**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2017-2018)

# MICROBIOLOGY AND CELL BIOLOGY

**MODEL QUESTION PAPER**

**Time: 21/2 hrs. Marks :60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary.**  **3 x 10 = 30**M

**SECTION - A**

1. Write an essay on electron microscopy.
2. Explain different kinds of plasmids in bacteria and add notes on their functions.
3. Explain lysogenic cycle of bacteriophage.

**SECTION - B**

1. Write an essay classification of organisms based on nutrition.
2. What is sterilization and explain different methods of sterilization.
3. Explain different steps in mitosis.

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Contribution of Louis Pasteur.
2. Gram’s staining.
3. Dark field microscopy.
4. Differential media.
5. Classification of viruses basing on nucleic acids.
6. Classification of microorganisms basing on temperature requirements.
7. Short notes on batch cultures.
8. Structure and functions of mitochondria.
9. Prophase – I
10. Structure and functions of Golgi complex.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - I**

 **MICROBIOLOGY AND CELL BIOLOGY**

**QUESTION BANK**

**Module I**

**Essay questions**

1. Write an essay on contributions of Louis Pasteur and Robert Koch to development of microbiology.

2. Write an essay on electron microscopy.

3. Explain any three staining procedures.

**Short answer questions**

1. Contributions of Edward Jenner.
2. Numerical aperture and its importance.
3. Resolving power.
4. Dark field microscope.
5. Fluorescent microscopy.
6. Difference between TEM and SEM.
7. Endospore staining.
8. Flagella staining.

**Module II**

**Essay questions**

1. Give an essay on cell wall of gram positive and gram negative bacteria.
2. Define plasmid and explain different kinds of plasmids present in bacteria and add a note on its function.
3. Explain lysogenic cycle of bacteriophage along with neat diagrammatic representation
4. Write an essay on sub cellular structures of bacterial cell.

**Short answer questions**

1. Explain different kinds of bacteria based on its shape and size.
2. Endospore.
3. Short notes on Flagella.
4. Fimbriae.
5. Classification of viruses based on nucleic acids.
6. Symmetries of viruses.

 **Module III**

**Essay questions**

1. Describe classification of micro organisms based on their nutrition.
2. Explain about sterilization methods.
3. Describe about isolation and maintenance of pure cultures.
4. Explain physical conditions for the growth of micro organisms.

**Short answer questions**

1. Differential media.
2. Enriched and enrichment media.
3. Growth curve.
4. Continuous culture and batch cultures.
5. Chemical methods of sterilization.

**Module IV**

**Essay questions**

1. Explain different stages in mitosis with neat labelled diagrams.
2. Explain different stages in meiosis with neat labelled diagrams.
3. Describe the structure and function of nucleus.

**Short answer questions**

1. Golgi complex.
2. Mitochondria
3. Endoplasmic reticulum.
4. Lysosomes.
5. Cell cycle.
6. Chloroplast.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2017-2018)

**MACROMOLEULES AND ENZYMOLOGY**

**MODEL QUESTION PAPER**

**Time: 2 1/2 hrs. Marks :60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary.**  **3 x 10 = 30**M

**SECTION - A**

**UNIT - I**

1. Explain structure and functions of glucose and fructose. -
2. Explain any two repair mechanism of DNA.

**UNIT - III**

1. Describe in detail the Watson and Crick of DNA.

**SECTION - B**

**UNIT - II**

1. Explain polarity based classification of amino acids. -
2. Derive the Michaelis- Menten equation.

**UNIT - IV**

1. Write an essay on competitive inhibition.

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Structure and function of sucrose.
2. Mutarotation.
3. Secondary structure of proteins.
4. Classification of lipids.
5. Cholesterol.
6. A-DNA and Z-DNA.
7. DNA damage.
8. Hyaluronic acid.
9. Induced fit theory.
10. Effect of pH and temperature on enzyme activity.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - II**

**MACROMOLEULES AND ENZYMOLOGY**

**QUESTION BANK**

**Module I**

**Essay questions**

1. Explain structure and functions of glucose and fructose.
2. What are polysaccharides and explain structure and function of starch.
3. What are disaccharides and explain structure and functions of sucrose.
4. Explain classification of carbohydrates and properties of monosaccharide’s.

