	Conservation of momentum
8	Collisions	Conservation of momentum
9	Collisions	Conservation of momentum
10	Energy	Analysis of kinetic energies from collisions
11	Fluids	Buoyancy
12	Dynamics	Acceleration of pendulum
13	Dynamics	Direction of pendulum acceleration
14	Dynamics	Forces and circular motion
15	Energy	Work-energy theorem
16	Energy	Analysis of potential energy graph
17	Other	Dimensional analysis
18	Other	Re-expression of data
19	Oscillatory Motion	Oscillation of a liquid in a U-tube
20	Fluids	Balance of forces, equilibrium
21	Kinematics	Coefficient of restitution, infinite series
22	Energy	Graph analysis
23	Energy	Vertical spring, conservation of energy
24	Other	Transverse wave, fundamental frequencies
25	Oscillatory Motion	Coupled oscillators

Kinematics	4
Dynamics	4
Energy	6
Collisions	4
System of Masses	0
Rigid Bodies	0
Oscillatory Motion	2
Gravity	0
Fluids	2
Other	3
	25

2016	Topic	Comment
1	Kinematics	Angular velocity of car wheels
2	Fluids	Adding oil to water
3	Energy	Book hitting snow
4	Dynamics	Sliding bead, finding acceleration
5	Kinematics	Projectile motion, reference frames
6	Kinematics	Projectile motion, reference frames
7	Oscillatory Motion	Oscillating mass, linear approximations
8	Gravity	Kepler's laws
9	Energy	Sliding bead
10	Dynamics	Two hanging blocks
11	Energy	Power output and maximum velocity
12	Fluids	Acceleration of container
13	Collisions	Elastic and perfectly inelastic collisions
14	Oscillatory Motion	Rod oscillation, linear approximations
15	Oscillatory Motion	Rod oscillation, linear approximations
16	Kinematics	Reference frame, projectile motion
17	Rigid Bodies	Rotating sphere under friction
18	Kinematics	Angular kinematics
19	Energy	Projectile motion
20	Rigid Bodies	Critical angle, center of mass
21	System of Masses	Center of mass
22	System of Masses	Conservation of energy
23	Dynamics	Making linear approximations
24	Rigid Bodies	Calculating moments inertia
25	Other	Error propagation

Kinematics	5
Dynamics	3
Energy	4
Collisions	1
System of Masses	2
Rigid Bodies	3
Oscillatory Motion	3
Gravity	1
Fluids	2
Other	1
	25

2017	Topic	Comment
1	Dynamics	Friction, circular motion
2	Oscillatory Motion	Coupled oscillators
3	System of Masses	Center of mass
4	Kinematics	Constant acceleration motion
5	Kinematics	Maximizing range
6	Dynamics	Balance of torques
7	Energy	System with increasing energy
8	Energy	Power, accounting for dissipation
9	Fluids	Comparing pressures
10	Fluids	Gauge pressure
11	System of Masses	Center of mass, torques
12	System of Masses	Center of mass, torques
13	Dynamics	Atwood machine, limiting case
14	Rigid Bodies	Rolling down an incline
15	Rigid Bodies	Comparing moments of inertia
16	Rigid Bodies	Motion of a rod
17	Kinematics	Free fall motion
18	Dynamics	Tracking acceleration vector
19	Dynamics	Infer coefficient of friction from graph
20	Collisions	Completely inelastic
21	Collisions	Elastic, momentum transfer
22	Collisions	Elastic, energy transfer
23	Other	Speed of wave in string
24	Energy	Collision, potential energy in spring
25	Gravity	Orbital speeds, conservation of energy

Kinematics	3
Dynamics	5
Energy	3
Collisions	3
System of Masses	3
Rigid Bodies	3
Oscillatory Motion	1
Gravity	1
Fluids	2
Other	1
	25

