BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – B.Sc.(MLT)-2019
Course Name – Genetics & Molecular Biology
Course Code - BMLT602
(Semester VI)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Identify the structure of t-RNA.

a) Leaf-shaped b) Apple-shaped
c) Shovel shaped d) Clover-shaped

(ii) Choose the type of polymerase which is not thermostable.

a) pfu polymerase b) Taq polymerase
c) DNA polymerase III d) Vent polymerase

(iii) Choose the correct option: In polymerase chain reaction, the binding of primer to the denatured strand is called

a) Annealing b) Denaturation
c) Renaturation d) Primer extension

(iv) Choose the correct option: In polymerase chain reaction, the denaturation process is done at:

a) Heating between 40 to 60°C b) Heating between 50-72°C
c) Heating between 90 to 98°C d) None of these

(v) Predict the true statements iregarding the migration of biomolecules.

a) Low voltage is used for separation of high mass molecules b) Rate of migration is inversely proportional to current
c) The rate of migration is directly proportional to the resistance of medium d) Rate of migration is directly proportional to current

(vi) A student performed western blot technique using a solution of 3 proteins with different sizes. The protein of interest is smallest among all proteins present in the solution. Predict the expected location of the protein in the blot.

a) At the top of the blot. b) At the bottom of the blot.
c) At the middle of the blot. d) The location can not be determined.

(vii) Restate the reason of proper washing in western blot.

a) It clears the excess reagents used in previous steps
b) It helps to form bonds strongly
c) It decreases the reaction rate
d) It increases the concentration of protein band

(viii) Give example of point mutation.

a) Thalassemia
b) Sickle cell anaemia
c) Night blindness
d) Down's syndrome

(ix) Give example from the following genotypes and phenotypes that indicates aneuploidy in sex chromosomes.

a) 22 pairs + Y females
b) 22 pairs + XY females
c) 22 pairs + XXY females
d) 22 pairs + XXXY females

(x) A father is having a disease and the mother is normal. All their sons are normal, but all the daughters are diseased. Predict the nature of the disease.

a) Autosomal dominant
b) Autosomal recessive
c) Sex-linked dominant
d) Sex-linked recessive

(xi) Identify the correct option regarding sickle cell anemia.

a) The number of RBC decreases
b) The amount of hemoglobin decreases
c) RBCs are deformed and cannot carry oxygen
d) None of these

(xii) The law of independent assortment represents:

a) Different alleles get sorted independently during fertilization.
b) Formation of variation.
c) Formation of new characters.
d) None of these.

(xiii) Select the incorrect option regarding the sex determination in human.

a) It is determined by X and Y chromosome.
b) Females produce only X chromosome
c) Males produce only Y chromosome.
d) Gametes receive sex chromosomes from both of the parents.

(xiv) Select the correct option: DNA repair mechanism involves all except:

a) Mismatch repair
b) Base excision repair
c) Hingejoint repair
d) homologous recombination

(xv) Select the correct option to fill the gap: During DNA replication the synthesis of _____ occurs.

a) Satelite segment
b) Okazaki fragment
c) Watson fragment
d) Crick segment

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Classify the effects of mutation according to the changes in DNA. (3)
3. Explain the role of crossing over during meiosis. (3)
4. Mitochondrial DNAs are derived from mother only. Explain this statement. (3)
5. Predict the outcome if the pH of buffer is changed in western blot. (3)
6. The globin part of hemoglobin is composed of 2 alpha chains and 2 beta chains. Evaluate the number of bands you will get after gel elctrophosis of globin. (3)

OR

Insulin hormone is made up of 2 peptide chains. Predict the number of bands you will get after gel elctrophosis of insulin. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain how a X-linked disorder (such as hemophilia) is transmitted to the children. (5)
8. Discuss about gene mapping. (5)

9. Describe the structure of B-DNA. (5)
10. Interpret the reasons of using different reagents for the sample preparation in western blot. (5)
11. Explain the role of blocking agent in western blot technique. (5)
12. Write a short note on hemophilia. (5)

OR

Write a short note on sickle cell anemia. (5)

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