

KATHMANDU UNIVERSITY
End Semester Examination [C]
January, 2018

Marks Scored:

Level : B.Tech.

Year : II

Exam Roll No.:

Time: 30 mins.

Course : BIOT 206

Semester: II

F.M. : 20

Registration No.:

Date JAN 14 2018

SECTION "A"

[20 Q.×0.5=10 marks]

Choose the most appropriate answer.

1. The correct genetic sequence is
 Promotor, initiation code, gene, terminator code, terminator region
 Promotor, initiation code, gene, terminator region, terminator code
 Initiation code, promotor, gene, terminator code, terminator region
 Initiation code, promotor, gene, terminator region, terminator code
2. While one strand of duplex DNA is being transcribed to mRNA
 the complementary strand makes tRNA
 the complementary strand is inactive
 the complementary strand at this point is replicating
 mutations are impossible during this short period
3. Which of the following statements, concerning regulation of *trp* operon expression by attenuation, is correct?
 The leader peptide sequence encodes enzymes required for tryptophan synthesis.
 The leader peptide sequence contains no tryptophan residues
 Rapid translation of the leader peptide allows completion of the mRNA transcript
 Rapid translation of the leader peptide prevents completion of the mRNA transcript.
4. Which of the following is true of the lac operon in *E. coli*?
 The operon is only switched on in the absence of lactose in the growth medium.
 The lac operon messenger RNA is a polycistronic mRNA
 The enzyme β -galactosidase is only produced in large quantities when the lac repressor is bound to the operator
 The promoter is the binding site for the lac repressor.
5. Suppose a certain gene contains the double-stranded sequence:
5'- ATGTTTAGCGCC -3'
3'- TACAAATCGCGG -5'
If the top strand is the sense strand and codes for an mRNA whose sequence begins 'ATG', which of the following would be the sequence of the corresponding segment of antisense RNA?
 5'-AUGUUUAGCGCC-3' 5'-CCGCGAUUUGUA-3'
 5'-GGCGCUAAACAU-3' 5'-UACAAAUCGCGG-3'

6. The chromosomal genes that possess fertility factor is known as
 R Factor F prime factor F factor Hfr
7. Which of the following processes generates a new copy of the transposable element at a new location of DNA?
 Homologous genetic recombination
 Site specific recombination
 Non-homologous recombination
 Replicative recombination
8. Which of the following does not code for an enzyme having both helicase and nuclease activity?
 Rec-A Rec-B Rec-C Rec-D
9. Which of these describes a Holliday junction?
 A section of DNA where base pairing is not exact
 A strand of DNA containing genetic material from two different chromosomes
 An interaction of two strands of DNA from homologous chromosomes
 A three stranded DNA structure where single stranded DNA has invaded a double Helix
10. A frameshift mutation
 replaces one amino acid with another
 removes part of the protein
 introduces a section of amino acids not normally found
 joins two different proteins
11. Alkyltransferase can be used only once because
 The protein is hydrolyzed in the process of repairing the DNA
 The protein is chemically changed by the addition of a methyl group.
 The protein becomes attached to the DNA strand
 All of these
12. How does recombinational repair differ from nucleotide excision repair (NER)?
 Unlike NER, recombinational repair is unable to repair damage caused by thymine dimers
 NER replaces the thymine dimer while recombinational repair leaves it in place
 NER requires DNA polymerase and ligase function, while recombinational repair does not.
 NER involves nick translation, which recombinational repair does not
13. How does the mismatch repair system distinguish between the parental (i.e. correct) DNA strand and the newly synthesised strand containing the mismatched base?
 Thymine in the parental strand of the helix is methylated at GATC.
 Thymine in the new strand of the helix is methylated at GATC.
 Guanine in the parental strand of the helix is methylated at GATC
 Guanine in the new strand of the helix is methylated at GATC.

SECTION "B"

Fill in the blanks

[10 Q.×1=10 marks]

1. RNAi stands for _____
2. If the DNA coding strand is ACAGTCGAT, the mRNA strand will be _____.
3. Nucleases that specifically cleave Holliday intermediates are often called _____.
4. Changing the codon AGC to AGA represents a _____ mutation
5. Addition or deletion of a nucleotide base pair involves _____ mutation
6. The enzyme photolyase repair the thymine dimer in the DNA by _____ mechanism.
7. If 30% of an organisms DNA is thymine then _____ % is Guanine.
8. Hsp 60 and 70 are proteins involved in _____
9. There are _____ types of RNA polymerases in eukaryotes
10. The complex of RNA polymerase, DNA template and new RNA transcript is called _____.

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SECTION "C"
[11 Q.×5=55 marks]

Attempt ALL questions

1. DNA polymerase is a processive enzyme. Explain.
2. Describe post translational modifications of proteins.
3. Enlist different biological roles for recombination and explain any one in detail.
4. Explain how chemicals can act as potential DNA mutagens.
5. Explain the role of methylation in DNA mismatch repair.
6. Explain the role of ubiquitin in protein degradation.
7. Enlist any five similarities between DNA replication and transcription.
8. Explain the two modes for termination of transcription.
9. tRNA acts as an adapter molecule in translation. Explain.
10. Enlist any five differences between B-DNA and Z-DNA.
11. Explain the significance of gene regulation

