CISR NET Exam Pattern & Syllabus

Dear Candidates, We are providing the Latest Syllabus & Exam Pattern for CISR NET Recruitment 2017 which helps you to prepare for your Exam. The details descriptions of the Exam Pattern & Syllabus are as follows-

Selection Process

The candidate will be selected according to these selection procedures:

Written Test Paper Pattern

Sl.No	Name of the Subjects	No of Marks	Duration of the Exam
1.	Life Science		

2.	Mathematical Sciences	200	3 Hr
3.	Chemical Sciences		
4.	Physical Sciences		
5.	Earth Atmospheric		
6.	Ocean		
7.	Planetary Sciences		

LIFE SCIENCES

1. Molecules and their Interaction Relevant to Biology
2. Cellular Organization
3. Fundamental Processes
4. Cell Communication and Cell Signaling
5. Developmental Biology
6. System Physiology – Plant
7. System Physiology – Animal
8. Inheritance Biology
9. Diversity of Life Forms
10. Ecological Principles
11. Evolution and Behavior
12. Applied Biology
13. Methods in Biology

MOLECULES AND THEIR INTERACTION RELAVENT TO BIOLOGY

1. Structure of atoms, molecules and chemical bonds.
2. Composition, structure and function of bimolecular (carbohydrates, lipids, Proteins, nucleic acids and vitamins).
3. Stabilizing interactions (Van Waals, electrostatic, hydrogen bonding, hydrophobic interaction, etc.).
4. Principles of biophysical chemistry (pH, buffer, reaction kinetics, thermodynamics,
   Colligative properties).
5. Bioenergetics, glycolysis, oxidative phosphorylation, coupled reaction, group transfer, and biological energy transducers.
6. Principles of catalysis, enzymes and enzyme kinetics, enzyme regulation, mechanism of
   enzyme catalysis, isozymes
7. Conformation of proteins (Ramachandran plot, secondary structure, domains, motif
   And folds).
8. Conformation of nucleic acids (helix (A, B, Z), t-RNA, micro-RNA).
9. Stability of proteins and nucleic acids.
10. Metabolism of carbohydrates, lipids, amino acids nucleotides and vitamins.

CELLULAR ORGANIZATION

1. Membrane structure and function
   (Structure of model membrane, lipid belayed and membrane protein diffusion, osmosis,
   ion channels, active transport, membrane pumps, mechanism of sorting and regulation of intracellular transport, electrical properties of membranes).
2. Structural organization and function of intracellular organelles (Cell wall, nucleus,
   Mitochondria, Golgi bodies, lysosomes, endoplasmic reticulum, peroxisomes, plastids,
   vacuoles, chloroplast, structure & function of cytoskeleton and its role in motility).
3. Organization of genes and chromosomes (Operon, unique and repetitive DNA,

interrupted genes, gene families, structure of chromatin and chromosomes, heterochromatin, euchromatin, transposons).

4. Cell division and cell cycle (Mitosis and meiosis, their regulation, steps in cell cycle,regulation and control of cell cycle).
5. Microbial Physiology (Growth yield and characteristics, strategies of cell division, stress response)

FUNDAMENTAL PROCESSES

A) DNA replication, repair and recombination (Unit of replication, enzymes involved, replication origin and replication fork, fidelity of replication, extrachromosomal replicons, DNA damage and repair mechanisms, homologous and site-specific recombination).

B) RNA synthesis and processing (transcription factors and machinery, formation of initiation complex, transcription activator and repressor, RNA polymerases, capping, elongation, and termination, RNA processing, RNA editing, splicing, and polyadenylation, structure and function of different types of RNA, RNA transport).

C) Protein synthesis and processing (Ribosome, formation of initiation complex, initiation factors and their regulation, elongation and elongation factors, termination, genetic code, aminoacylation of t RNA, tRNA-identity, aminoacyl tRNA synthetase, and translational proof-reading, translational inhibitors, Post- translational modification of proteins).

D) Control of gene expression at transcription and translation level (regulating the expression of phages, viruses, prokaryotic and eukaryotic genes, role of chromatin in gene expression and gene silencing).

4. Cell communication and cell signaling

A) Host parasite interaction Recognition and entry processes of different

pathogens like bacteria, viruses into animal and plant host cells, alteration of host
cell behavior by pathogens, virus-induced cell transformation, pathogen-induced
diseases in animals and plants, cell-cell fusion in both normal and abnormal cells.

B) Cell signaling Hormones and their receptors, cell surface receptor, signaling through G-protein coupled receptors, signal transduction pathways, second messengers, regulation of signaling pathways, bacterial and plant twocomponent
systems, light signaling in plants, bacterial chemotaxis and quorum sensing.

C) Cellular communication Regulation of hematopoiesis, general principles of cell
communication, cell adhesion and roles of different adhesion molecules, gap junctions, extracellular matrix, integrins, neurotransmission and its regulation.

D) Cancer

Genetic rearrangements in progenitor cells, oncogenes, tumor suppressor genes,
cancer and the cell cycle, virus-induced cancer, metastasis, interaction of cancer
cells with normal cells, apoptosis, therapeutic interventions of uncontrolled cell growth.

E) Innate and adaptive immune system Cells and molecules involved in innate and adaptive immunity, antigens, antigenicity and immunogenicity. B and T cell
epitopes, structure and function of antibody molecules. generation of antibody diversity, monoclonal antibodies, antibody engineering, antigen-antibody interactions, MHC molecules, antigen processing and presentation, activation and differentiation of B and T cells, B and T cell receptors, humoral and cellmediated
immune responses, primary and secondary immune modulation, the complement system, Toll-like receptors, cell-mediated effector functions, inflammation, hypersensitivity and autoimmunity, immune response during bacterial (tuberculosis), parasitic (malaria) and viral (HIV) infections,

congenital
and acquired immunodeficiencies, vaccines.

DEVELOPMENTAL BIOLOGY

A) Basic concepts of development : Potency, commitment, specification, induction,
competence, determination and differentiation; morphogenetic gradients; cell fate and cell
lineages; stem cells; genomic equivalence and the cytoplasmic determinants; imprinting; mutants
and transgenics in analysis of development
B) Gametogenesis, fertilization and early development: Production of gametes, cell surface
molecules in sperm-egg recognition in animals; embryo sac development and double fertilization
in plants; zygote formation, cleavage, blastula formation, embryonic fields, gastrulation and
formation of germ layers in animals; embryogenesis, establishment of symmetry in plants; seed
formation and germination.
C) Morphogenesis and organogenesis in animals : Cell aggregation and differentiation in
Dictyostelium; axes and pattern formation in Drosophila, amphibia and chick; organogenesis –