

SBI4U1-Biology 12 University-Exam Review

Exam Format and Guidelines

- Exam will be out of 180 and is 2 hrs in duration. Therefore budget your time.
- Student must bring pen, pencil, and calculator. Genetic code would be provided.
- Category breakdown; K/U=135, T/I=15, Com=15, and M/C=15.
- Part breakdown; True/False=10, Multiple Choice=30, Diagrams=15, Short Answer=125.
- Exam is about 10 double sided pages in length.
- Scantron will be used to record and evaluate the True/False and Multiple Choice questions.

Exam Content (Emphasis Points)

Biochemistry

- Isotopes vs isomers (difference, usefulness to society, radiometric tracers, examples from p10 table 2).
- Functional groups (recognize for unknown molecules).
- Intermolecular vs intramolecular forces with examples.
- Dehydration synthesis and hydrolysis for all macromolecules.
- Carbohydrates (structure, function, types, linkages, examples).
- Lipids (types, structure, function, examples).
- Proteins (types of a.a., structures; eg tertiary, function, examples).
- Protein folding (p46).
- Nucleic acids (DNA vs RNA, polymerization, p53).
- Energetics-thermodynamics (laws, exergonic vs endergonic, energy diagrams, Gibbs Free Energy, p65, Redox reactions).
- Enzymatics (induced-fit model p70, regulation; competitive, non-competitive, allosteric p73).
- Enzymes in society (3 examples p 76).

Metabolic Processes; Cellular respiration and Photosynthesis

- Stages of cellular respiration (reactants, products, site, types of reactions, diagram recognition and labeling, p114).
- Regulation of cellular respiration (4 points, p113).
- Lactic acid and alcoholic fermentation (reactants, products, occurrence, p119).
- Lipid catabolism (beta-oxidation, gluconeogenesis, p118).
- Chlorophyll (types, structure, p139).
- Molecular mechanism of stomata opening and closing (p143).
- Diagram labeling of mitochondria and chloroplast (p144).
- Light dependent and light independent reactions (reactants, products, site, types of reactions, diagram recognition and labeling).
- Chromatography (use, and Rf calculation, and interpretation, p163).
- C3, C4, and CAM plant photosynthesis (occurrence, intermediate reactants/products, energy requirements, 168).

Molecular Genetics

- Discovery of DNA (3 Classical experiments, p207-209)
- DNA replication (nature, enzymes, p221)
- DNA transcription (stages, enzymes, post-transcriptional modifications, p242)
- DNA translation (tRNA, sequence of events, post-translational modifications, p250)
- Genetic code (use)
- Mutations (5 types, examples, consequences, p263)
- Gene regulation (lac, trp operons, similarities and differences, p256)
- Biotechnology (gel electrophoresis, plasmids, restriction endonucleases, Sanger dideoxy sequencing, PCR, RFLP, p296-298)

Homeostasis

- Homeostasis (definition, rationale, example)
- Urine production (filtration, reabsorption, secretion, p351)
- Kidney structure (diagram, nephron)
- Homeostatic role of kidney (ADH, Aldosterone, pH balance, p353)
- Diseases of the kidney (D. mellitus vs D. insipidus, Bright's disease, p357)
- Endocrinology; hormonal mode and action (origin, function, target tissue, p376-377)
- Stress hormones (for long, and short term stress, p382)
- Reproductive hormones (p394, p398)
- Nervous system (divisions, p412)
- Motor vs sensory neuron (p413)
- Arc reflex (p416)
- Action potential (p420)
- Synaptic transmission (p423)
- Spinal cord, brain, eye, ear (structure, function, diagram labeling, p427-430, p439, p445)
- Non-specific immune response (1st line of defense, inflammation, p463)
- Antibodies (shape, production, types, applications, p487)
- Specific immune response (B-cells, T-cells; Killer, Helper, Suppressor, p469)
- Vaccines (discovery, and contributors, p482)

Evolution

- Contributors of the theory of natural selection (historical perspective, slide presentation)
- Fossils (types, use, radiometric dating)
- Theories of Catastrophism, and Uniformitarianism (p517)
- Homologous vs analogous features with examples (p523)
- Theory of Natural Selection (postulates of Darwin and Wallace, p530)
- Hardy-Weinberg principle (definition, word problems, p547)
- Genetic drift and Gene flow (definitions, and examples, p550-552)
- Types of selection (stabilizing, directional, disruptive, sexual with examples, p557)
- Speciation (species, allopatric/sympatric speciation with examples, p571, p574)
- Isolating mechanisms (ecological, mechanical, behavioural with examples, p572)
- Punctuated equilibrium, theory of gradualism (divergent, convergent, adaptive radiation, p599)