**Short answer questions**

1. Classification of carbohydrates.
2. Mutarotation.
3. Physiologically important glycosides.
4. Hyluronic acid.
5. Glycogen.

**Module II**

**Essay questions**

1. Write about Classification of amino acids.
2. Explain primary, secondary, tertiary and quaternary structure of proteins.
3. Write about classification of lipids.

**Short answer questions**

1. Peptide bond.
2. Properties of amino acids.
3. Properties of fatty acids.
4. Triacylglycerols.
5. Sphingolipids.
6. Structure and function of Cholesterol.

**Module III**

**Essay questions**

1. Describe in detail about the Watson and crick model of DNA.
2. Explain any two experimental proofs that DNA as genetic material.
3. Describe about DNA damage.
4. Explain any two repair mechanisms of DNA.

**Short answer questions**

1. Tobacco mosaic virus.
2. Forms of DNA.
3. Hershey and chase experiment.
4. Nucleosides and nucleotides.
5. Structure of nitrogen bases

**Module IV**

**Essay questions**

1. Derive Michaellis Menten equation.
2. Write an essay on enzyme inhibition kinetics.
3. Write about classification and nomenclature of enzymes.
4. Describe factors effecting enzymatic activity.

**Short answer questions**

1. Active site.
2. Substrate specificity.
3. Induced fit theory.
4. Holoenzyme.
5. Inhibitor and activator.
6. Lock and key mechanism

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2018-2019)

**BIOPHYSICAL** T**ECHNIQUES**

**MODEL QUESTION PAPER**

**Time: 21/2 hrs. Marks: 60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary.**  **3 x 10 = 30**M

**SECTION - A**

1. Write an essay on density gradient centrifugation.
2. Write an essay on paper chromatography.
3. Explain principle and procedure for Ion – exchange chromatography.

**SECTION – B**

1. Explain principle and procedure for SDS-PAGE.
2. Write an essay on applications of radioisotopes in biology.
3. Explain instrumentation of UV-Vis spectrophotometer.

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Spectrum of light.
2. Short notes on double beam spectrophotometer.
3. Applications of calorimeter.
4. Short notes on types of gels and glass beads.
5. Types of exchangers used in ion exchange chromatography.
6. Factors affecting Electrophoretic mobility.
7. Rate of radioactive decay.
8. Types of centrifuges.
9. Concept of RCF.
10. Short notes on sedimentation coefficient.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - III**

**BIOPHYSICAL** T**ECHNIQUES**

**QUESTION BANK**

**Module I**

**Essay questions**

1. Write an essay on preparative centrifugation.
2. What is principle of centrifugation and explain different types of centrifuges.
3. Write an essay on analytical centrifugation.

**Short answer questions**

1. Concept of RCF.
2. Sedimentation coefficient.
3. Differential centrifugation.
4. Short notes on ultracentrifuge.

**Module II**

**Essay questions**

1. Write an essay on paper chromatography.
2. Explain principle and procedure for ion exchange chromatography.
3. Write an essay on thin layer chromatography.
4. Explain principle and procedure for affinity chromatography.

**Short answer questions**

1. Partition coefficient.
2. Types of gels and glass beads.
3. Brief note on ligand attachment.
4. Types of resins.
5. Amino acid analyser.

**Module III**

**Essay questions**

1. Explain the instrumentation of UV and visible spectrophotometry.
2. What is Beer’s law and derive its equation.
3. Explain the instrumentation of Calorimeter.
4. Application of UV and visible spectrophotometry.

**Short answer questions**

1. Spectrum of light.
2. Beers law and its deviation.
3. Application of calorimetry.
4. Absorption of electromagnetic radiation.
5. Double beam spectrophotometer.

**Module IV**

**Essay questions**

1. Explain principle and procedure of agarose electrophoresis.
2. Write about biological applications of radioisotopes.
3. Explain principle and procedure of SDS-PAGE electrophoresis.
4. Describe basic principle and instrumentation for measurement of radioactivity.

