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KT-5261

Seat No._____

B. Sc. (Sem. V) Examination

November / December – 2014

CC-I-8 : Biotechnology : Paper - 502

(Molecular Genetics)

Time : **3** Hours] [Total Marks : **70**

1. MCQ. **10**

1. The sequence of one strand of DNA is 5' TCGATC 3'. The sequence of the complementary strand would be

   (A) 5' AGCTAG 3' (B) 5' TCGATC 3'

   (C) 5' CTAGCT 3' (D) 5' GCTAGC 3'

2. The tRNA anticodon for the DNA sequence AGT would be

   (A) UCA. (B) AGU.

   (C) TCA. (D) AGT

3. A role of mRNA in protein synthesis. is to

   A. Form ribosomes.

   B. Form the protein's tertiary structure.

   C. carries appropriate amino acids into place.

   D. carries genetic information out of the nucleus.

4. The molecule that is responsible for carrying amino acids to ribosomes is

   (A) DNA. (B) tRNA.

   (C) rRNA. (D) mRNA.

5. A polypeptide found in the cytoplasm of a cell contains 12 amino acids. How many nucleotides would be required in the mRNA for this polypeptide to be translated?

(A) 4 (B) 12 (C) 24 (D) 36

6. Which of the following describes a DNA molecule?

A. Double helix of glucose sugars and phosphates.

B. Ladder-like structure composed of fats and sugars.

C. Double chain of nucleotides joined by hydrogen bonds.

D. A chain of alternating phosphates and nitrogenous bases.

7. A section of DNA has the following sequence of nitrogenous bases: CGATTACAG Which of the following sequences would be produced as a result of transcription?

(A) CGTUUTCTG (B) GCTAATGTC

(C) CGAUUACAG (D) GCUAAUGUC

8. mRNA is produced in the process called

(A) respiration. (B) translation.

(C) replication. (D) transcription

9. DNA is replicated:

(A) Conservatively (B) Distributively

(C) Semi-conservatively (D) Dispersively

10. Which of the following events would occur at the *E. coli lac* operon when the glucose concentration of the growth medium is low and the lactose concentration is high?

(A) The *lac* repressor protein will bind to the operator sequence.

(B) Ribosomes will stall during translation of the first 13 amino acids.

(C) The transcribed RNA will form a cAMP-dependent stem-loop structure to terminate transcription.

(D) The catabolite gene activator protein (CAP), bound with cAMP, will stimulate binding of RNA polymerase to the promoter.

2. Answer the following (Any Five) **10**

1. Define Transcription and Gene.
2. Draw the labeled Diagram of prokaryotic mRNA synthesis.
3. Define Intron and Extron.
4. Give one role of each of the following in the production of a protein a) tRNA b) rRNA
5. Draw the Watson and Crick DNA double helix model.
6. write subunits of DNA Polymerase in Eukaryotic cell
7. Give role of RNA polymerase in DNA replication.

3. Answer the following (Any Five) **30**

1. Explain Griffith Experiments.
2. Explain Initiation process of Translation in Eukaryotic cell.
3. Write a note on Prokaryotic DNA Polymerase with their role
4. Write a note Types of RNA molecules
5. Explain Transposable elements

6. Write a note on DNA components

7. Do as Follows

   a) Give the location of the following processes in the cell:

      i) transcription **1**

      ii) translation. **1**

   b) What is the role of mRNA in transcription? **2**

   c) What is the role of mRNA and tRNA in translation? **2**

4. Answer the following (Any Two) **20**

1. Explain DNA Replication process in Prokaryotic cell
2. Explain Protein synthesis process in Prokaryotic cell
3. Explain genetic code with significant
4. Explain Transcription process in Eukaryotic cell
