

KAKATIYA UNIVERSITY
U.G. Skill Enhancement Course - IV
(Under CBCS)
B.Sc. Final Year
SEMESTER - VI
(FOR ALL SCIENCE FACULTY DEPARTMENTS)

QUANTITATIVE APTITUDE TEST

Credits: 2

Theory: 2 hours/week

Marks - 40

Unit – I ARITHMETICAL ABILITY

- 1.1 Arithmetical Ability:** Ratio & Proportion
- 1.2 Arithmetical Ability:** Time & Work, Time & Distance
- 1.3 Arithmetical Ability:** Simple Interest, Compound Interest
- 1.4 Arithmetical Ability:** Stocks & Shares

Unit – II DATA INTERPRETATION

- 2.1 Data Interpretation:** Tabulation
- 2.2 Data Interpretation:** Bar Graphs
- 2.3 Data Interpretation:** Pie Charts
- 2.4 Data Interpretation:** Line Graphs

Text Book: Quantitative Aptitude by Dr. R.S. Aggarwal

KAKATIYA UNIVERSITY
U.G. B.Sc. Final Year (Under CBCS)
Semester – VI: Generic Elective Paper-II
(FOR ALL SCIENCE FACULTY DEPARTMENTS)

WATER RESOURCES MANAGEMENT

UNIT-I

1. Importance of Natural Resources – Different Types Resources
2. Significance of Water Resources and their uses
3. Conservation of water and recycling of the water – Global distribution of water
4. Water shed programmes and their management
5. Storing the rain water in tanks and recharging ground water.

Unit-II

6. Rain water harvesting in rural areas (chekdam, trenches etc.,)
7. Over use of surface and ground water and control measures.
8. Aims, objectives and implementation of Mission Bhagiratha (Telangana Government Drinking water programme)
9. Aims, objectives and implementation of Mission Kakatiya (Telangana Government minor irrigation programme)
10. Issues and challenges in Water Resources Management

KAKATIYA UNIVERSITY
U.G. BIOCHEMISTRY (Under CBCS)
B.Sc. Final Year (DSC-1F)
SEMESTER – VI

MOLECULAR BIOLOGY AND REGULATION OF GENE EXPRESSION

CREDITS: 3

MAXIMUM MARKS: 75

Unit – I: DNA Replication and Transcription

- 1.1. Organization of genome in prokaryotes and eukaryotes. Experimental evidences to prove nucleic acids as genetic material. Nature and structure of the gene.
- 1.2. DNA replication- models of replication (Meselson-Stahl's experiment). Okazaki fragments, Inhibitors of DNA replication.
- 1.3. Transcription – RNA synthesis, RNA polymerases of prokaryotes. Promoters, Initiation-sigma factors and their recognition sites. Elongation-role of core enzyme. Termination-rho dependent and rho independent.
- 1.4. RNA polymerase I, II and III of eukaryotes. Post transcriptional modifications.

Unit – II: Protein Synthesis

- 2.1 Introduction to protein synthesis-Genetic code, structure of t-RNA, deciphering of genetic code, Nirenberg's and Khorana's experiments,
- 2.2. Wobble hypothesis, degeneracy of genetic code.
- 2.3. Protein synthesis-activation of amino acids (aminoacyl t-RNA synthetases). Ribosome structure. Initiation, elongation and termination of protein synthesis.
- 2.4. Post-translational modifications-Phosphorylation & Glycosylation. Inhibitors of protein synthesis.

Unit – III: Regulation of Gene Expression

- 3.1.Regulation of prokaryotic gene expression – induction and repression,
- 3.2.Lac operon, catabolite repression.
- 3.3. Tryptophan operon and attenuation.
- 3.4. Positive and negative regulation

Unit-IV: Recombinant DNA technology

- 4.1. Cloning strategies. DNA sequencing – Maxam Gilbert and Sanger's methods. Tools of r-DNA technology: Restriction Enzymes, ligase, Cloning Vectors- Plasmids.
- 4.2.. c-DNA and Genomic libraries and their applications.
- 4.3. Polymerase chain reaction- principle and applications. Blotting techniques-Southern, Northern and Western.
- 4.4. Applications of gene cloning-production of insulin and human growth hormone, and edible vaccines.

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B.Sc. Final Year (DSC-1F)
SEMESTER – VI

MOLECULAR BIOLOGY AND REGULATION OF GENE EXPRESSION
(PRACTICALS)

CREDITS: 1

MAXIMUM MARKS: 25

1. Isolation of DNA from onion/liver/coconut endosperm.
2. Isolation of plasmids.
3. Determination of purity of nucleic acids by UV-spectrophotometric method.
4. Estimation of DNA by Diphenylamine method.
5. Estimation of RNA by Orcinol method.
6. Electrophoresis of Nucleic acids and visualization by Ethidium bromide.
7. Restriction mapping DNA with any two restriction enzymes.

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SEMESTER – VI
ELECTIVE
A - HUMAN PHYSIOLOGY

CREDITS: 3

MAXIMUM MARKS: 75

Unit 1 Homeostasis and the organization of body fluid compartments

- 1.1. Intracellular, extracellular and interstitial fluid.
- 1.2. Homeostasis, control system and their components.
- 1.3. Plasma as an extracellular fluid, RBC, molecular mechanism of blood coagulation, role of vitamin K in coagulation, anticoagulant and fibrinolytic systems.
- 1.4. Anemias, polycythemia, haemophilia and thrombosis.

