WEST BENGAL STATE UNIVERSITY

B.Sc. Honours/Programme 3rd Semester Examination, 2021-22

MLBHGEC03T/MLBGCOR03T-MOLECULAR BIOLOGY (GE3/DSC3)

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***ten*** questions from the following: 1×10 = 10

(i) Which of the following act as the second messenger?

(A) ATP (B) NADP (C) cAMP (D) $FADH_2$

(ii) 5′-3′ exonuclease activity is present in

(A) RNA polymerase (B) DNA polymerase II
(C) DNA polymerase I (D) DNA ligase

(iii) Central Dogma of Molecular Biology was proposed by

(A) Watson (B) Crick
(C) Griffith (D) Meselson-Stahl

(iv) Nonsense mutation always results in a

(A) larger polypeptide than original
(B) same length as in original but different amino acid sequence
(C) shorter polypeptide than original
(D) none of the above is true

(v) Which of the following is translational type of Mutation?

(A) Adenine to Adenine (B) Adenine to Guanine
(C) Adenine to Thymine (D) Adenine to Uracil

(vi) The role of SSB protein is

(A) to introduce the negative supercoiling in DNA
(B) to break the hydrogen bonds between the complementary bases
(C) to introduce positive supercoiling in DNA
(D) to keep apart the single strand from the other

(vii) Which is not part of prokaryotic core RNA polymerase?

(A) Alpha subunit (B) Beta subunit
(C) Sigma subunit (D) Omega subunit

(viii) Which form of DNA is normally found in the biological system?

(A) Dehydrated right handed helix (B) Wet right handed helix

(C) Dehydrated left handed helix (D) Wet left handed helix

(ix) Number of ATP needed for synthesis of a protein of 100 amino acids are

(A) 400 (B) 396 (C) 404 (D) 4000

(x) Activation of amino acid refers to the

(A) Esterification of amino acid (B) Phosphorylation of amino acid

(C) Peptidation of amino acid (D) Acylation of amino acid

(xi) Primosome consists of

(A) DNA pol + Helicase (B) DNA pol + Primase

(C) DNA pol + Primase + Helicase (D) DNA helicase + Primase

(xii) Which of the following is correct with respect to absorption at 260 nm?

(A) ds DNA > SS DNA > SS RNA > Free nucleotides

(B) Free nucleotides > SS RNA > ds DNA > SS DNA

(C) Free nucleotide > SS DNA > SS RNA > ds DNA

(D) SS RNA > SS DNA > ds DNA > Free nucleotides

(xiii) σ factor is involved in the

(A) Phosphodiester bond formation between the ribonucleotides

(B) Phosphodiester bond formation between the deoxyribonucleotides

(C) Recognition of sequences for RNA synthesis

(D) Recognition of sequences for DNA synthesis

(xiv) Which of the following is the property of genetic code?

(A) The genetic code are ambiguous (B) The genetic code are overlapping

(C) All of these (D) None of these

2. Answer any ***ten*** questions from the following: 2×10 = 20

(a) What do you mean by 30 nm fibre?

(b) What is hot spot?

(c) How does Klenow fragments differ from exo-Klenow fragment?

(d) What is meant by transcription bubble?

(e) What is the role of 9 mer and 13 mer in the initiation of DNA replication?

(f) What is Chargaff's rule?

(g) How *E. coli* ligase differs from T4 ligase?

(h) What is base analog Mutagen? Give one example.

(i) Give the structure of GC bonding in DNA.

(j) What is SD sequence?

(k) What is the difference between prokaryotic and eukaryotic ribosome?

(l) What do you mean by TATA box?

(m) What is ρ factor?

(n) How does streptomycin prevent protein synthesis?

3. Answer any ***two*** questions from the following: 5×2 = 10

(a) (i) Describe structure and function of nucleosome in genome organization of eukaryotes. 3+2

(ii) What is DNA denaturation? Indicate melting temperature (T_m) of DNA denaturation curve.

(b) (i) Indicate the role of Tus protein in termination of prokaryotic replication. 2+3

(ii) Write the Meselson-Stahl experiment to prove DNA replication is semiconservative in nature.

(c) Describe Ames test and discuss its significance. 5

(d) Discuss the mechanisms of mutation induced by nitrous acid and ethidium bromide. 5

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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