



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2011/2012
SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR
OF SCIENCE IN CELL AND MOLECULAR BIOLOGY

SBC 318: MOLECULAR BIOLOGY OF EUKARYOTIC CELLS

DATE: Wednesday, 28th March, 2012

TIME: 8.00 a.m. – 10.00 a.m.

INSTRUCTIONS: Write *ALL* your answers in the Examination Answer Booklet.

Section A: Attempt All Questions each is 1 Mark

1. tRNA has
(A) Clover leaf structure (B) anticodon arm (C) poly 'A' tail 3' (D) Cap at 5' end
2. The mechanism of synthesis of DNA and RNA are similar in all the following ways except
(A) They involve release of pyrophosphate from each nucleotide added
(B) They require activated nucleotide precursor and Mg⁺⁺
(C) The direction of synthesis is 5' → 3'
(D) They require a primer
3. Template-directed DNA synthesis occurs in all the following except
(A) The replication fork (B) Polymerase chain reaction (C) Growth of RNA tumor viruses
(D) Expression of oncogenes
4. RNA directed DNA polymerase is
(A) Replicase (B) Transcriptase (C) Reverse transcriptase (D) Polymerase-III
5. Precursor fragments are small bits of
(A) RNA (B) DNA (C) DNA with RNA heads (D) RNA with DNA heads
6. DNA synthesis in laboratory was first achieved by
(A) Watson and crick (B) Khorana (C) A. Kornberg (D) Ochoa
7. ATP is required for
(A) Fusion of 40S and 60S of ribosome
(B) Accommodation tRNA amino acid in a site of ribosome
(C) Movement of ribosome along mRNA
(D) formation of tRNA amino acid complex

8. AN Eukaryotic ribosome is made up of _____ sub unit.
(A) 40S and 60S (B) 40S and 50 (C) 40S and 80S (D) 60S and 80S
9. eIF-1A and eIF-3 are required
(A) For binding of amino acyl tRNA to 40 S ribosomal subunit
(B) For binding of mRNA to 40 S ribosomal subunit
(C) For binding of 60 S subunit to 40 S subunit
(D) To prevent binding of 60 S subunit to 40 S subunit
10. All the following statements about tRNA are correct except
(A) A given tRNA can be charged with only one particular amino acid
(B) The amino acid is recognized by the anticodon of tRNA
(C) The amino acid is attached to end of tRNA
(D) The anticodon of tRNA finds the complementary codon on mRNA
11. The first amino acyl tRNA approaches 40 S ribosomal subunit in association with
(A) eIF-1A and GTP (B) eIF-2 and GTP
(C) eIF-2C and GTP (D) eIF-3 and GTP
12. Eukaryotic promoters contain
(A) TATA box 25bp upstream of transcription start site
(B) CAAT box 70-80 bp upstream of transcription start site
(C) Both (A) and (B)
(D) None of these
13. Primase activity is present in
(A) DNA polymerase II (B) DNA polymerase α
(C) DNA polymerase (D) DNA polymerase δ
14. Newly synthesized tRNA undergoes posttranscriptional modifications which include all the following except
(A) Reduction in size (B) Methylation of some bases (C) Formation of pseudouridine
(D) Addition of C-C-A terminus at 5' end
15. The termination site for transcription is recognized by
(A) α Subunit of DNA-dependent RNA polymerase (B) β Subunit of DNA-dependent RNA polymerase
(C) Sigma factor (D) Rho factor
16. DNA topoisomerase I of E. coli catalyses
(A) Relaxation of negatively supercoiled DNA
(B) Relaxation of positively supercoiled DNA
(C) Conversion of negatively supercoiled DNA into positively supercoiled DNA
(D) Conversion of double helix into supercoiled DNA
17. In RNA, the complementary base of adenine is
(A) Cytosine (B) Guanine (C) Thymine (D) Uracil
18. Ribonucleotides of RNA primer are replaced by deoxyribonucleotides by the enzyme:
(A) DNA polymerase I (B) DNA polymerase II (C) DNA polymerase III holoenzyme (D) All of these

19. An Okazaki fragment contains about
(A) 10 Nucleotides (B) 100 Nucleotides (C) 1,000 Nucleotides (D) 10,000 Nucleotides
20. Translocation of the newly formed peptidyl tRNA at the A site into the empty P site involves
(A) EF-II, GTP (B) EF-I, GTP (C) EF-I, GDP (D) Peptidyl transferase, GTP

Section B: Attempt All Questions Each is 5 Marks

1. Why did nature choose for uracil instead of thymine in RNA. Explain 5 marks
2. a. Define gene family 1 mark
b. Write short notes on function elements required for duplication and hereditary purposes in yeast 4 marks
3. Describe the mechanism of action of Telomerase 5 marks
4. a) Describe the initiation process of translation of a eukaryotic organism 3 marks
b) (i) Define RNA polymerase processivity 1 mark
(ii) What is the significance of this processivity? 1 mark
5. a. Using a diagram describe the structure of RNA molecule 3 marks
b) Illustrate the formation of a tripeptide molecule composed of the following amino acid sequence FAS 2 marks
6. a. Describe five broad classes of proteins are generally recognized as being encoded by tumor-suppressor genes 2.5 marks
b. Describe the molecular mechanism of transposition 2.5 marks

Section C: Attempt Any Two Questions each is 10 marks

1. Discuss in details, the function replication fork, and the progressions in front and behind it 10 marks
2. a. Describe a model of splicing mechanism 5 marks
b. How does DNA polymerase distinguish between a replicated and a non-replicated origin? 5 marks
3. Discuss the secretory and endocytic pathways of protein sorting. 10 marks