**Short answer questions**

1. Factors effecting elecrophoretic mobility.
2. Solubilizers.
3. Units of radioactivity.
4. Rate of radioactive decay.

Detection and recovery methods of macromolecules in electrophoresis

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2018-2019)

**IMMUNOLOGY**

**MODEL QUESTION PAPER**

**Time: 2 1/2 hrs. Marks: 60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary.**  **3 x 10 = 30**M

**SECTION - A**

1. Write an essay on classification of immune system.

**Unit - I**

1. Explain structure and functions of different class of antibodies.
2. Write an essay on T-Cell mediated immunity.-

**Unit - III**

**SECTION – B**

1. Explain the following:

**Unit - II**

1. Precipitation reaction b) ELISA
2. Write an essay on production of monoclonal antibodies.

**Unit - IV**

1. Explain Type – I and Type – II hypersensitivity reactions.-

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Antigen – physico-chemical characteristics
2. Cell of immune system.
3. Agglutination reaction.
4. Short notes on SRID.
5. Short notes on cytokines.
6. Structure of MHC.
7. Phagocytosis.
8. Short notes on autoimmunity.
9. Short notes on types of vaccines.
10. Delayed type hypersensitivity.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - IV**

**IV Semester – IMMUNOLOGY**

**QUESTION BANK**

**Module I**

**Essay questions**

1. Write in detail about innate immune mechanism.
2. Explain structure and functions of secondary lymphoid organs.
3. Write an essay on cells of the immune system.
4. Define antibody and explain basic structure of antibody.
5. Explain structure and functions of different classes of antibody.

**Short answer questions**

1. Short notes on primary lymphoid organs.
2. Short notes on acquired immunity.
3. Complement system.
4. Factors affecting antigenecity.
5. Short notes on Humoral immunity

**Module II**

**Essay questions**

1. Write in detail about ELISA and its types.
2. What are monoclonal antibodies and explain procedure for production of monoclonal antibodies.
3. Explain any three antigen-antibody reactions.

**Short answer questions**

1. Applications of monoclonal antibodies.
2. Short notes on complement fixation.
3. Short notes on immunodiffusion.

 **Module III**

**Essay questions**

1. Write in detail about cell mediated immunity.
2. Define MHC and explain structure of different classes of MHC molecules.

**Short answer questions**

1. Short notes on phagocytosis.
2. ADCC.
3. Role of MHC in organ transplantation.
4. Short notes on cytokines.

**Module IV**

**Essay questions**

1. Define hypersensitivity and explain type-I and type-II hypersensitivity reactions.
2. Define vaccines and explain different types of vaccines with examples.
3. Explain in detail about type-III and type-IV hypersensitivity reactions.

**Short answer questions**

1. Short notes on autoimmune response.
2. What are second generation vaccines.
3. Delayed type hypersensitivity.
4. Erythroblastosis fetalis.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2019-2020)

**Paper – V GENETICS AND MOLECULAR BIOLOGY**

**MODEL QUESTION PAPER**

**Time: 21/2 hrs. Marks: 60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessar**  **3 x 10 = 30**M

**SECTION - A**

1. Describe Mendel’s laws and deviations.

**Module - I**

1. Describe Recessive and dominant epistatic gene interactions.
2. Explain steps in DNA replication process with neat labeled diagram. **Module - III**

**SECTION – B**

1. Describe chromosome abnormalities in animals.

**Module - II**

1. Define mutation and explain different types of gene mutations.
2. What is transcription and explain steps in transcription process **Module IV**

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Short notes on Pleiotropism.
2. Short notes on multiple alleles.
3. Short notes on linkage.
4. Capping.
5. Define promoter and explain different types of promoters in transcription.
6. Modes of DNA replication.
7. Short notes on types of DNA polymerases.
8. Action of DNA ligase.
9. Short notes on chemical mutagens.
10. Short notes on RNA polymerase

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - V**

 **GENETICS AND MOLECULAR BIOLOGY**

**QUESTION BANK**

**Module I**

**Essay questions**

1. Explain Mendel’s laws with examples.
2. Describe dominant epistatic gene interactions.
3. Describe Recessive epistatic gene interactions.
4. Write an essay on deviations of Mendel’s laws.

