Selection test for JRF in Human Genetics to be held in 2026 Syllabus of HGA (MCQ type) & HGB (descriptive answer type)

Cell Biology: Prokaryotic & eukaryotic cells; Nucleus and nuclear components; Cell division, cell cycle; Diversity of genomes; Transport across membrane; Cellular compartments and function, protein sorting; Mitochondria and chloroplast; Cell signaling; Germ cells; Stem cells; Cancer cells; Necrotic & Apoptotic cell death.

Biochemistry: Amino acids and proteins; Carbohydrates; Nucleotides and nucleic acids; Lipids; Vitamins; Hormones; Protein structure and functions, enzymes; Metabolism, metabolic pathways and metabolic diseases; Biochemistry of signal transduction; Biochemistry of hormone action.

Molecular Biology: Discovery of DNA as genetic material; Structure & function of DNA, RNA; Chromosomes, chromatin and function; Replication; Repair; Recombination; Transposons & retroposons; Transcription; RNA processing; Genetic code; Translation; Gene regulation in Prokaryotes and Eukaryotes; Genomic evolution & diversity.

Immunology: Immune system; B cell, T cell receptors and signalling; Antigens; Innate immunity; Cytokines and chemokine; The complement system; MHC, Antigen processing & presentation; T cell/B cell development, activation & differentiation; Adaptive immunity; Immunoglobulins; Antibody diversity; Antigen antibody reactions; Self Non-self-discrimination; Clonal selection; Leukocyte migration and inflammation; Autoimmunity; Tumour immunology.

Genetics: Information transfer DNA-RNA-Protein; genotype & phenotype; Pseudogenes; Mutation; Mendelian inheritance; Deviation from Mendelian inheritance, Linkage & Sex-linked inheritance; mitochondrial genetics, Recombination; Human genetics & genetic disorders; Population genetics; Immunogenetics; Genes and Evolution.

Epigenetics: DNA methylation; Non-coding RNAs; Chromatin remodelling; Histone modifications, Role of epigenetics in human diseases.

Genetic Engineering and techniques: Modern methodologies in cell/tissue culture; Chromosome techniques; PCR, qPCR; ELISA; Immunocyto/histochemical techniques; Radiolabelling of nucleic acids; Hybridization techniques; Protein DNA interaction; Antisense RNA; Cloning; Transformation & transfection; Gene editing; Next generation sequencing technologies and other molecular biology techniques.

Basic Statistics: Measures of central tendency and dispersion; Correlation and Regression; Binomial, Poisson and Normal Probability distributions; Test of significance, t-test; Chi-square test; F-test; basic nonparametric tests.