18BTU07

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2022
(Second Semester)

Branch – **BIOTECHNOLOGY**

GENETICS

Time: Three Hours Maximum: 50 Marks

SECTION-A (5 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 = 5)

1. Name the X linked genes responsible for abnormal conditions that pass the harmful allele to sons while daughters are carriers.
   (i) Ataxia (ii) Hemophilia
   (iii) Hypertrichosis (iv) Webbed toes
2. Identify the disease where tumor suppressor gene is mutated in chromosome 13 that regulate the cell cycle and maintain balance of cell growth resulting in inherited cancer in children.
   (i) Crude-chat syndrome (ii) Chimera
   (iii) Mosaic (iv) Retinoblastoma.
3. Specify cytoplasmic male sterility condition widespread among higher plants that represent a valuable tool in hybrid seed production in self-pollinating crop species where the plant is unable to produce functional _____.
   (i) peduncle (ii) pollen
   (iii) stamen (iv) stigma
4. Mention the fatal disease in children usually by age 5 that causes progressive degeneration of the central nervous system caused by the absence of the hexamidase A gene.
   (i) Cystic fibrosis (ii) Achondroplasia
   (iii) Sickle cell anemia (iv) Tay Sach's
5. State the implication of Hardy-Weinberg principle that specify the rare alleles are more likely to be present among ——— individuals.
   (i) Heterozygous (ii) Homozygous
   (iii) Random (iv) Assortative

SECTION - B (15 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 3 = 15)

6 a Differentiate allelic and non-allelic interactions with suitable examples.
OR
b Explain the concept of epistasis and give note on its significance.

7 a Describe human traits and elaborate on the chromosome theory of inheritance.
OR
b State the effect of deletion, duplication, inversion and translocation changes in Chromosome with suitable examples.

8 a Outline the significance of cytoplasmic inheritance, role of organellar genes and cytoplasmic male sterility.
OR
b Narrate meiotic pairing and give note on autosyndesis and allosyndesis.

Cont...

9 a Show the X linked and Y linked inheritance of genetic disease with suitable examples.

OR

b Describe multifactorial inheritance of congenital malformation, cleft lip and palate, rheumatoid arthritis and diabetes.

10 a Bring out the concept of random mating population and give its significance.

OR

b Summarize genetic drift, migration and effect of mutation on population.

SECTION -C (30 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 x 6 = 30)

11 a Compare the variation in number and structure of chromosomes in Euploidy, Non disjunction and aneuploidy with examples.

OR

b Elaborate on linkage and write an account on the concept of recombination and linkage mapping.

12 a Describe epigenetics and give notes on histone, chromosome modification and chromosome remodelling.

OR

b Enumerate the structural changes in chromosomes resulting in genetic diseases Cri-du-chat syndrome and retinoblastoma.

13 a Summarize the cytological and genetic methods of identification of ploidy in plants with suitable diagrams.

OR

b Outline heterosis, their genetic basis and its prediction. Write note on F2 heterosis.

14 a Highlight the different autosomal dominant and autosomal recessive inheritance of genetic disease with examples and give their inheritance pattern.

OR

b Point out different mitochondrial disorders like LHON, DAD, MERRF and MELAS.

15 a Distinguish Hardy- Weinberg principle, non-random mating and write note their influence on genetic variations.

OR

b Discuss hierarchical populations, effect of isolate breaking, inbreeding and assortative and non assortative mating on population genetics.

Z-Z-Z

END