**Short answer questions**

1. Short notes on penetration.
2. Short notes on Pleiotropism.
3. Short notes on multiple alleles.
4. Define test cross and back cross with examples.

**Module II**

**Essay questions**

1. Describe the concept of recombination.
2. Write an essay on chromosomal abnormalities in animals.
3. Describe the concept of linkage.
4. Define mutation and explain different types of gene mutations.
5. Define mutagen and explain physical and chemical mutagens with examples.
6. Explain eukaryotic gene structure.

**Short answer questions**

1. Structure of gene.
2. Hardy Weinberg equation.
3. Short notes on chromosomal abnormalities in plants.
4. Short notes on gene maps.
5. What is non-disjunction and explain its consequences.

**Module III**

**Essay questions**

1. Write an essay on enzymology DNA replication.
2. Explain the process of DNA replication with neat labelled diagrams.
3. What are different modes of DNA replication and explain experiment that proves DNA replication is semi-conservative.

**Short answer questions**

1. Types of DNA polymerases and their role in replication.
2. Short notes on lagging strand synthesis.
3. Action of DNA ligase.
4. Short notes on replication origin and primosome formation.
5. Explain role of DNA gyrase in replication process.

**Module IV**

**Essay questions**

1. Define transcription and explain steps involved in prokaryotic transcription process with neat labelled diagrams.
2. Explain steps involved in eukaryotic transcription process with neat labelled diagrams.
3. Write an essay on post-transcriptional modifications.

**Short answer questions**

1. Structure of RNA polymerase.
2. Define promoter and explain different types of promoters in transcription.
3. Short notes on regulation of transcription process.
4. Short notes on reverse transcription.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2019-2020)

**Paper – VI GENE EXPRESSION AND rDNA TECHNOLOGY**

**MODEL QUESTION PAPER**

**Time: 21/2 hrs. Marks: 60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessar**  **3 x 10 = 30**M

**SECTION - A**

1. What is genetic code and Explain characteristics of genetic code.
2. Explain steps in translation process with labeled diagrams.
3. Define operon and explain lac operon system in bacteria.

**SECTION – B**

1. Define vector and explain plasmid vectors used in rDNA technology.
2. Describe bacterial transformation process.
3. Explain steps involved in construction of cDNA libraries.

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Short notes on wobble hypothesis.
2. Structure of tRNA.
3. Components of operon.
4. Short notes on trp operon.
5. Short notes on Gal operon.
6. Short notes on restriction endonucleases.
7. Short notes on phage vectors.
8. Explain steps in PCR.
9. Applications of rDNA technology.
10. Features of expression vectors.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - V**

 **GENE EXPRESSION AND rDNA TECHNOLOGY**

**QUESTION BANK**

**Module I**

**Essay questions**

1. What is genetic code and explain characteristics of genetic code.
2. Explain steps in translation process with labeled diagrams.
3. Write an essay on regulation of translation process.
4. Explain structure of tRNA and add notes on role of aminoacyl synthetases in translation process.

**Short answer questions**

1. Wobble hypothesis.
2. Antibiotics affecting translation process.
3. Role of Shine-Dalgarno sequence in translation process.
4. Structure of ribosome with labelled diagram.

**Module II**

**Essay questions**

1. Define operon and explain components of operon with their role in regulation process.
2. Explain Lac operon with neat labelled diagram.
3. Explain Gal operon with neat labelled diagram.

**Short answer questions**

1. Short notes on Trp operon
2. Positive regulation of Lac operon.
3. Structure of gene.
4. Define gene and classify gene with respect to their expression.

 **Module III**

**Essay questions**

1. Write an essay on enzymology DNA replication.
2. Explain the process of DNA replication with neat labelled diagrams.
3. What are different modes of DNA replication and explain experiment that proves DNA replication is semi-conservative.