2018A	Topic	Comment
1	Dynamics	Air resistance, terminal velocity
2	Collisions	Velocity of center of mass
3	Collisions	Energy and momentum conservation
4	Energy	Maximize kinetic energy
5	System of Masses	Center of mass
6	Energy	Work-energy theorem
7	Kinematics	Symmetry, path of shortest time
8	Rigid Bodies	Rolling without slipping
9	Rigid Bodies	Force equation, torque equation
10	Dynamics	Air resistance, acceleration
11	Oscillatory Motion	Effective spring constant
12	Other	Error propagation
13	Other	Young's modulus
14	Oscillatory Motion	Physical pendulum, moments of inertia
15	Gravity	Kinetic and potential energies of satellite
16	Dynamics	Noninertial frame, fictitious forces
17	Dynamics	Dropping sand from helicopter
18	Dynamics	Vertical circular motion
19	Collisions	Raindrops falling on the ground
20	Energy	Elastic energy, effective spring constant
21	Rigid Bodies	Rolling without slipping
22	Fluids	Sinking boat
23	Rigid Bodies	Rolling, angular acceleration
24	Oscillatory Motion	Increasing amplitude of pendulum
25	Other	Error propagation

Kinematics	1
Dynamics	5
Energy	3
Collisions	3
System of Masses	1
Rigid Bodies	4
Oscillatory Motion	3
Gravity	1
Fluids	1
Other	3
	25

2018B	Topic	Comment
1	Collisions	Clay hitting the ground
2	Energy	Dissipation from friction
3	Collisions	Energy after perfectly inelastic collision
4	Collisions	Conservation of energy and momentum
5	Kinematics	Ratio of angular accelerations
6	Other	Dimensional analysis
7	Oscillatory Motion	Resonance, maximizing amplitude
8	Rigid Bodies	Torque, rolling without slipping
9	Collisions	Conservation of energy and momentum
10	Fluids	Compressible air, buoyant force
11	Other	Speed of waves in string
12	Dynamics	Noninertial frame, fictitious forces
13	Dynamics	Friction, slipping between blocks
14	Rigid Bodies	Torque, slip without rotating
15	Dynamics	Acceleration, scale reading
16	Dynamics	Plane flight, engine power
17	Energy	Vertical spring, conservation of energy
18	Dynamics	Effective spring constant & length
19	Other	Error propagation
20	Dynamics	Friction, rope hanging over table
21	Oscillatory Motion	Physical pendulum, moment of inertia
22	Dynamics	Perturbation to Atwood machine
23	Rigid Bodies	CM frame, circular orbit
24	Fluids	Effect of gravity as a fluid, Pascal's law
25	Other	Error propagation

Kinematics	1
Dynamics	7
Energy	2
Collisions	4
System of Masses	0
Rigid Bodies	3
Oscillatory Motion	2
Gravity	0
Fluids	2
Other	4
	25

2019A	Topic	Comment
1	Dynamics	Free fall, drag, terminal velocity
2	Collisions	Elastic, perfectly inelastic, ratio of energies
3	Collisions	Conservation of momentum, energy
4	Oscillatory Motion	Vertical spring, period
5	Rigid Bodies	Balance torques, rolling
6	Kinematics	Inclined plane, bouncing, change of axes
7	Energy	Conservation of energy, centripetal force
8	Gravity	Trajectory, circular orbit, escape velocity
9	Rigid Bodies	Rolling motion, velocity addition
10	Rigid Bodies	Calculating moment of inertia
11	Other	Error propagation
12	Kinematics	Bouncing ball, change of variables
13	Energy	Power, kinetic energy delivered periodically
14	Dynamics	Coriolis force, deflection, kinematics
15	Rigid Bodies	Center of mass frame, rotating rod
16	Kinematics	Dropping stone, error propagation
17	Rigid Bodies	Statics, balance torques, clamped disc
18	Energy	Conservation of energy, kinetic energy
19	Fluids	Pendulum in water, change of frequency
20	Energy	Mass-spring system, stable equilibrium
21	Gravity	Cloud of dust, circular orbits
22	Dynamics	Circular motion, tensions, limiting cases
23	Dynamics	Direction of friction, center of mass
24	Oscillatory Motion	Potential landscape, simple harmonic motion
25	Fluids	Noninertial frame, effective gravity, Torricelli

Kinematics	3
Dynamics	4
Energy	4
Collisions	2
System of Masses	0
Rigid Bodies	5
Oscillatory Motion	2
Gravity	2
Fluids	2
Other	1
	25

