

Register Number: .....

**B.TECH. DEGREE EXAMINATIONS: APRIL / MAY 2012**

Fourth Semester

**BIOTECHNOLOGY**

BTY111: Molecular Biology

**Time: Three Hours**

**Maximum Marks: 100**

**Answer All Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Which of the following statements about heritability is true?
  - (a) is a measure of level of gene linkage
  - (b) is a measure of proportion of repeated DNA in an organism
  - (c) is a measure of the level of heterozygotes in a population
  - (d) is a measure of the proportion of variation that is due to genetic causes
2. To determine if an organism with a dominant phenotype is heterozygous, one should perform
  - (a) reciprocal cross
  - (b) dihybrid cross
  - (c) test cross
  - (d) back cross
3. The proofreading of newly synthesized DNA, to excise incorrect nucleotides which have been inserted, is done by
  - (a) a restriction endonucleases
  - (b) DNA gyrase
  - (c) DNA ligase
  - (d) DNA polymerase III
4. A gene always encodes a protein product.
  - (a) Partly wrong
  - (b) Wrong
  - (c) Partly correct
  - (d) Correct
5. Promoter regions are nucleotide sequences that:
  - (a) are involved in the initiation of transcription
  - (b) are involved in transcription termination
  - (c) contain the code for 1mRNA molecule
  - (d) are important to the translation process
6. During transcription
  - (a) nucleotides are polymerized by DNA polymerase
  - (b) initiation occurs at a site recognized by the sigma factor
  - (c) only single gene-sized mRNA molecules are synthesized
  - (d) both DNA strands of a single gene are used as templates simultaneously
7. The anticodon is in
  - (a) DNA
  - (b) mRNA
  - (c) tRNA
  - (d) rRNA

8. Which of the following is correct for prokaryotic ribosomes.

- (a) 70S - 50S (5S, 23S) 30S (16S)                      (b) 70S - 50S (5S, 23S) 30S (18S)  
(c) 70S - 50S (6S, 23S) 30S (16S)                      (d) 70S - 50S (5S, 24S) 30S (16S)

9. A transducing phage:

- (a) contains only viral DNA                      (b) may contain viral and bacterial DNA  
(c) is sensitive to DNase                      (d) can never transfer extrachromosomal genes

10. Which of the following mutations would be easiest to revert:

- (a) an insertion of 10 base pairs                      (b) a deletion of more than 10 base pairs  
(c) a base pair substitution                      (d) insertion of a transposon

**PART B (10 x 2 = 20 Marks)**

11. State the properties of a genetic material?  
12. How donor bacterial cell identifies its recipient during transformation?  
13. What is origin of replication? Mention its significance.  
14. Define types of DNA grooves.  
15. What is RNA polymerase? Highlight its subunits.  
16. Reveal the significances of consensus sequences.  
17. How reading frame works in the nucleic acids?  
18. Mention the coding and chemical problem in translation.  
19.  $\beta$ -Galactosidase has to be produced by a bacterial cell validate the statement.  
20. Define spontaneous and induced mutations with examples.

**PART C (5 x 14 = 70 Marks)**

21. a) Comment on the laws of Mendel with suitable crosses.

**(OR)**

b) How genetic recombination of bacteria is achieved through generalized transduction?

22. a) Describe the structure, properties and uses of topoisomerases.

**(OR)**

b) Elaborately distinguish de novo Initiation and covalent extension model of DNA synthesis.

23. a) What is RNA splicing? Add a note on its significance.

**(OR)**

b) Explain the necessity that primer is required for chain initiation.

24. a) What is genetic code? How codons work for the synthesis of polypeptide.

**(OR)**

b) How complex translational units functions in a cellular system?

25. a) Explicate the molecular mechanism of lysogeny. Add a note on how lysogeny can be reverted to lytic phase.

**(OR)**

b) What is a chemical mutation? Mention its effect on the biological system.

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