**Short answer questions**

1. Types of DNA polymerases and their role in replication.
2. Short notes on lagging strand synthesis.
3. Action of DNA ligase.
4. Short notes on replication origin and primosome formation.
5. Explain role of DNA gyrase in replication process.

**Module IV**

**Essay questions**

1. Define mutation and explain different types of gene mutations.
2. Define mutagen and explain physical and chemical mutagens with examples
3. Define transcription and explain steps involved in transcription process with neat labelled diagrams.

**Short answer questions**

1. Structure of RNA polymerase.
2. Define promoter and explain different types of promoters in transcription.
3. Short notes on regulation of transcription process.
4. Short notes on reverse transcription.
5. Short notes on genome.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2019-2020)

**SEMESTER - VI**

**Elective A: BIOSTATISTICS, BIOINFORMATICSAND IPRs**

**MODEL QUESTION PAPER**

**Time: 21/2 hrs. Marks: 60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary**  **3 x 10 = 30**M

**SECTION – A**

1. Write essay on data collection methods and its merits and demerits?
2. Write an essay on concept of probability distribution and its applications in biology.
3. Write about concept of poisson distribution.

**SECTION – B**

1. Explain the procedure for searching a sequence in database using BLAST.
2. What are Biological databases? Differentiate between primary and secondary databases.
3. Write essay on intellectual property rights.

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Represent the given data graphically through histogram.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Plant Height (Cm) | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| Number of verities | 5 | 9 | 15 | 22 | 25 |

1. Short notes on mode.
2. Short notes on standard deviation.
3. Briefly explain probability addition theorem.
4. Short notes on binomial distribution.
5. BLOSUM.
6. Short notes on data retrieval from databases.
7. International organizations and agencies related to IPR.
8. Importance of intellectual property rights.
9. Treaties related to IPR.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - VI**

**BIOSTATISTICS, BIOINFORMATICSAND IPRs**

**QUESTION BANK**

**Module I**

**Essay questions**

1. Write essay on data collection methods, its merits and demerits.
2. What is standard deviation. Calculate standard deviation for the given data. Variable (χ) = 10,13,17,22,27,30,31.
3. Explain mean, median and mode with examples.
4. Write an essay on sampling.

**Short answer questions**

1. Represent the given data through Bar diagram

|  |  |
| --- | --- |
| **Mutants** | **Frequency** |
| Albina | 50 |
| Chlorina | 30 |
| Virids | 25 |
| Chloro viridis | 20 |

1. Represent the given data graphically through histogram.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Plant Height(CM) | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
| No.Of Varities | 5 | 7 | 6 | 10 | 12 |

1. Short notes on tabulation of data.
2. Short notes on frequency polygon.
3. ANOVA.
4. Short notes on standard deviation.

**Module II**

**Essay questions**

1. Write about concept of binomial distribution. Calculate the probability of getting two males in three child births.
2. Write about the concept of poisons distribution. If alpha particles are emitted by radio active source at the rate of 3 per every minute on the average and the number of particles is distributed according to Poisson distribution. Calculate the probability of getting exactly 5 emissions in one minute. e=2.71
3. Write an essay on Normal distribution
4. Write an essay on Standard distributions.

**Short answer questions**

1. Short notes on random variable.
2. Briefly explain probability addition theorem.
3. Briefly explain probability multiplication theorem.

 **Module III**

**Essay questions**

1. Write an essay on biological databases.
2. Write the procedure for searching a sequence in data base using BLAST.
3. Write an essay on Multiple sequence alignment.

**Short answer questions**

1. Data retrival tools.
2. Short notes on BLOSUM.
3. Short notes HTML, HTPP.

**Module IV**

**Essay questions**

1. Write an essay on intellectual property rights.
2. Write an essay on importance of intellectual property right

**Short answer questions**

1. International organizations and agencies related to IPR.
2. Treaties related to IPR.
3. Infringement of IPR.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2019-2020)

**SEMESTER - VI**

**Cluster Elective- A1: PLANT AND** **ANIMAL BIOTECHNOLOGY**

**MODEL QUESTION PAPER**

**Time: 21/2 hrs. Marks: 60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessar**  **3 x 10 = 30**M

**SECTION – A**

1. Describe the constituents of plant tissue culture media.
2. Write an essay on protoplast culture.
3. Write an essay on applications of transgenic plants.