Unit 2 Cardiovascular physiology

- 2.1. Pressure, flow and resistance. Anatomy of heart. Physiology of the cardiac muscle, automaticity of the cardiac muscle contraction, excitation contraction coupling,
- 2.2. Relationship between cardiac cycle, heart sound, control of cardiac function and output.
- 2.3. The arterial system, venous system. Portal circulations. Arterial pressure and its regulation.
- 2.4. Hypertension, congestive heart disease, atherosclerosis and myocardial infarction.

Unit 3 Respiration and Gastrointestinal physiology

- 3.1. Mechanism of respiration. Principles of gas exchange and transport.
- 3.2. Regulation of respiration. Pulmonary oedema and regulation of pleural fluid. Hypoxia, hypercapnea, pulmonary distress, emphysema.
- 3.3. Propulsion and motility of food and digested material. Secretory functions of the gastrointestinal tract,
- 3.4. Peptic ulcer, Sprue, celiac disease, IBD, regurgitation, diarrhea and constipation.

Unit 4 Musculoskeletal system and Biochemistry of Vision

- 4.1. Physiology of muscle contraction in striated and non-striated muscle.
- 4.2. Biochemistry of muscle contraction.
- 4.3. Physiology of Eye,
- 4.4. Biochemistry of vision.

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SEMESTER – VI
ELECTIVE
A - HUMAN PHYSIOLOGY (PRACTICALS)

CREDITS: 1

MAXIMUM MARKS: 25

1. RBC and WBC counting
2. Differential leucocyte count.
3. Clotting time & Bleeding Time.
4. Estimation of haemoglobin.
5. ESR
6. Determination of total iron binding capacity.
7. Case studies (Renal clearance, GFR, ECG).

SUGGESTED READINGS

1. Vander's Human Physiology (2008) 11th ed., Widmaier, E.P., Raff, H. and Strang, K.T., McGraw Hill International Publications (New York), ISBN: 978-0-07-128366-3.
2. Harper's Biochemistry (2012) 29th ed., Murray, R.K., Granner, D.K., Mayes and P.A., Rodwell, V.W., Lange Medical Books/McGraw Hill. ISBN:978-0-07-176-576-3.
3. Textbook of Medical Physiology (2011) 10th ed., Guyton, A.C. and Hall, J.E., Reed Elseviers India Pvt. Ltd. (New Delhi). ISBN: 978-1-4160-4574-8.
4. Fundamental of Anatomy and Physiology (2009), 8th ed., Martini, F.H. and Nath, J.L., Pearson Publications (San Francisco), ISBN: 10:0-321-53910-9 / ISBN: 13: 978-0321-53910-6.

KAKATIYA UNIVERSITY
U.G. BIOCHEMISTRY (Under CBCS)
B.Sc. Final Year (DSE-1F)
SEMESTER – VI
ELECTIVE
B - CELL BIOLOGY AND CANCER BIOLOGY

CREDITS: 3

MAXIMUM MARKS: 75

Unit 1 Cell Biology

- 1.1. Cell structure and functions. Cell organelles, their structure and functions.
- 1.2. Structure and functions of Plasma membrane and transport across plasma membrane
- 1.3. Structure of Nuclear Envelope; Nuclear Pore Complex; Transport Across Nuclear Envelope; Regulation of Nuclear Protein Import and Export.
- 1.4. Chromosomes – structure, types and giant chromosomes.

Unit 2 Cell-Cell Interaction

- 2.1. Cell-Cell Interactions and Cell-Matrix Interactions; Components of Extracellular Matrix;
- 2.2. Collagen and Non-Collagen Components; Tight Junctions; Gap Junctions; Desmosomes; Hemidesmosomes;
- 2.3. Focal adhesions and Plasmodesmata, Cell Wall
- 2.4. Role of Cell Interaction in development.

Unit 3 Cell Cycle and Programmed Cell Death

- 3.1. Overview of The Cell Cycle; Eukaryotic Cell Cycle; Events Of Mitotic Phase; Cytokinesis;
- 3.2. Events Of Meiosis and Fertilization;
- 3.3. Cell cycle and its regulation. Apoptosis and Necrosis.
- 3.4. Stem Cells and Maintenance of Adult Tissues, Hematopoiesis, Embryonic Stem Cells and Therapeutic Cloning.

Unit 4 Cancer Biology

- 4.1. Development and causes of Cancer and characteristics of cancer cells
- 4.2. Genetic Basis of Cancer; Oncogenes, Tumor suppressors and tumor Viruses; Molecular Approach to Cancer Treatment.
- 4.3. Cancer metabolism and invasion and metastasis
- 4.4. Stem cells – types and characteristics of stem cells and stem cells in therapeutics.

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SEMESTER – VI
ELECTIVE

B - CELL BIOLOGY AND CANCER BIOLOGY (PRACTICAL)

CREDITS: 1

MAXIMUM MARKS: 25

1. Isolation of organelles by sub-cellular fractionation.
2. Study of cell viability /death assay by use of trypan blue and MTT assay.
3. Identification and study of cancerous cells using permanent slides and photomicrographs.
4. Microscopic identification & cell cycle stages (onion bulb)

SUGGESTED READINGS:

1. Cooper, G.M. and Hausman, R.E. 2009 The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
2. Karp, G. 2010 Cell and Molecular Biology: Concepts and Experiments. 6 edition. John Wiley & Sons. Inc.
3. Alberts, B., Johnson,A., Lewis, J., and Enlarge, M. 2008 Molecular Biology of the Cell. 47
5th ed., Garland Science (Princeton),
4. Lodish, H., Berk, A., Zipursky, S.L., Matsudaira, P., Baltimore, D. and Darnell. J. 2012. Molecular Cell Biology. 7th ed., W.H. Freeman & Company (New York),
5. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009 The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco.