SSR DEGREE COLLEGE (AUTONOMOUS) NIZAMABAD
M.Sc. BIOTECHNOLOGY- I YEAR
QUESTION BANK
GENETICS INTERNAL QUESTION BANK

CHOOSE THE CORRECT ANSWERS

1. Extranuclear inheritance refers to inheritance of genes present in
A. Nucleus
B. Chromosomes
C. Cytoplasm
D. Nucleolus
✓ Correct Answer: C

2. In Nicotiana, extranuclear inheritance is associated with
A. Nuclear genes
B. Chloroplast genes
C. Mitochondrial genes
D. Ribosomal genes
✓ Correct Answer: B

3. Chloroplast inheritance in Nicotiana is transmitted mainly through
A. Pollen
B. Both parents equally
C. Male parent only
D. Female parent only
✓ Correct Answer: D

4. The gene responsible for leaf color variation in Nicotiana is located in
A. Nucleus
B. Mitochondria
C. Chloroplast
D. Cell membrane
✓ Correct Answer: C

5. Extranuclear inheritance does not follow Mendelian ratios because
A. Genes mutate frequently
B. Genes are recessive
C. Genes are present outside nucleus
D. Chromosomes do not segregate
✓ Correct Answer: C

6. In Nicotiana, reciprocal crosses give different results due to

A. Dominance
B. Codominance
C. Maternal inheritance
D. Linkage
✓ Correct Answer: C

7. Leaf variegation in Mirabilis jalapa is an example of
A. Nuclear inheritance
B. Cytoplasmic inheritance
C. Sex-linked inheritance
D. Polygenic inheritance
✓ Correct Answer: B

8. The variegated leaf color in Mirabilis jalapa is due to defective
A. Mitochondria
B. Ribosomes
C. Chloroplasts
D. Vacuoles
✓ Correct Answer: C

9. Green leaf color in Mirabilis jalapa is due to presence of
A. Mutant chloroplasts
B. Normal chloroplasts
C. No chloroplasts
D. Mitochondria
✓ Correct Answer: B

10. White branches of Mirabilis jalapa lack
A. Chlorophyll
B. Mitochondria
C. Cell wall
D. Ribosomes
✓ Correct Answer: A

11. Seeds produced by green branches of Mirabilis jalapa give rise to
A. Only white plants
B. Only green plants
C. Only variegated plants
D. Lethal plants
✓ Correct Answer: B

12. Pollen has no effect on leaf color inheritance in Mirabilis jalapa because
A. Pollen is sterile
B. Pollen lacks nucleus

C. Chloroplasts are maternally inherited
D. Fertilization does not occur
✓ Correct Answer: C

13. Variegation in Mirabilis jalapa is due to
A. Gene mutation in nucleus
B. Unequal segregation of chloroplasts
C. Crossing over
D. Chromosomal aberration
✓ Correct Answer: B

14. Poky mutant of Neurospora shows defect in
A. Chloroplasts
B. Ribosomes
C. Mitochondria
D. Nucleus
✓ Correct Answer: C

15. The poky mutation affects the process of
A. Photosynthesis
B. Respiration
C. Transcription
D. Translation
✓ Correct Answer: B

16. Poky mutants grow slowly due to defective
A. Glycolysis
B. Electron transport chain
C. DNA replication
D. Protein synthesis in nucleus
✓ Correct Answer: B

17. In Neurospora, poky trait is inherited through
A. Male parent
B. Female parent
C. Both parents
D. Pollen
✓ Correct Answer: B

18. Maternal inheritance occurs because
A. Only maternal genes are dominant
B. Cytoplasm is contributed mainly by mother
C. Paternal genes are inactive
D. Mutation occurs only in eggs

✓ Correct Answer: B

19. Poky mutants show abnormal mitochondrial
A. DNA only
B. Ribosomes only
C. Enzymes of respiration
D. All of the above
✓ Correct Answer: D

20. Poky mutant inheritance does not follow Mendelian laws because
A. Chromosomes fail to segregate
B. Genes are sex-linked
C. Genes are extranuclear
D. Mutation is lethal
✓ Correct Answer: C

FILL IN THE BLANKS

1. Cytoplasmic male sterility is a condition in which plants fail to produce _____ pollen.
Answer: Functional

2. CMS is usually controlled by genes present in the _____.
Answer: Cytoplasm

3. Cytoplasmic male sterility is commonly associated with _____ genes.
Answer: Mitochondrial

4. CMS is widely used in agriculture for _____ seed production.
Answer: Hybrid

5. In CMS-based hybrid seed production, male-sterile plants act as the _____ parent.
Answer: Female

6. Fertility in CMS plants can be restored by _____ genes present in the nucleus.
Answer: Restorer (Rf)

7. CMS helps in preventing _____ pollination in crop plants.
Answer: Self

8. The total collection of genes in a population is called the _____.
Answer: Gene pool

9. The proportion of a particular allele in a population is known as _____ frequency.
Answer: Gene (allele)

10. Hardy–Weinberg principle describes genetic _____ in a population.
Answer: Equilibrium

11. According to Hardy–Weinberg law, allele frequencies remain constant in the absence of _____ forces.
Answer: Evolutionary

12. Random mating is an essential assumption of the _____ principle.
Answer: Hardy–Weinberg

13. The Hardy–Weinberg equation is represented as _____.
Answer: $p^2 + 2pq + q^2 = 1$

14. In Hardy–Weinberg equation, p and q represent _____ frequencies.
Answer: Allele

15. Shell coiling direction in snails is an example of _____ effect.
Answer: Maternal

16. In snails, the shell coiling phenotype is determined by the _____ genotype.
Answer: Mother's

17. The genes responsible for shell coiling are expressed during early _____ development.
Answer: Embryonic

18. Mitochondrial DNA is inherited mainly from the _____ parent.
Answer: Maternal

19. Mitochondrial DNA inheritance is considered a form of _____ inheritance.
Answer: Extranuclear (cytoplasmic)

20. Lack of recombination is a characteristic feature of _____ DNA inheritance.
Answer: Mitochondrial

LONG QUESTION AND ANSWERS

1) Explain Shell coiling in snails

2) Write about Linkage and types

3) Describe Cytoplasmic inheritance in leaf

4) Write about Mitochondrial inheritance

5) Explain Hardy Weinberg equilibrium