Q1/ Multiple choices (circle the correct answer). (45 M.)

1. Amino acids are the building blocks of
2. DNA and RNA
3. Lipids
4. Proteins
5. In a DNA double-helix, nucleotides on complementary strands are held together by
6. hydrogen bonds
7. phosphodiester bonds
8. none of the above
9. Which of the following statements true?
10. Each DNA molecule is a single gene
11. DNA molecules are in the shape of a double helix
12. mRNA molecules are in the shape of a double helix

4- A promoter is a

a- binding site for DNA polymerase.

b- binding site for RNA polymerase.

1. start signal for replication.
2. Which of the following statements is true about the protein synthesis process?
3. When a section of a DNA molecule unwinds and unzips along its bases, a transfer RNA forms by copying one side of the DNA.
4. The transfer RNA leaves the nucleus and goes out to the ribosomes in the cytoplasm where proteins are assembled with the help of messenger RNA.
5. Both statements are false
6. Each tRNA anticodon has three bases. The three base combinations are codes for attracting specific kinds of:
7. Endoplasmic reticula
8. Ribosomes
9. Amino acids.
10. A DNA codon consists of:
11. One nucleotide
12. Three nucleotides
13. Hundreds or even thousands of nucleotides
14. Which of these catalyzes the synthesis of RNA from a DNA template
15. DNA ligase
16. DNA polymerase
17. RNA polymerase
18. The RNA components of ribosomes are synthesized in the \_\_\_\_\_\_\_\_.
    1. cytoplasm
    2. nucleus
    3. nucleolus
19. A mRNA molecule is produced by
20. Transcription
21. Duplication
22. Translation
23. Which of the following is the correct sequence of event with reference to the central dogma?
24. Transcription, Replication, Translation
25. Duplication, Translation, Transcription
26. Replication, Transcription, Translation
27. Which of the following processes does not occur in prokaryotes?  
     a-Transcription  
     b-Splicing  
     c-Translation
28. Which of the following base-pairing rule is correct?  
     a- Adenine with guanine and thymine with cytosine  
     b- DNA base pairing is non-specific  
     c- Adenine with cytosine and guanine with thymine
29. What is produced during transcription?
30. RNA polymerase

b- DNA molecules

d- Proteins

15- During translation, the type of amino acid that is added to the growing polypeptide depends on the

b- Anticodon on the mRNA and the anticodon on the tRNA.

c- Anticodon on the rRNA and the codon on the mRNA.

d- Codon on the mRNA and the anticodon on the Trna

Q2/ Multiple choices (circle the correct answer). (45 M.)

**1- Short strands of ——- primers are used in DNA replication.**

1. DNA
2. RNA
3. Histone
4. Protein

**2- During DNA replication the synthesis of the leading strand of DNA results in fragments known as**

1. Okazaki fragments
2. Satellite segments
3. Kornberg segment
4. Double -helix segment

**3- Which of the following base-pairing rule is correct?**

1. Adenine with guanine and thymine with cytosine
2. DNA base pairing is non-specific
3. Adenine with cytosine and guanine with thymine
4. Adenine with thymine and guanine with cytosine

**4- True replication of DNA is due to**

1. Phosphate backbone
2. Hydrogen bonding
3. Complementary base pairing rule
4. None

**5- During translation, a transfer RNA (tRNA) molecule is associated with:**

1. An amino acid molecule, a DNA molecule, and a ribosome.
2. An amino acid, a messenger RNA molecule and a ribosome.
3. RRNA molecule, DNA molecule, and a phosphate
4. An amino acid, rRNA and DNA

**6-A promoter is \_\_\_\_\_\_\_\_.**

1. a specific sequence of DNA nucleotides
2. a specific sequence of RNA nucleotides
3. a protein that binds to DNA
4. an enzyme that synthesizes RNA

**7-The function of β subunit of polymerase is**

1. Template binding
2. Catalytic binding
3. Promoter binding
4. Cation binding

**8- Which of the following processes does not occur in prokaryotes?**

1. Transcription
2. Splicing
3. Translation
4. Replication

**9- How many RNA polymerases are present in a bacterial system?**

1. 4
2. 2
3. 1
4. 3

**10-Translation is terminated when a stop codon is presented at the \_\_\_\_\_\_\_\_ site.  
A.**AB.P  
C.E  
E. either A or C

