

**GUJARAT NATIONAL LAW UNIVERSITY  
GANDHINAGAR**

Course: Cytology and Genetics  
Semester-I (Batch: 2019-24)

End Semester Examination: October-2019

Date: 23<sup>rd</sup> October, 2019

Duration: 2 hours

Max. Marks: 40

**Instructions:**

- Read the questions properly and write the answers in the given answer book.
- The respective marks for each question are indicated in-line.
- Do not write anything on the question paper.
- Indicate correct question numbers in front of the answers.
- No questions or clarifications can be sought during the exam period, answer as it is, giving reason, if any.
- Draw **diagrams only with pencil**.

Q.1 Write short note on **any three** of the following.

**Marks**  
(3x2=  
06)

- (a) Model organisms
- (b) Amniocentesis
- (c) Mutagens
- (d) Bombay Phenotype

Q.2 Answer **any four** of the following.

(4x4=  
16)

- (a) What is genetic code? What are the three important properties of genetic code?
- (b) Differentiate between eugenics, cuthenics and euphenics.
- (c) Describe apoptosis.
- (d) Explain sex-linked inheritance with an example.
- (e) A woman bears a child with erythroblastosis at her second delivery. She never had a blood transfusion. Based on this information, classify the woman her husband and both children as to Rh type. Also add a brief note on erythroblastosis fetalis.

Q.3 Answer **any three** of the following briefly.

(3x6=  
18)

- (a) What is conjugation in bacteria? Compare conjugation between F<sup>+</sup> x F<sup>-</sup> strain and Hfr x F<sup>-</sup> strain.
- (b) Differentiate between autopolyploids and allopolyploids. Add a note on evolutionary significance of polyploidy.
- (c) Cystic fibrosis is a genetic disorder in homozygous recessives that causes death during the teenage years. If 4 in 10,000 newborn babies have the **disease**, what are the expected frequencies of the three genotypes in newborns, assuming the population is at Hardy Weinberg equilibrium? Why is this assumption not correct?
- (d) John Jones has been working in a nuclear power plant for 15 years and has applied for a medical discharge because of the emergence of tumors in different parts of his

body, all of which are attributed to a genetic condition called Von Hippel Lindau syndrome. In spite of these cancers, John has been an exemplary employee.

John learns that some workers who developed cancer were eligible for a substantial compensation from the employer. The company regulations governing qualification for the compensation package exempt diseases that are "hereditary and/or genetic" on the assumption that these diseases were incurred prior to employment with the company. Without this additional compensation, John's medical benefits do not cover a majority of his medical expenses and he is very concerned about his support to his family.

John is denied the compensation package. However, John appealed his employer's decision and won a medical discharge when he was able to present evidence that environmental, as well as genetic factors may have played a role in the development of his tumors.

- (a) Is it fair for employers to differentiate between employees who have a condition with a known genetic basis and those with a medical condition not identified as genetic?
- (b) What all are covered under genetic information?
- (c) What all are not covered under genetic information?
- (d) Which federal law protects people from genetic discrimination? Add a note on it.

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