

**GUJARAT NATIONAL LAW UNIVERSITY  
GANDHINAGAR****Course: Microbiology and Genetics  
Semester-I (Batch: 2015-20)****End Semester Examination: Oct-Nov. 2015****Date: 02<sup>nd</sup> November, 2015****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.

**Marks****Part - A**

- Q.1 Write short notes on *any five* of the following. ( word limit, max.: 20 words) (5x2 =10)
- (a) Cell cycle check points
  - (b) Significance of polyploidy
  - (c) IPPC
  - (d) Prions
  - (e) Euthenics
  - (f) Plant quarantine
- Q.2 Answer *any six* of the following. (6x3 =18)
- (a) What is apoptosis? What are the major cellular changes during apoptosis?
  - (b) Briefly discuss five important economic uses of fungi.
  - (c) A two year old baby was brought to the emergency ward, as they noted black discoloration on the diaper. They had delayed disposing one of the child's diapers and noted black discoloration where the urine had collected. Later, they realized that urine upon standing turns black. Identify the metabolic disorder. Briefly describe the amino acid pathway that is affected in this phenomenon.
  - (d) What is Hardy-Weinberg equilibrium? Briefly discuss the conditions necessary for the maintenance of this equilibrium in any population?
  - (e) Briefly describe the various types of microbial interactions.
  - (f) What is genetic code? What are the three important properties of genetic code?
  - (g) What is mutation? How does mutation act?
- Q.3 Answer *any three* of the following: (3x4 =12)
- (a) Explain quantitative inheritance with an example.
  - (b) Mr. Alex died and left all of his money in the name of his two children. Because of Mr. Alex's prominent role in society, his death made news headlines. Shortly after, a young man named Toms who claimed to be Mr. Alex's long lost son arrived and demanded his share in the inherited property. Mr. Alex's two children and their lawyers are sceptical and refused this young man the property, so he sued. The

judge ordered blood tests for all of the family. Mr. Alex's blood type, as it appears on his hospital records, is **AB**. His wife had blood type **A**. Mr. Alex's two known children were both type **B**. The young man claiming to be a long lost son had blood type **O**.

- (i) Whether or not Toms could be a child of Mr. Alex. Prove. Also add a brief note to defend your conclusion.
  - (ii) Determine the genotypes for each individual involved, and use Punnett Squares as evidence.
- (c) A woman bears a child with erythroblastosis at her second delivery. She never had a blood transfusion.
- (i) Based on this information, classify the woman, her husband and both the children as to Rh type.
  - (ii) Also add a brief note on erythroblastosis fetalis.
- (d) A two year old baby was taken to a physician as he was showing a variable combinations of growth and mental retardation, facial and digit anomalies including cardiac defects, Chromosome analyses of cultured blood lymphocytes were carried out. G banded chromosome analysis from culture showed all cells to be positive for Jacobsen syndrome. The karyotype of the patient is 46, XX, Del (11) (q24.1q24.3). Based on your understanding of chromosomal aberrations, answer the following questions
- (i) What is G banded chromosome analysis?
  - (ii) Is this an example of numerical or structural aberrations? Which chromosomes are involved?

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