



**PAQ-003-001518**

Seat No. \_\_\_\_\_

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

October / November - 2018

**Biotechnology : BT-502**

*(Genetics & Molecular Biology)*

**Faculty Code : 003**

**Subject Code : 001518**

Time :  $2\frac{1}{2}$  Hours]

[Total Marks : 70

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

**1 Objective Questions : 20×1=20**

- (1) A man of A-blood group marries women of AB blood group. Which type of progeny would indicate that man is heterozygous A?
- (2) How many different types of genetically different gametes will be produced by a heterozygous plant having the genotype AABbCC?
- (3) Gene that affects two or more seemingly unrelated phenotypic traits is called \_\_\_\_\_
- (4) The genotype of an individual with Klinefelter's syndrome will be \_\_\_\_\_
- (5) Members of the same species which are capable of interbreeding is best described as a(n) \_\_\_\_\_
- (6) If 25% of an organism's DNA is thymine, then \_\_\_\_\_% is guanine and \_\_\_\_\_% adenine.
- (7) The E. coli chromosome has  $7.2 \times 10^6$  bp; a replication fork progresses at about 1000 nucleotides/sec. Therefore, the minimum time required to complete replication is about \_\_\_\_\_ minutes.

- (8) The actual synthesis of DNA in *E. coli* is the function of \_\_\_\_\_
- (9) Okazaki fragments are used to elongate \_\_\_\_\_
- (10) Unwinding of DNA is done by \_\_\_\_\_
- (11) \_\_\_\_\_ and \_\_\_\_\_ first confirmed that the replication of DNA was semiconservative.
- (12) The exchange of genetic material through cell to cell contact from a donor bacterium to recipient bacterium is known as \_\_\_\_\_
- (13) The uptake of DNA fragments from surroundings by a bacterium is termed as \_\_\_\_\_
- (14) Hypothesis that states 'Some amino acids are coded for by more than one codon' is known as \_\_\_\_\_
- (15) The full form of TBP is \_\_\_\_\_
- (16) The expression of the *trp* operon in *E. coli* is regulated in by the availability of the amino acid tryptophan. This regulatory process is referred to as \_\_\_\_\_
- (17) \_\_\_\_\_ enzymes are used to join pieces of DNA.
- (18) \_\_\_\_\_ can recognizes a specific DNA sequence and cuts within a DNA molecule.
- (19) In pUC 18, UC stands for \_\_\_\_\_
- (20) A collection of total genomic DNA from a single organism is called \_\_\_\_\_

**2** (a) Answer any **three** : **3×2=6**

- (1) Explain Dominance type of gene interaction.
- (2) Explain Transduction.
- (3) Describe SOS Repair Mechanism.
- (4) Describe Linkers.
- (5) Write a note on Genetic Code.
- (6) Define : C Value

(b) Answer any **three** : **3×3=9**

- (1) Explain complementary type of Non allelic interaction.
- (2) Write a note on Extra Chromosomal Inheritance.
- (3) Explain Mis-Match Repair Mechanism.
- (4) Describe Polynucleotide kinase and Alkaline Phosphatase.
- (5) Describe Types of RNA molecules.
- (6) Define : Cistron, Recon and Muton

(c) Answer any **two** : **2×5=10**

- (1) Write a note on Mendelian inheritance pattern and Laws of Heredity.
- (2) Write a detail note on prokaryotic replication.
- (3) Describe Plasmid in detail.
- (4) Write a note on Transcription.
- (5) Explain Lac operon in detail.

**3** (a) Answer any **three** : **3×2=6**

- (1) Write a note on Concepts of Central Dogma.
- (2) Explain Meselson and Stahl Experiment.
- (3) Describe Adaptors.
- (4) Explain in short Trp Operon.
- (5) Role of tRNA in protein synthesis.
- (6) Write a note on law of purity of gametes with appropriate example.

(b) Answer any **three** : **3×3=9**

- (1) Explain Supplementary type of Non allelic interaction.
- (2) Write a note on DNA polymerase.
- (3) Write in detail Restriction Endonucleases.
- (4) Explain post translational modification.
- (5) Explain 5' capping of mRNA and Polyadenylation.
- (6) Explain homopolymer tailing.

(c) Answer any **two** : **2×5=10**

- (1) Write a note on structure of eukaryotic gene.
  - (2) Write in detail Watson and Crick Model.
  - (3) Describe in detail Direct DNA repair mechanism.
  - (4) Application of Genetic Engineering.
  - (5) Explain Prokaryotic Translation in detail.
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