



BRAINWARE UNIVERSITY

Term End Examination 2021 - 22

Programme – Bachelor of Science (Honours) in Biotechnology

Course Name – Molecular Biology

Course Code - BBTC401

(Semester IV)

Time allotted : 1 Hrs.15 Min.

Full Marks : 60

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question)

1 x 60=60

Choose the correct alternative from the following :

- (1) Which of the following bonds are broken during DNA replication?

a) hydrogen bonds between bases	b) phosphodiester bonds
c) covalent bonds between bases	d) ionic bonds between bases and phosphate groups
- (2) Which base is not found in RNA?

a) adenine	b) cytosine
c) thymine	d) uracil
- (3) How many base pairs are there in one full turn of the B-DNA double helix?

a) 4	b) 10
c) 16	d) 64
- (4) Which technique was used to determine the double-helical structure of DNA?

a) Electrophoresis	b) Chromatography
c) Centrifugation	d) X-ray crystallography
- (5) Which of the following options, A – D, are the pyrimidine bases found in DNA?

a) uracil and thymine	b) thymine and cytosine
c) adenine and thymine	d) cytosine and Uracil
- (6) Who is credited with discovering the structure of DNA?

- a) Crick and Neck
c) Watson and Franklin
- b) Watson and Crick
d) Holmes and Watson
- (7) Semi-conservative DNA replication was first demonstrated in
a) *Drosophila melanogaster*
c) *Streptococcus pneumoniae*
- b) *Escherichia coli*
d) *Drosophila melanogaster*
- (8) Tetracycline blocks protein synthesis by
a) inhibiting binding of aminoacyl tRNA to ribosome
c) inhibiting peptidyl transferase
- b) inhibiting initiation of translation
d) inhibiting translocase enzyme
- (9) Both the strands of DNA serve as templates concurrently in
a) Replication
c) Mismatch repair
- b) Excision repair
d) None of these
- (10) DNA synthesis prokaryotes is
a) unidirectional
c) nondirectional
- b) bidirectional
d) Multidirectional
- (11) Replication occurs once every cell generation during
a) S phase
c) C phase
- b) T phase
d) A phase
- (12) In Prokaryotes, the ribosomal binding site on mRNA is called
a) Hogness sequence
c) Pribnow sequence
- b) Shine-Dalgarno sequence
d) TATA box
- (13) Round structures of Deoxyribonucleic Acid (DNA) around histone proteins are called
a) Mono hybrid genes
c) Chromosomes
- b) Hybrid genes
d) Nucleosomes
- (14) Process in which ribosome reads sequence carried by mRNA and joins amino acids to form protein is called
a) Denomination
c) Segregation
- b) Translation
d) Transcription
- (15) Synthesis of RNA from DNA is
a) Transcription
c) Metabolism
- b) Translation
d) Reduction
- (16) What is not True for DNA in prokaryotes?
a) Present in the form of a compact structure called nucleoid
c) Found in cytoplasm in a supercoiled condition
- b) The coils are maintained by non-histone basic proteins
d) Packaged as nucleosomes along with histones
- (17) Pick the right difference between a DNA and RNA
a) Sugar and phosphate
c) Sugar and pyrimidines
- b) Purines and phosphate
d) Sugar and purines

