

**P-103 (INHERITANCE BIOLOGY)**

**1. Answer the following questions.**

**[ 1 mark ]**

1. Smallest genome size is seen in  
a) *E.coli* b) *Helicobacter pylori* c) *Carsonella ruddii* d) *Saccharomyces cerevisiae*
2. Which human chromosome has the highest number of genes?  
a) X chromosome b) Chromosome 1 c) Y chromosome d) Chromosome 8
3. The haploid chromosome number of Rice is  
a) 10 b) 11 c) 12 d) 13
4. Covid 19 genome is  
a) Single stranded RNA  
b) Double stranded RNA  
c) Single stranded DNA  
d) Double stranded DNA
5. Mendel, after his experiments with the garden pea, continued his experiments with:  
a) *Drosophila* and *Neurospora*  
b) Honey bee and *Neurospora*  
c) *Heiracium* and honey bee  
d) *Drosophila* and honey bee
6. Albinism is a congenital human disorder resulting from the lack of the enzyme  
a) Catalase  
b) Fructokinase  
c) Tyrosinase  
d) Xanthine oxidase
7. The starting t-RNA of prokaryotes is loaded with  
a) Valine  
b) Methionine  
c) Formylated Methionine  
d) Tryptophan
8. Gene-battery model" of gene regulation in eukaryotes is proposed by  
a) Jacob and Monod  
b) Britten and Davidson  
c) Beadle and Tatum  
d) Kornberg and Ochoa
9. The enzyme that removes the RNA-primer after DNA replication is  
a) DNA polymerase-I  
b) DNA polymerase-II  
c) Ligase  
d) Gyrase

10. DNA replication occurs in

- a) G1 phase
- b) G2 phase
- c) S-phase
- d) Interphase

11. A nucleosome is made of

- a) DNA
- b) Histone
- c) Histone wrapped over octameric core of nucleic acid
- d) DNA wrapped over octameric core of histone

12. Degeneration of genetic code is attributed to the

- a) First member of codon
- b) Second member of codon
- c) Entire codon
- d) Third member of codon

13. In split genes, the coding sequences are called

- a) Introns
- b) Operons
- c) Exons
- d) Cistrons

14) Genes which confer antibiotic resistance on bacteria are located on

- a) Chromosomal DNA
- b) Plasmid
- c) RNA
- d) Polysome

15. Suggest the number of phenotypes possible in a test cross of AABBCcDD if there is complete dominance

- a) Four
- b) Six
- c) Two
- d) Eight

16. Phenotypic and genotypic F2 ratio remains the same in:

- a) Intermediate dominance
- b) Co dominance
- c) Overdominance
- d) Dominant epistasis

17. Which among the following is a codominant marker?

- a) RAPD

- b) AFLP
- c) STMS
- d) AP PCR

18. In Snapdragon the Red flower colour is incompletely dominant over White with the heterozygous producing Pink flowers. Tall plant is completely dominant over Dwarf. If a cross between two snapdragons produced Tall Red, Tall Pink, Dwarf Red and Dwarf Pink in the ratio 3:3:1:1, predict the genotypes of the parents.

- a) TtRR X TtRr
- b) TTRr X TtRr
- c) Ttrr X TtRr
- d) TTrr X TtRr

19. Genomic imprinting is

- a) Expression of genes depend on its paternal or maternal inheritance
- b) Expression of genes linked with X chromosomes
- c) Expression of genes linked with Y chromosomes
- d) Expression of extrachromosomal genes

20. Genes with intervening sequences

- a) Introns
- b) Split genes
- c) Exons
- d) Pseudo genes

Answers:

1. c) *Carsonella ruddii*
2. b) Chromosome 1
3. c) 12
4. a) Single stranded RNA
5. c) Heiracium and honey bee
6. c) Tyrosinase
7. c) Formylated Methionine
8. b) Britten and Davidson
9. a) DNA polymerase-I
10. c) S-phase
11. d) DNA wrapped over octameric core of histone
12. d) Third member of codon
13. c) Exons
14. b) Plasmid
15. c) Two
16. a) Intermediate dominance
17. c) STMS
18. a) TtRR X TtRr
19. a) Expression of genes depend on its paternal or maternal inheritance
20. b) Split genes

**2. Answer the following questions within 2-3 sentences.**

**[1.5 mark]**

1. What is allele ?
2. What is multiple allelism ?
3. What is epistasis ?
4. What is pseudoallele ?
5. What is linkage ?
6. What is sex linkage?
7. Define somatic cell hybrid .
8. Differentiate between maternal inheritance and maternal effect.
9. Define transformation.
10. What is pedigree analysis ? What is its significance ?
11. What are karyotypes ?
12. What do you understand by QTL mapping ?
13. State some cause of mutation .
14. How are mutation detected ?
15. What is lethal mutation?
16. What is conditional mutation ?
17. What is deletion.
18. What happens in phenomenon of duplication.
19. What do you mean by inversion.
20. What is euploidy and aneuploidy ?

**3. Answer the following questions within 75-100 words.**

**[2 marks]**

1. State about co-dominance .
2. What is incomplete dominance ?
3. Define pleiotropy . Give examples.
4. What are sex-limited traits ? Give examples.
5. What are sex-influenced traits ? Give examples.
6. What are linkage maps.
7. What is cytoplasmic inheritance.
8. State about maternal inheritance.
9. What are the different methods of gene transfer in microbes.
10. Describe briefly about LOD score for linkage testing.
11. Name some genetic disorder.
12. What is polygenic inheritance.
13. Differentiate between loss of function mutation and gain of function mutation.
14. Write about germinal and somatic mutants.
15. What is insertional mutagenesis.
16. What are the different types of chromosomal aberrations.
17. Define translocation. What are its types?
18. What is recombination ?

19. What is ploidy ? What are its types ?
20. What are genetic implications of ploidy ?

**4. Answer the following questions within 500 words.**

**[6marks]**

1. Give Mendel's laws of inheritance .
2. Give an account on gene interactions .
3. Explain briefly about inheritance of mitochondrial gene by giving suitable examples.
4. What is maternal inheritance ? Give an example .
5. Explain mapping by using somatic cell hybrids.
6. Write about gene mapping with molecular markers.
7. What is tetrad analysis ?
8. What are linkage maps ?
9. State different genetic disorders .
10. What is karyotype ? Add a note on LOD score for linkage analysis .
11. Give a detailed account on Conjugation .
12. What do you understand by Transformation .
13. State about transduction and sexduction .
14. What is polygenic inheritance ?
15. Give an account on QTL mapping .
16. What are different types of mutation ?
17. Give an account on causes and detection of mutation.
18. What are the structural and numerical alternation of chromosomes.
19. Write short note on Homologous and Non-Homologous recombination.