2019B	Topic	Comment
1	Energy	Inclined plane, dissipation to friction
2	Fluids	Different densities, oil, water, buoyancy
3	Dynamics	Springs in series, potential energies
4	Gravity	Conservation of energy, collision time
5	Gravity	Shell theorem, gravitational acceleration
6	Gravity	Gauss's law of gravity, density of dust
7	Fluids	Pascal's law, distribution of pressure
8	Dynamics	Pushing on a scale, balancing forces
9	Rigid Bodies	Balancing torques, statics
10	System of Masses	Conservation of momentum
11	Rigid Bodies	Calculating moment of inertia
12	Gravity	Kepler's 3rd law, energy, angular momentum
13	Kinematics	Height, range equations
14	Kinematics	Range equation, trajectory reflection
15	Dynamics	Centripetal force, similar triangles
16	Rigid Bodies	Kinetic friction, rolling motion, kinematics
17	Rigid Bodies	Kinetic friction, rolling motion, kinematics
18	Other	Kinematics, error propagation
19	Dynamics	Swinging pendulum, total acceleration
20	Kinematics	Inclined plane, sliding up and down
21	Dynamics	General Newton's 2nd law, dropping sand
22	Dynamics	Impulse-momentum, average pressure
23	Oscillatory Motion	Simple harmonic motion, acceleration
24	Dynamics	Atwood machine, acceleration
25	Other	Error propagation, dominant uncertainty

Kinematics	3
Dynamics	7
Energy	1
Collisions	0
System of Masses	1
Rigid Bodies	4
Oscillatory Motion	1
Gravity	4
Fluids	2
Other	2
	25

2020A	Topic	Comment
1	Energy	Free fall, conservation of energy
2	Rigid Bodies	Rolling without slipping
3	Other	Dimensional analysis, energy
4	Dynamics	Circular motion, rods
5	Oscillatory Motion	Simple pendulum, resonance
6	Gravity	Conservation of angular momentum
7	Gravity	Energy, period of elliptical orbit
8	Kinematics	Exponential motion
9	Dynamics	Pulley system, equilibrium
10	Dynamics	Pulley system, string length
11	Other	Tensile strength
12	Oscillatory Motion	Period of a physical pendulum
13	Rigid Bodies	Angular momentum, cross product
14	Dynamics	Friction between two masses, slipping
15	Fluids	Gauge pressure, Pascal's law
16	Energy	Conservation of energy, surface tension
17	Collisions	Falling rain, general Newton's 2nd law
18	System of Masses	Conservation of angular momentum
19	Rigid Bodies	Rolling without slipping, velocity addition
20	Energy	Power output, time averaging
21	Rigid Bodies	Tipping over a table, torques
22	Collisions	Invariant properties of collisions
23	Other	Error propagation, spring constant
24	Dynamics	Circular motion, shifting equilibrium
25	Dynamics	Stable equilibrium, spring system

Kinematics	1
Dynamics	6
Energy	3
Collisions	2
System of Masses	1
Rigid Bodies	4
Oscillatory Motion	2
Gravity	2
Fluids	1
Other	3
	25

2020B	Topic	Comment
1	Kinematics	Elastic collisions, free fall
2	Rigid Bodies	Perpendicular axis theorem
3	Dynamics	Conical pendulum
4	Dynamics	Weightlessness, accelerating frames
5	Gravity	Elliptical orbits, angular momentum
6	Rigid Bodies	Choosing torque axis, maximum forces
7	Gravity	Energy, period of elliptical orbit
8	Dynamics	Friction, changing reference frames
9	Dynamics	Spring force, Atwood machine
10	Oscillatory Motion	Effective spring constant
11	Energy	Definition of work
12	Rigid Bodies	Platform attached to wall, equilibrium
13	Oscillatory Motion	Physical pendulum, moments of inertia
14	Collisions	Perfectly inelastic collisions
15	Fluids	Valves, balancing pressures
16	Oscillatory Motion	Matching periods, kinematics
17	Energy	Conservation of energy, elastic collision
18	Energy	Principle of virtual work
19	Rigid Bodies	Angular momentum, rotational kinetic energy
20	Fluids	Inflated balloon, scale
21	System of Masses	Conservation of angular momentum
22	Dynamics	Kinetic friction, kinematics
23	Other	Dimensional analysis
24	Collisions	Elastic collisions, maximizing velocity
25	Other	Error propagation

