



قائمة بعناوين المراجع الاختيارية

م	اسم الكتاب	الناشر	المؤلف	رقم الطبعة	الرقم الدولي
1	Chemistry	McGraw-Hill Education	Raymond Chang, Kenneth Goldsby	11th	ISBN 13: 9780071317870
2	Organic Chemistry, International Edition	Mary Finch, Brooks/Cole (Cengage Group),	John McMurry	^th	ISBN-13:978-0-8400-5453- ISBN-10:0-8400-5453-X
3	Inorganic Chemistry	Pearson Education Limited	Catherine E. Housecroft and Alan G. Sharpe	2nd	ISBN 0130-39913-2
4	Physical Chemistry	Houghton Mifflin	K. J. Laidler, J. H. Meiser, B. C. Sanctuary	4th	ISBN-13: 978-0618152926 ISBN-10: 061815292X
5	Quantitative Chemical Analysis	W. H. Freeman	Daniel C. Harris	^th	ISBN-10:1429263091 ISBN-13:978-1429263092 ISBN: 9781429218153
6	Spectrometric Identification of Organic Compounds	John Wiley & Sons, Inc	Robert M. Silverstein, Francis X. Webster, David J. Kiemle, David L. Bryce	^th	ISBN : 978-0-470-61637-6
7	Environmental Chemistry	CRC Press	Stanley Manahan, Stanley E. Manahan	9th	ISBN-10: 1420059203 ISBN-13: 978-1420059205



المواضيع التي يتضمنها الاختبار:

Content Specifications

I. GENERAL CHEMISTRY – 8%

- A. Chemistry Definition and its applications
- B. Significant Figures and Units and Measurements
- C. Orders of elements based on electronic configurations
- D. Naming of ionic and molecular compounds and their bonds properties
- E. Chemical calculations of elements compositions and Stoichiometry of reactions.

I. ANALYTICAL CHEMISTRY — 22%

- A. Data Acquisition and Use of Statistics — Errors, statistical considerations
- B. Solutions and Standardization — Concentration terms, primary standards
- C. Homogeneous Equilibria — Acid-base, oxidation-reduction, complexometry
- D. Heterogeneous Equilibria — Gravimetric analysis, solubility, precipitation titrations, chemical separations
- E. Instrumental Methods — spectroscopic methods, chromatographic methods, calibration of instruments
- F. Environmental Applications

II. INORGANIC CHEMISTRY — 22%

- A. General Chemistry — Periodic trends, oxidation states, nuclear chemistry
- B. Ionic Substances — Lattice geometries, ionic radii and radius/ratio effects
- C. Covalent Molecular Substances — Lewis diagrams, molecular point groups, VSEPR concept, valence bond description and hybridization, molecular orbital description, bond energies, covalent and van der Waals radii of the elements, intermolecular forces
- D. Concepts of Acids and Bases — Brønsted-Lowry approaches, Lewis theory, solvent system approaches



- E. Chemistry of the Main Group Elements — Electronic structures, occurrences and recovery, physical and chemical properties of the elements and their compounds
- F. Chemistry of the Transition Elements — Electronic structures, occurrences and recovery, physical and chemical properties of the elements and their compounds, coordination chemistry

III. ORGANIC CHEMISTRY — 28%

- A. Structure, Bonding and Nomenclature — Lewis structures, orbital hybridization, configuration and stereochemical notation, conformational analysis, systematic IUPAC nomenclature, spectroscopy (IR and ^1H and ^{13}C NMR)
- B. Functional Groups — Preparation, reactions, and interconversions of alkanes, alkenes, alkynes, dienes, alkyl halides, alcohols, ethers, epoxides, sulfides, thiols, aromatic compounds, aldehydes, ketones, carboxylic acids and their derivatives, amines, heterocyclic chemistry (five and six membered ring with one or two heteroatoms), reactivity of five and six membered rings.
- C. Reaction Mechanisms — Nucleophilic displacements and addition, nucleophilic aromatic substitution, electrophilic additions, electrophilic aromatic substitutions, eliminations, Diels-Alder and other cycloadditions
- D. Special Topics —aromaticity, antiaromaticity, amino acids, peptides, carbohydrates, polymers

IV. PHYSICAL CHEMISTRY — 20%

- A. Thermodynamics — First, second, and third laws, thermochemistry, ideal and real gases and solutions, Gibbs and Helmholtz energy, chemical potential, chemical equilibria, phase equilibria, colligative properties, statistical thermodynamics
- B. Chemical Reactions Kinetics and its applications
- C. Special Topics — Electrochemistry, Colloids, Kinetics, Phase Rules.