Central University of South Bihar, Post- Fatehpur, Gaya (Bihar)

Mid-Semester Examination 1st semester 2023-24

Enrollment no:_____

Invigilator's signature:_____

Name of the course	: Fundamental of Genetics	**Semester**	: 1st
Course code	: AGP-111	**Max. marks**	:30 marks
Degree program	:B.Sc. (Hons) Agriculture	**Time**	: 90 min

SECTION-A

I. Answer the question with correct option. (5x1)=5 marks

Q1. Mendel's law of segregation states that:

A) Traits are inherited independently.

B) Alleles segregate during gamete formation.

C) Dominant traits always mask recessive traits.

D) Traits are only inherited from the mother.

Q2. In a dihybrid cross involving two heterozygous individuals (AaBb x AaBb), what is the probability of obtaining an offspring with the AABB genotype?

A) 1/16

B) 1/8

C) 1/4

D) ½

Q3. What is the primary function of telomeres in chromosome structure?

A) Protecting the ends of chromosomes from degradation.

B) Initiating DNA replication.

C) Assisting in DNA repair.

D) Controlling gene expression.

Q4. According to the chromosomal theory of inheritance, genes are located on:

A) DNA strands

B) Ribosomes

C) Chromosomes

D) Mitochondria

Q5. What is the role of DNA helicase in DNA replication?

A) It adds nucleotides to the growing DNA strand.

B) It unwinds and separates the DNA strands.

C) It forms phosphodiester bonds between nucleotides.

D) It proofreads the newly synthesized DNA strand.

Q6. What is the function of DNA ligase in DNA replication?

A) It unwinds the DNA helix.

B) It joins Okazaki fragments together.

C) It synthesizes a new DNA strand.

D) It separates the DNA strands.

Q7. In DNA, the purine bases are:

A Adenine and Guanine

B) Adenine and Thymine

C) Cytosine and Thymine

D) Cytosine and Guanine

Q8. What is the significance of the "three-parent baby" technique in mitochondrial replacement therapy?

A) It allows for the treatment of mitochondrial disorders by replacing defective mitochondrial DNA.

B) It involves the genetic contribution of three parents to an offspring.

C) It is used to select specific mitochondrial traits in offspring.

D) It is a form of cytoplasmic inheritance.

Q9. What term is used to describe chromosomes that are similar in size, shape, and gene content, but not identical?

A) Homologous chromosomes

B) Non-homologous chromosomes

C) Sister chromatids

D) Lampbrush chromosomes

Central University of South Bihar, Post- Fatehpur, Gaya (Bihar)
Mid-Semester Examination 1st semester 2023-24

Q10. Which of the following is a special type of chromosome:

A) Lampbrush chromosomes

B) Giant chromosomes

C) Polytene chromosomes

D) All of the above

II. Answer by filling correct word/s in the blank space (5x1)=5 marks

Q11. In _____ chromosomes, the centromere is located at one end of the chromosome so that the chromosome has only one arm.

Q12. The chromosomes are composed of thread like structures called chromatin. Based on its affinity to basic dyes (acetocarmine or feulgen) during prophase, the chromatin which are darkly stained regions were termed as _____.

Q13. In chromatin, the positively charged _____ proteins make complex with DNA.

Q14. Mendel's work was rediscovered by _____, _____ and _____.

Q15. Double helical structure of DNA proposed by _____ and Crick at Cambridge

III. Answer by writing True/False regarding the given statements in the space (5x1)=5 marks

Q16. Telomeres play a role in preventing chromosomal instability and cellular aging.

Q17. Resolvase is an enzyme involved in DNA replication.

Q18. Mendelian principles of heredity apply equally to all organisms.

Central University of South Bihar, Post- Fatehpur, Gaya (Bihar)
Mid-Semester Examination 1st semester 2023-24

Q19. Centromeres are typically located near the ends of chromosomes.

Q20. Homologous chromosomes share identical genetic information.

SECTION-B

IV. Answer by writing short notes on each of the following: (5x1)=5 marks

Q21. Polytene chromosomes
Q22. Chromatin
Q23. Mitochondrial inheritance
Q24. Law of Independent assortment
Q25. DNA replication

V. Answer by writing detailed notes on any one of the following:

(1x5)=5 marks

Q26. Write detailed notes on any one:

Protein synthesis
or
Mitosis