**SECTION – B**

1. Write an essay on IVF.
2. Write an account on culture media for animal cells.
3. Explain steps involved in production of insulin.

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Short notes on physical methods of sterilization.
2. Induction of callus.
3. Short notes on laboratory facilities needed for tissue culture.
4. Short notes on somatic hybridization.
5. Ti-Plasmid.
6. Short notes on cell-lines.
7. Explain laboratory facilities needed for animal cell culture.
8. Explain characteristics of cells in animal cell culture.
9. Types of vaccines.
10. Short notes on gene therapy.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - VI**

**Cluster Elective- A1: PLANT AND** **ANIMAL BIOTECHNOLOGY**

**QUESTION BANK**

**Module I**

**Essay questions**

1. Write about laboratory facilities and physical environment in plant tissue culture.
2. What is MS media and explain composition of MS media.
3. Define sterilization and explain different methods of sterilization techniques.

**Short answer questions**

1. What is explants and importance of explants in plant tissue culture?
2. Define callus and explain callus culture.
3. Role of growth regulators in plant tissue culture media.
4. Short notes on single cell clones.

**Module II**

**Essay questions**

1. Write an essay on micropropagation .
2. Explain protoplast culture and its importance.
3. Explain organization of Ti plasmid and its importance in plant tissue culture.
4. Haploids production and their significance in plant tissue culture.

**Short answer questions**

1. Short notes somatic hybridization.
2. Applications of transgenic plants.
3. Short notes on indirect regeneration.

**Module III**

**Essay questions**

1. Write an essay on culture media used for animal tissue culture.
2. Write essay on characteristics of cells in culture.
3. Write an essay on maintenance of cell lines in laboratory.

**Short answer questions**

1. Short notes on growth factors in animal cell culture.
2. Laboratory facilities for animal cell culture.
3. Immortal cell lines.
4. Culture vessels used for animal cell culture.

**Module IV**

**Essay questions**

1. Explain steps involved in production of insulin.
2. Explain steps involved in production of somatostatin.
3. Gene therapy and its significance.
4. Describe in detail about the process of IVF.

**Short answer questions**

1. Define vaccines and explain types of vaccines.
2. Short notes on gene therapy.
3. Applications of IVF.
4. Briefly explain steps in production of hepatitis.
5. Applications of transgenic animals.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2019-2020)

**SEMESTER - VI**

**Cluster Elective A2: ENVIRONMENTAL BIOTECHNOLOGY**

**MODEL QUESTION PAPER**

**Time: 2 1/2 hrs. Marks: 60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessar**  **3 x 10 = 30**M

**SECTION – A**

1. Describe in detail about Water ecosystem.
2. Explain Bio-geo chemical cycle of Nitrogen.
3. Write an essay on role of biotechnology in pollution control.

**SECTION – B**

1. Write about effluent treatment from paper industry.
2. Write in detail about solid waste management.
3. Explain Bioremediation.

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Short notes on terrestrial ecosystem.
2. Darwin and Odum definitions for ecosystem.
3. Explain reasons for land pollution.
4. Short notes on Superiority biological indicators.
5. Short notes on environmental monitoring.
6. Short notes on *Bt* biocide and its importance.
7. Explain aerobic treatment of waste water.
8. Short notes on In-situ bioremediation.
9. Short notes on role of genetically engineered microbes in the environmental management.
10. Explain genetically modified organisms with examples.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - VI**

**Cluster Elective A2: ENVIRONMENTAL BIOTECHNOLOGY**

**QUESTION BANK**

**Module I**

**Essay questions**

1. Describe in detail about water ecosystem.
2. Describe in detail about terrestrial ecosystem.
3. Write in detail about carbon cycle.
4. Write in detail nitrogen cycle and its importance in ecology

**Short answer questions**

1. Role of microbes in bio-geochemical cycles.
2. Significance of bio-geochemical cycles in ecosystem.
3. Short notes on aquatic ecosystem.