Kinematics	1
Dynamics	5
Energy	3
Collisions	2
System of Masses	1
Rigid Bodies	4
Oscillatory Motion	3
Gravity	2
Fluids	2
Other	2
	25

2021	Topic	Comment
1	Dynamics	Rolling up incline, velocity over time
2	Dynamics	Rolling up incline, horizontal velocity
3	System of Masses	Balancing torques
4	Dynamics	Coriolis force, deflection
5	Kinematics	Shortest path, accelerations
6	Energy	Lifting bucket of water
7	Collisions	Collisions between two walls
8	Other	Error propagation
9	Dynamics	Weightlessness, kinematics
10	System of Masses	Conservation of angular momentum
11	Kinematics	Projectile motion, comparing times
12	Dynamics	Friction, mass-spring system
13	Dynamics	Nonuniform circular motion
14	Other	Dimensional analysis
15	Dynamics	Sliding down incline, kinematics
16	Kinematics	Exponential motion
17	Dynamics	Centripetal acceleration
18	Kinematics	Rising smoke, relative velocities
19	Gravity	Principle of superposition, negative mass
20	Gravity	Period of Moon's rotation
21	Rigid Bodies	Rolling without slipping, down incline
22	Dynamics	Friction, normal forces
23	Oscillatory Motion	Force-position graph, period of oscillation
24	Gravity	Energy, period of elliptical orbit
25	Gravity	Angular momentum, escape velocities

Kinematics	4
Dynamics	9
Energy	1
Collisions	1
System of Masses	2
Rigid Bodies	1
Oscillatory Motion	1
Gravity	4
Fluids	0
Other	2
	25

2022A	Topic	Comment
1	Kinematics	Free fall
2	Kinematics	Constant acceleration equations
3	Collisions	Energy loss of inelastic collision
4	Dynamics	Trajectory of pendulum
5	Rigid Bodies	Rolling without slipping, kinetic energy
6	Dynamics	Pendulum, maximum tension
7	Other	Re-expression of data
8	Dynamics	Block on inclined plane, friction force
9	Dynamics	Atwood machine, conservation of string
10	Oscillatory Motion	Simple pendulum, period of oscillation
11	Gravity	Conservation of energy
12	Rigid Bodies	Newton's 2nd law, angular acceleration
13	Dynamics	Balancing torques
14	Energy	Sliding down bowl, velocity components
15	Kinematics	Projectile motion, limiting cases
16	Dynamics	Torque balance, static friction
17	Rigid Bodies	Momentum and energy of rod, center of mass
18	Fluids	Buoyant force, floating
19	Fluids	Hydrostatic force, buoyancy, pressure
20	Kinematics	Projectile motion, parabola
21	Fluids	Buoyant force, effective gravity
22	System of Masses	Inclined plane, acceleration constraint
23	Dynamics	Linear drag, quadratic drag
24	Gravity	Area of elliptical orbit
25	Dynamics	Rubber band around cylinder, linearization

Kinematics	4
Dynamics	8
Energy	1
Collisions	1
System of Masses	1
Rigid Bodies	3
Oscillatory Motion	1
Gravity	2
Fluids	3
Other	1
	25

2022B	Topic	Comment
1	Kinematics	Projectile motion, bouncing from inclined plane
2	Rigid Bodies	Moments of inertia around multiple axes
3	System of Masses	Center of mass, torque balance
4	Kinematics	Projectile motion, free fall frame
5	Kinematics	Relative velocity, average speed
6	Energy	Work-energy theorem, pushing a block
7	Dynamics	Atwood machine, effective mass
8	Kinematics	Projectile motion, bouncing from inclined plane
9	Dynamics	Pushing box on ground
10	Dynamics	Adding spring constants
11	Fluids	Buoyant force, atmospheric pressure
12	Dynamics	Pulleys on inclined plane, direction of friction
13	Collisions	Ballistic pendulum, angular momentum
14	Fluids	Surface energy, viscosity
15	Gravity	Centripetal force, thrust
16	Dynamics	Torque balance, block on inclined plane
17	Collisions	Elastic collision, center of mass frame
18	Oscillatory Motion	Mass-spring system, simple harmonic motion
19	Oscillatory Motion	Mass-spring system, angular oscillations
20	Rigid Bodies	Rolling without slipping, accelerating frame
21	Other	Error propagation
22	Gravity	Perigee of elliptical orbit, escape velocity
23	Energy	Energy of simple harmonic motion
24	System of Masses	Block sliding down ramp, energy conservation
25	System of Masses	Conservation laws, relative speed