- (18) Hershey and Chase experiment proving DNA as the genetic material was based on the principle
- a) Transduction
 - b) transformation
 - c) transcription
 - d) translation
- (19) A bacterial colony containing DNA made up of 100% N¹⁵ nitrogen bases is allowed to replicate in a medium containing N¹⁴ bases. After one round of replication the result would be
- a) All individuals will be identical to parents
 - b) All individuals will be hybrids
 - c) Only 50% individuals would be hybrids
 - d) All individuals would have DNA made up of 100% N¹⁴
- (20) Cistron is
- a) The coding sequence of DNA
 - b) The functional unit of DNA molecule that codes for a particular gene product
 - c) Intervening non coding sequence of DNA
 - d) The sequences which are removed during RNA splicing.
- (21) Read the statements given below and identify the incorrect statement
- a) The human genome contains 3164.7 million nucleotide bases
 - b) The average gene consists of 30,000 bp
 - c) The total number of genes is estimated at 30,000.
 - d) Chromosome Y has 231 genes
- (22) The coding sequences found in split genes are called
- a) Operons
 - b) Introns
 - c) Exons
 - d) Cistrons
- (23) The removal of which enzyme affects the synthesis of hnRNA in eukaryotes
- a) RNA polymerase II
 - b) RNA primase
 - c) RNA polymerase III
 - d) RNA polymerase I
- (24) Sickle cell anemia is caused
- a) When valine is replaced by glutamic acid in beta polypeptide chain
 - b) When glutamic acid is replaced by valine in beta polypeptide chain
 - c) When glutamic acid is replaced by valine in alpha polypeptide chain
 - d) When valine is replaced by glutamic acid in alpha polypeptide chain
- (25) Wobble position means
- a) Base pairing
 - b) Altered base on code
 - c) Third altered base on codon
 - d) None of the above
- (26) Peptidyl transferase
- a) Is a 23s rRNA
 - b) Forms peptide bonds
 - c) Component of ribosome
 - d) All the three
- (27) Which mRNA will be translated to a polypeptide chain containing 8 amino acids?
- a) AUGUUAAUAGACGAGUAGCGACGAUG
U
 - b) AUGAGACGGACUGCAUUCCCAACCUG
A

c) AUGCCCAACCGUUAUUCAUGCUAG

d) AUGUCGACAGUCUAAAACAGCGGG

(28) Select the incorrect statement out of the five given below about lac operon when Lactose is present in the medium.

a) Gene – A gets transcribed into mRNA which produces β -galactoside permease

b) Inducer-Repressor complex is formed

c) Lactose inactivates repressor protein

d) RNA polymerase transcribe Z-gene, Y-gene and A-gene

(29) The percentage of human genome which encodes proteins is approximately

a) Less than 2%

b) 0.05

c) 0.25

d) 0.99

(30) The stretch of codons between AUG and a stop codon is called

a) Open reading frame

b) TATA box

c) Colinearity

d) Degenerate

(31) The structural genes of lac operon transcribe mRNA which is

a) Polycistronic

b) Replicative

c) Monokaryotic

d) Monocistronic

(32) If the sequence of bases in DNA is TACCGACCA, then the sequence of codons on the transcript will be

a) ATGGCTGGT

b) ATCCGAACU

c) AUGGCUGGU

d) AUGGACUAA

(33) Genes which are active all the time synthesizing substances needed by the cell are called

a) Cellular luxury genes

b) Metabolic genes

c) House keeping genes

d) Control genes

(34) ISSR is a

a) DNA marker

b) Protein marker

c) Both

d) None of these

(35) At the physiological pH, the DNA molecules are;

a) Positively charged

b) Negatively charged

c) Amphipathic

d) Neutral

(36) DNA replication is

a) Conservative

b) Non-conservative

c) Semi-conservative

d) None

(37) Which of the following is true about DNA polymerase?

