JW-003-1015034 Seat No. _____

B. Sc. (Sem. V) (CBCS) Examination

October - 2019

Biotechnology : BT - 502

(Genetics & Molecular Biology)

Faculty Code : 003
Subject Code : 1015034

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

Instructions : (1) All questions are compulsory.
(2) The right side figure indicates total marks of the question.
(3) Draw the figure wherever necessary.

1 (a) Answer the questions : **4**

(1) A gene pair hides the effect of another. The phenomenon is _____.

(2) A man of B-blood group marries women of AB blood group. Progeny of _____ blood group would indicate that man is heterozygous A.

(3) How many different kinds of gametes will be produced by a plant having the genotype AaBbCC ?

(4) When a single gene influences more than one trait it is called _____.

(b) Answer any one : **2**

(1) Give gene-cistron relationship in prokaryotes.

(2) Explain any one allelic gene interaction with example.

(c) Answer any one : **3**

(1) Write a note on XX/XY sex determination system.

(2) What are lethal genes ? Explain with suitable example.

(d) Answer any one : **5**

(1) Explain Mendelian inheritance pattern and laws of heredity.

(2) Short note on :

(a) Supplementary genes

(b) Complementary genes

2 (a) Answer the questions : **4**

(1) 'Nucleic Acid' term was introduced by _____.

(2) In a population that is in Hardy-Weinberg equilibrium, the frequency of the homozygous recessive genotype is 0.04. What is the frequency of individuals that are homozygous for the dominant allele ?

(3) The X-ray diffraction studies conducted by _____ were key to the discovery of the structure of DNA.

(4) If the frequency of two alleles in a gene pool is 70% R and 30% r, what is the frequency of individuals in the population with the genotype Rr ?

(b) Answer any one : **2**

(1) What is Chargaff's principle ?

(2) Briefly explain genome organization in prokaryotes.

(c) Answer any one : **3**

(1) Explain central dogma.

(2) Discuss about indirect evidences of DNA as a genetic material.

(d) Answer any one : **5**

(1) Explain cytoplasmic inheritance with an example of leaf variegation in Mirabilis jalapa.

(2) Write a detail note on alternative forms of DNA.

3 (a) Answer the questions : 4

(1) Common lesions found in DNA after exposure to ultraviolet light are _____.

(2) Movement of a segment of DNA from one site of the genome to another is called _____.

(3) _____ & _____ first confirmed that the DNA replication is semiconservative.

(4) _____ is the enzyme responsible for making short strands of RNA at the site of replication initiation.

(b) Answer any one : 2

(1) Explain Meselson and Stahl experiment.

(2) What is Okazaki fragment ?

(c) Answer any one : 3

(1) Write a note on DNA polymerase.

(2) Explain mis-match repair mechanism.

(d) Answer any one : 5

(1) Write a detail note on excision repair mechanism.

(2) Explain the process of gene recombination.

4 (a) Answer the questions : 4

(1) Trp operon expression in *E. coli* is regulated by the availability of tryptophan. This regulatory process is known as _____.

(2) _____ hypothesis states that some amino acids are coded for by more than one codon.

(3) Eukaryotic translation initiation requires _____ energy rich molecule.

(4) In the experiments of Griffith, the conversion of nonlethal R-strain bacteria to lethal S strain bacteria was an example of the genetic exchange known as _____.

(b) Answer any one : 2

(1) What are promoter sequences ?
Give its importance.

(2) What is wobble hypothesis ?

(c) Answer any one : **3**

(1) Write a note on genetic code.

(2) Briefly explain post transcriptional modification of m-RNA.

(d) Answer any one : **5**

(1) Explain regulation of gene expression with Lac operon.

(2) Discuss eukaryotic translation in detail.

5 (a) Answer the questions : **4**

(1) A molecule that consists of a piece of DNA from one organism combined with the DNA from another species is called _____.

(2) Proteins isolated from bacteria that catalyse specific cleavage of DNA are _____.

(3) In pBR322 plasmid vector, pBR stands for _____.

(4) Nick translation is done by enzyme _____.

(b) Answer any one : **2**

(1) Define : Nuclease and enlist types of nucleases.

(2) Give ideal characteristics of a vector.

(c) Answer any one : **3**

(1) What are adaptors and linkers ? give its importance in genetic engineering.

(2) Explain homopolymer tailing in detail.

(d) Answer any one : **5**

(1) Explain techniques used for identification of recombinants.

(2) Enlist techniques used to introduce r-DNA into host cells and discuss any two in detail.