Kinematics	4
Dynamics	5
Energy	2
Collisions	2
System of Masses	3
Rigid Bodies	2
Oscillatory Motion	2
Gravity	2
Fluids	2
Other	1
	25

2023	Topic	Comment
1	Kinematics	Average speed vs. average velocity
2	Dynamics	Centripetal and tangential acceleration
3	Kinematics	Bouncing ball on incline
4	Energy	Computing work, box on inclined plane
5	Dynamics	Atwood machine
6	Dynamics	Circular motion, small angle approximation
7	Dynamics	Sliding blocks, static friction
8	System of Masses	CM frame, two-body problem
9	Energy	Helium balloon, gravitational potential energy
10	Kinematics	Projectile motion, range equation
11	Kinematics	Range equation, height equation
12	Dynamics	Hanging mass, tension
13	Dynamics	Lifting a block, static friction
14	Rigid Bodies	Balancing torques, center of mass
15	Gravity	Gauss's law, orbit velocity
16	Oscillatory Motion	Simple pendulum, elastic collision
17	Rigid Bodies	Comparing moments of inertia
18	Fluids	Buoyant force, scale reading
19	Other	Error propagation
20	Oscillatory Motion	Simple pendulum, velocity components
21	Rigid Bodies	Conservation laws, two-body problem
22	Dynamics	Effective spring constant, free pulley
23	Gravity	Parallax, small angle approximation
24	Collisions	Elastic collisions, probability
25	Kinematics	Projectile motion, inclined plane

Kinematics	5
Dynamics	7
Energy	2
Collisions	1
System of Masses	1
Rigid Bodies	3
Oscillatory Motion	2
Gravity	2
Fluids	1
Other	1
	25

2024	Topic	Comment
1	Kinematics	Projectile motion
2	Dynamics	Circular motion, balancing forces
3	Dynamics	Linked rods, statics
4	Kinematics	Bouncing ball, kinetic energy
5	Dynamics	Block on inclined plane, normal force
6	Oscillatory Motion	Simple pendulum, velocity of oscillator
7	Kinematics	Motion graph
8	Rigid Bodies	Sliding rod, velocity constraints
9	Energy	Energy dissipation, coefficient of friction
10	Dynamics	Centrifugal force, springs
11	Fluids	Air pressure, balancing forces
12	Gravity	Computing torque
13	Dynamics	Atwood machine, limiting cases
14	System of Masses	Bead sliding on hoop, conservation laws
15	Other	Dimensional analysis, viscosity
16	Other	Dimensional analysis, projectile motion
17	Dynamics	Atwood machine, springs, conservation of string
18	Gravity	Elliptical orbits, orbit velocity
19	Oscillatory Motion	Physical pendulum, center of mass
20	Oscillatory Motion	Energy conservation, period of oscillation
21	Fluids	Bernoulli's principle, continuity equation
22	Gravity	Shell theorem, gravitational field
23	Collisions	Inelastic collisions, changing reference frames
24	Other	Dimensional analysis, quadratic drag
25	Rigid Bodies	Energy conservation, conservation of string

Kinematics	3
Dynamics	6
Energy	1
Collisions	1
System of Masses	1
Rigid Bodies	2
Oscillatory Motion	3
Gravity	3
Fluids	2
Other	3
	25

%	Avg appearance	TOTAL:	
14.39	3.60	Kinematics	81
22.38	5.60	Dynamics	126
11.37	2.84	Energy	64
7.82	1.95	Collisions	44
5.15	1.29	System of Masses	29
11.19	2.80	Rigid Bodies	63
7.82	1.95	Oscillatory Motion	44
7.99	2.00	Gravity	45
5.51	1.38	Fluids	31
6.39	1.60	Other	36
100.00	**25.00**		**563**

Other	Dimensional analysis, elasticities, waves, etc.