a) It can synthesize DNA in the 5' to 3' direction

b) It can synthesize DNA in the 3' to 5' direction

c) It can synthesize mRNA in the 3' to 5' direction

d) It can synthesize mRNA in the 5' to 3' direction

(38) DNA replication in eukaryotes occurs only in

a) G1 phase

b) S phase

c) G2 phase

d) M phase

- (39) If the mutation has a negligible effect on the function of a gene, it is known as a
- a) Silent mutation
 - b) Frame shift mutation
 - c) Substitution mutation
 - d) Insertion mutation
- (40) Which of the following mechanisms will remove uracil and incorporate the correct base?
- a) Direct repair
 - b) Base excision repair
 - c) Mismatch repair
 - d) Nucleotide excision repair
- (41) Which of the following has the self-repairing mechanisms?
- a) DNA and RNA
 - b) DNA, RNA and protein
 - c) Only DNA
 - d) DNA and proteins
- (42) The function of enzyme involved in base excision repair is
- a) Addition of correct base
 - b) Addition of correct nucleotide
 - c) Removal of incorrect base
 - d) Removal of phosphodiester bond
- (43) The DNA polymerase involved in base excision repair is
- a) DNA polymerase α
 - b) DNA polymerase σ
 - c) DNA polymerase β
 - d) DNA polymerase γ
- (44) An alteration in a nucleotide sequence that changes a triplet coding for an amino acid into a termination codon is
- a) Nonsense mutation
 - b) Mutagenesis
 - c) Mutation
 - d) Mutagen
- (45) A point mutation that replaces a purine with another purine, or a pyrimidine with another pyrimidine
- a) Nonsense mutation
 - b) Silent mutation
 - c) Transition mutation
 - d) Transversion
- (46) The enzyme of E.coli is a nuclease that initiates the repair of double stranded DNA breaks by homologous recombination
- a) DNA glycosylase
 - b) DNA ligase
 - c) DNA polymerase
 - d) RNA polymerase
- (47) Recombinational repair is often due to
- a) Incorporation of many incorrect nucleotides by DNA pol
 - b) Many cystidine dimer and associated large gaps in a strand
 - c) Many thymidine dimer formation and associated large gaps in a strand
 - d) All of these
- (48) The enzyme photolyase is used in what method of repair?
- a) Base excision
 - b) Photo reactivation
 - c) Nucleotide excision
 - d) None of these
- (49) Name the site where upstream sequences located?
- a) Prior to start point
 - b) After the startpoint
 - c) Right border of DNA
 - d) In the middle of DNA
- (50) Which of the following is TRUE for the RNA polymerase activity?

- a) DNA dependent DNA synthesis
c) DNA dependent RNA synthesis
- b) Direct repair
d) RNA dependent RNA synthesis
- (51) Who discovered RNA polymerase?
- a) Samuel B. Weiss
c) Jerard Hurwitz
- b) Nirenberg
d) Darwin
- (52) What is the work of the sigma factor in transcription?
- a) Helicase action
c) Transcription elongation
- b) Transcription initiation
d) Transcription termination
- (53) Which of the following transcription termination technique has RNA dependent ATPase activity?
- a) Intercalating agents
c) Rho independent
- b) Rho dependent
d) Rifampcin
- (54) Which of the following are non-sense codons?
- a) AUG
c) UAA
- b) GUG
d) UCU
- (55) What is the direction in which the transcript produced by RNA polymerase grows?
- a) 3'→5' direction on 3'→5' strand
c) 3'→5' direction on 5'→3' strand
- b) 5'→3' direction on 5'→3' strand
d) 5'→3' direction on 3'→5' strand
- (56) Which of these is the 1st event to take place during transcription initiation?
- a) Formation of a closed initiation complex
c) Formation of absorptive transcript
- b) Formation of open initiation complex
d) Promoter clearance
- (57) RNA required for the protein synthesis
- a) mRNA
c) rRNA
- b) tRNA
d) All of these
- (58) The DNA chain acting as template for RNA synthesis has the following order of bases, A GCTTCGA. What will be the order of bases in mRNA?
- a) TCGAAGCT
c) TCGAUCGU
- b) UGCUAGCT
d) UCGAAGCU
- (59) In Eukaryotes the region between 1st AUG and 5'-G cap is known as _____
- a) Leader
c) UTR
- b) Attenuator
d) ORF
- (60) What is the correct definition of excision repair?
- a) Repair of a single damaged nucleotide
c) Removal of a single damaged nucleotide
- b) Repair of a damaged oligonucleotide
d) Removal of a damaged oligonucleotide