**Module II**

**Essay questions**

1. Write an essay on organic and inorganic pollutants of water and their effects.
2. Describe different methods of prevention of pollution.
3. Write an essay on environmental monitoring

**Short answer questions**

1. Short notes on biological indicators.
2. Short notes on green house effect.
3. Organic pollutants of air.
4. Short notes on acid rains.

**Module III**

**Essay questions**

1. Give an account of Biocides.
2. Write an essay on different treatment methods used in waste water treatment.
3. Mention different effluent treatment methods for pulp and paper industry.
4. Write an essay on solid waste management.

**Short answer questions**

1. Trickling filters.
2. Sludge digestion.
3. Briefly explain effluent treatment methods of fertilizer industry.
4. Short notes on bioreactors.

**Module IV**

**Essay questions**

1. Explain different types of Bioremediation.
2. Give an account on the role of genetically modified organisms in environmental management.

**Short answer questions**

1. Methanogens.
2. Xenobiotics.
3. Factors effecting biodegradation.
4. Short notes on recalcitrant compounds.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

 (WITH EFFECTIVE FROM 2019-2020)

**SEMESTER - VI**

**Cluster Elective- A3: INDUSTRIAL BIOTECHNOLOGY**

**MODEL QUESTION PAPER**

**Time: 21/2 hrs. Marks: 60M**

**PART - I**

 **Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessar**  **3 x 10 = 30**M

**SECTION – A**

1. Define sterilization and explain different sterilization techniques used for media and glassware.
2. Write an essay on different types of media used in fermentation technology.
3. Write an essay on continuous fermentation.

**SECTION – B**

1. Explain different steps involved in production of Citric acid.
2. Describe the production of Baker’s Yeast.
3. What is Hybridoma technology and explain production of monoclonal antibodies.

**PART – II**

 **Answer any SIX Questions. 6 x 5= 30M**

1. Short notes on Precursors.
2. Short notes on preservation techniques.
3. Bubble column bioreactor.
4. Short notes on fed-batch bioreactor.
5. Short notes on basic principles of bioreactor.
6. Molasses.
7. Steps involved in production of wine.
8. Short notes on solid state fermentation.
9. Short notes on SCP production.
10. Short notes on recombinant vaccines.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**SEMESTER - VI**

**Cluster Elective A3: INDUSTRIAL BIOTECHNOLOGY**

**QUESTION BANK**

**Module I**

**Essay questions**

1. Give an account on sterilization of media, equipment and preparation of inoculation for fermentation.
2. Write an essay on different types of media used in fermentation technology.
3. Write an essay on different isolation and screening methods of industrially important microorganisms.

**Short answer questions**

1. Short notes on Precursors.
2. Short notes on antifoam agents and its importance.
3. Short notes on preservation methods of microorganisms.
4. Short notes on strain improvement.

**Module II**

**Essay questions**

1. Write an essay on bioreactor.
2. Explain different types on bioreactors.
3. Write an essay on continuous cultures.

**Short answer questions**

1. Bubble column bioreactor.
2. Fluidized bed reactor.
3. Short notes on batch culture.
4. Short notes on fed batch culture.

 **Module III**

**Essay questions**

1. Explain different steps involved in production of Citric acid.
2. Explain steps involved in production of wine.

**Short answer questions**

1. Molasses.
2. Steps in ethanol production.
3. Short notes on solid state fermentation.
4. Short notes on submerged fermentation.

**Module IV**

**Essay questions**

1. Describe the production of Baker’s Yeast.
2. What is Hybridoma technology and explain production of monoclonal antibodies.
3. Describe the production of enzyme amylase.
4. Write an essay on synthesis of recombinant Growth Hormone.

**Short answer questions**

1. Short notes on SCP production.
2. Penicillin structure.
3. Short notes on recombinant Hepatitis-B vaccine.
4. Applications of industrial biotechnology.