

1	Describe the Laws of Thermodynamics.	Nº1
2	Describe Thermodynamic Potentials.	Nº1
3	Explain operators and inverse operators, the uncertainty principle and the principle of superposition, matrices.	Nº1
4	Describe Schrödinger equation, flux density, linear oscillator, potential box, the transmission coefficient.	Nº1
5	Explain energy and momentum	Nº1
6	Explain transformation matrices, matrix density.	Nº1
7	Explain and describe angular momentum, eigenvalues and eigen functions, parity states.	Nº1
8	Describe the motion in a centrally symmetric field.	Nº1
9	Describe spherical coordinates, decomposition in plane waves.	Nº1
10	Explain Electrostatic and Gravitational Fields.	Nº1
11	Explain and describe Conductors, Semiconductors, Isolators.	Nº1
12	Explain Gauss's Law for Electric Fields.	Nº1
13	Explain Gauss's Law for Magnetism.	Nº1
14	Describe Maxwell's Equations.	Nº1
15	Describe Lorentz Force.	Nº1
16	Describe fields in a Medium.	Nº2
17	Explain and describe Diamagnetism, Paramagnetism and Ferromagnetism.	Nº2
18	Describe Black Body Radiation.	Nº2
19	Describe dispersion of Light.	Nº2
20	Explain and describe reflection and refraction.	Nº2
21	Describe the wavefunction.	Nº2
22	Explain Operators and States in Quantum Mechanics.	Nº2
23	Describe Harmonic Oscillator. Ladder Operators.	Nº2
24	Explain and describe emission and absorption of radiation. Tunnel.	Nº2
25	Explain exchange Interaction.	Nº2
26	Describe exchange energy and ferromagnetism.	Nº2
27	Explain and describe paradoxes in quantum mechanics.	Nº2
28	Describe Schrödinger Cat.	Nº2
29	Describe quantized fields and particles.	Nº2
30	Describe Dirac Equation.	Nº2

31	Describe and explain quantum electrodynamics. Unitarity.	Nº3
32	Describe FeynmanDiagrams.	Nº3
33	Explain and describe real and virtual particles in Feynman diagrams.	Nº3
34	Describe Compton Scattering, the formation of electron-positron pairs.	Nº3
35	Describe principle of Gauge Invariance. CPT Symmetry.	Nº3
36	Explain Electron Self-energy. Vacuum Polarization.	Nº3
37	Explain and describe theory of Weak Interactions.	Nº3
38	Dscribe YangMillsFields.	Nº3
39	Describe Nambu-GoldstoneTheorem.	Nº3
40	Explain and describe quantum numbers. Parity. C, P and T transformations.	Nº3
41	Explain Higgs Mechanism, Glashow Salam-Weinberg Model.	Nº3
42	Explain Neutrino Oscillations and Masses.	Nº3
43	Describe and explain Hadrons and Quarks, Quantum Chromodynamics.	Nº3
44	Dscribe GrandUnification.	Nº3
45	Explaininflation, supersymmetry, superstrings.	Nº3