

SIXTH SEMESTER

Z 6.1 GENETICS AND BIOTECHNOLOGY

40 Marks

Code : **Z-6.1**

Univ Code :

Contact Hours :54

Work load : 3 hours per week

Credit Points :

Evaluation: Continuous Internal Assessment - 30 marks
Semester End Examination - 70 marks

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| 1. INTRODUCTION TO GENETICS
Mendelian Genetics and its practical applications, Mendelian laws with examples,,
Back cross and test cross. | 4 hrs |
| 2. MULTIPLE ALLELES
Concept of multiple alleles, coat colour in Rabbit, ABO & Rh factor Blood group system.
Concept of multi genes (polygenic inheritance) with reference to skin colour in man. | 4 hrs |
| 3. GENE INTERACTION
Concept of gene interaction, co-dominance and incomplete dominance. Complementary factors (9:7), Supplementary factors(9:3:4), Inhibitory factors(13:3), Duplicate dominant factors (15:1), Lethal genes (dominant and recessive), Epistasis | 6 hrs |
| 4. CHROMOSOMES
Introduction to morphology, composition and classification based on centromere position, types of chromosomes (autosomes, sex chromosomes, polytene and lampbrush chromosomes). Chromosomal aberrations: numerical and structural | 4 hrs |
| 5. SEX- DETERMINATION
Chromosomal : XX-XY ,ZZ-ZW ,XX-XO methods, Haploid-Diploid, parthenogenesis, Gynandromorphy. Environmental- Sex determination in Bonellia | 4 hrs |
| 6. HUMAN GENETICS
Preparation and analysis of human karyotype. Syndromes - autosomal abnormalities :Down's (Mongolism), Criduchat syndrome. Sex chromosomal abnormalities in man: Klinefelter and Turner syndrome. Inborn errors of metabolism: albinism, phenylketonuria and alkaptonuria | 4 hrs |
| 7. SEX LINKED INHERITANCE IN HUMAN
Colour-blindness, Haemophilia and hypertrichosis. Sex -influenced genes- Pattern baldness in human | 2 hrs |
| 8. NUCLEIC ACIDS
Structure of DNA, Types of DNA-A,B,Z & H forms, Types of RNA and its functions. Physio-chemical properties of DNA. DNA as genetic material- evidences. RNA as genetic material in viruses | 2 hrs |
| 9. Central Dogma of Molecular Biology
DNA replication in prokaryotes, eukaryotes. Types of replication, experimental proof that DNA replication is semi conservative type. Components of protein biosynthesis, mechanism of protein biosynthesis. Genetic code, properties of genetic code, wobble hypothesis. | 4 hrs |
| 10. Regulation of Gene Activity:
Gene regulation in prokaryotes-Lac operon concept | 2 Hrs |
| 11. Genetic engineering:
Tools used in r-DNA technology. Applications of genetic engineering in medicine and agriculture | 2 Hrs |

REFERENCE BOOK

1. Molecular biology of cell, 3rd, 4th edition, Alberts B.D. Lewis J. Raff M. Roberts K. And Watson.
2. Gene, Vol. V,VI,VII,VIII and IX, Lewis B., Oxford University Press, Oxford.
3. Molecular biology of the genes, 1993, Watson J. Hopkins, Roberts Steitz & Weiner, Benjamin Cummings.
4. Cell and molecular biology, 1996, G. Karp, John Willey & Sons, U.S.A. Text Book of Molecular Biology, 1994, K. Sivarama sastry G. Padmanabhan and C. Subramanyam : Macmillan, India

**SYLLABUS FOR PRACTICAL ZP 6.1
BASED ON PAPER Z – 6.1
GENETICS AND BIOTECHNOLOGY**

1. Genetic problems: Monohybrid inheritance
2. Genetic problems: Dihybrid inheritance
3. Genetic problems: Multiple alleles-ABO blood group in human
4. Detection of A, B and O blood groups and Rh factors; explain the inheritance.
5. Sex-linked inheritance in Drosophila.
6. Interaction of genes (two problems).
7. Sex-linked inheritance in humans
8. Calculation of allele frequency-ABO blood group in humans, Rh factor and calculating frequency of occurrence
9. General morphology of Drosophila and identification of different mutants in drosophila (dominant mutation, recessive, pleotrophic mutation and bar eye
10. Preparation of salivary gland chromosomes of Drosophila/ Chironomus larvae
11. Study tour is compulsory, students are supposed to submit the brief tour report at the time of practical examination

**FORMAT OF QUESTION PAPER FOR
PRACTICAL Z-P.6.1
GENETICS, MOLECULAR BIOLOGY AND BIOTECHNOLOGY**

Maximum Marks : 40

Q.1	Squash preparation of salivary gland chromosome of Drosophila/ Chironomous larvae	:	10 x 1 = 10
Q.2	Detection of blood group (A,B,O) and Rh-factor. Give the genetic Significance	:	5 x 1 = 5
Q.3	Genetic problem (monohybrid).	:	05
Q.4	Genetic problem (dihybrid/ multiple alleles)	:	05
Q.5	problem on sex-linked inheritance/ interaction of genes	:	05
Q.6	Viva voce	:	05
Q.7	Record Book	:	05

Key note to the Examiners:

1)For Question no 1-in case of lack material in the college, the candidates are asked to write the characters of salivary gland chromosome with a neat labelled diagram and also to write the Procedure and staining of Salivary gland chromosome of chironomous larvae.