REV-00
MBT/26/31

2018/06

M. Sc. BIOTECHNOLOGY
SECOND SEMESTER
GENETICS
MBT – 203

(Use Separate Answer Scripts for Objective & Descriptive)

Duration : 3 hrs. **Full Marks : 70**

(PART-A : Objective)

Time : 20 min. **Marks : 20**

Choose the correct answer from the following: ***1×20=20***

1. Genomics is the study of genomes. Genome refers to the
   a. total DNA and RNA of an organism
   b. Entire genes of an organism
   c. Total DNA, RNA, and cDNA of an organism
   d. DNA of an organism

2. Variation between individuals due to single base changes is called as
   a. contigs
   b. ESTs
   c. SNPs
   d. Transition-Transversion

3. DNA sequencing followed by genome annotation are steps of
   a. Transcriptomics
   b. Comparative genomics
   c. Structural genomics
   d. Functional genomics

4. Which of the following statements are true regarding Law of Segregation?
   a. The segregation of factors is due to the segregation of chromosomes during meiosis
   b. Alleles separate with each other during gametogenesis
   c. Law of segregation is called as law of purity of gamates
   d. All of the above

5. The crossing of F1 to homozygous recessive parent is called
   a. test cross
   b. back cross
   c. F1 cross
   d. all of these

6. Which of the following terms represent a pair of contrasting characters?
   a. Allelomorphs
   b. Heterozygous
   c. Homozygous
   d. Co-dominant genes

7. If you discovered a bacterial cell that contained no restriction enzymes, which of the following would you expect to happen?
   a. The cell would be unable to replicate its DNA
   b. The cell would be easily infected and lysed by bacteriophages.
   c. The cell would create incomplete plasmids.
   d. The cell would become an obligate parasite.

(PART-B : Descriptive)

Time : 2 hrs. 40 min. **Marks : 50**

[Answer question no.1 & any four (4) from the rest]

1. Discuss all the possible and real useful phenotypes for the isolation of genetic mutants along with examples. 10

2. Describe various genetic suppressor mutants with examples. What are the different mechanisms of action for various antibiotic resistance? 5+5=10

3. Write short notes with proper examples in explaining (a) Co-dominance phenomena and (b) the complex inheritance in genetics. 4+6 =10

4. Explain the different molecular biological and immunological methods for studying epigenetics phenomena. What are the critical Histone modifications that affect gene expression? 6+4 =10

5. Why Chloroplast is chosen for the transplastomic technologies? Briefly explain the different transformation systems in Plastid? 5+5=10

6. Describe two different mechanisms for the cause of X-Chromosome inactivation. How microRNA contributes in regulation of epigenetics? 6+4 =10

7. Explain the Sanger's sequencing with reference to the industry protocol. What is the conceptual difference between Mendel's law of Segregation Vs. Independent Assortment? 5+5=10

8. What are the benefits of the Human Genome Project? Explain the term Pedigrees. Give one example for each with explanation: Autosomal Dominant & Recessive, Sex-linked Dominant & Recessive disorders. +3+4 =10

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8. Homologous repeats are involved in which of the following types of mutation?
   a. Frameshifts
   b. Large deletions
   c. Mis-sense mutation
   d. Splicing mutations

9. Which one of the following types of mutation is most likely to result from UV exposure?
   a. Thymidine dimer
   b. Nonsense mutation
   c. Chromosome breakage
   d. Chromosome inversion

10. Consanguinity shows a strong association with which pattern of inheritance?
   a. Autosomal dominant
   b. Autosomal recessive
   c. X-lined dominant
   d. X-linked recessive

11. During cell division there are three types of check points one of them (M checkpoint) to ensure
   a. Complete DNA replication
   b. DNA not damage or broken
   c. Chromosomes are attached to the spindle
   d. All of the above

12. The F+ segment of bacteria may be transferred to F- bacteria by the process of
   a. Transformation
   b. Transduction
   c. Conjugation
   d. All the above

13. Quantitative inheritance defines
   a. Variation in phenotype
   b. Variation in genotypes
   c. Variation in genes
   d. Variation in environment

14. Genetic disorder Xeroderma Pigmentosum is due to error in
   a. Base-excision repair mechanism
   b. Nucleotide-excision repair mechanism
   c. Direct repair mechansim
   d. DNA replication mechansim

15. If inheritance of disease in the next generation is only possible through female, the probable inheritance is
   a. Sex-linked
   b. Organellar
   c. Mendelian
   d. Autosomal

16. If a gene product in species A is 90% similar that of species B, such genes are termed as
   a. Orthologous
   b. Allologous
   c. Paralogous
   d. Perilogous

17. The strongest evidence that the DNA is the genetic material comes from
   a. The finding that DNA is not present in the cytoplasm
   b. The fact that the chromosome are made of DNA
   c. The knowledge that DNA is present in the nucleus
   d. Studies of bacterial transformation

Contd...

18. Which of the following scientists demonstrated that in DNA, A=T & G=C
   a. Griffith
   b. Meselson and Stahl
   c. Chargaff
   d. Hershey and Chase

19. Down's syndrome is due to
   a. nondisjunction of chromosomes
   b. crossing-over
   c. sex-linked inheritance
   d. linkage

20. The genes, which remain confined to differential region of Y-chromosome, are
   a. Autosomal genes
   b. Holadric genes
   c. completely sex-linked genes
   d. mutant genes

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P.T.O.