**11- Which of the following proteins first binds to TATA box during transcription?**

1. TF II A
2. TF II D
3. TF II B
4. RNA polymerase

**12-The location of core promoter in eukaryotes is a short DNA sequence known as a [TATA](https://en.wikipedia.org/wiki/TATA_box)**

**[box](https://en.wikipedia.org/wiki/TATA_box),is**

1. at the transcription start site
2. approximately 90 bases upstream of the transcription start site
3. approximately 10 bases upstream of the transcription start site
4. approximately 25 bases upstream of the transcription start site

**13- The sigma factor……………………**

1. is responsible for recognizing the termination sequence
2. provides the catalytic function of cleaving off pyrophosphates during mRNA synthesis
3. recognizes the promoter
4. accomplishes DNA restriction

**14- Proofreading and repair occur**

1. at anytime during and after synthesis of DNA
2. only before DNA synthesis
3. Only in the presence of DNA polymerase
4. Only in the presence of an excision repair mechanism.

**15-During DNA replication what is the first process to occur?**

1. Sealing of the nicks between short DNA sections
2. Synthesis of the lagging strand
3. Unwinding of parental DNA
4. Synthesis of the leading strand

Q3/ Outline the three steps involved in processing pre- mRNA in eukaryotes before translation.

(25 M.)

Q4/ a- What is the PCR? (20 M.)

1. Comparative between DNA Replication and PCR.

Q5/ Transcribe this DNA strand into an mRNA strand (10 M.)

5- ATGCCTAGGTACCTATGA-3

3- TACGGATCCATGGATACT-5

Q6/ Mention the major types of RNA and their functions (20 M.)

Q7/ What are the roles of [TATA-binding protein](https://en.wikipedia.org/wiki/TATA-binding_protein) (TBP), α factor, RNA polymerase III, and [Transcription factors](https://en.wikipedia.org/wiki/Transcription_factors) of DNA in transcription? (20 M.)

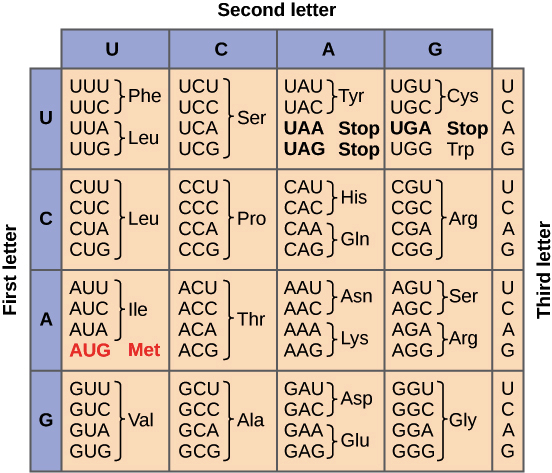
**Q8 / Answer these questions briefly. (8 M.)**

1. What is the role of topoisomerase in DNA replication?
2. What happens if DNA polymerase 1 is absent?
3. Which type of DNA is more stable?
4. Which side of DNA has continuous replication? Why?

**Q9 /**What are the stages of translation? Briefly describe what occurs in each stage. **(7 M.)**

**Q10 /** If you have a polypeptide sequenced as (start amino acid, Glutamic, Alanine, Glycine)

What is the sequence of the mRNA and DNA for this polypeptide, and then if a secondC deletedin the DNA sequence write down the new DNA, mRNA and polypeptide chain sequences. Use this table for your answer. **(10 M.)**



**Q11 /** Numerate types of markers, and describe molecular markers in detail. **(10 M.)**

**Q12/** What is protein and describe structure of proteins in short? **(10 M.)**

|  |
| --- |
| ***Q13:*** *Define the Polymerase Chain Reaction, and write all stages for this machine with graph.* *(10 Marks)*  ***Q14:*** *Write what you know about transcription and translation in animal cell.* *(10 Marks)*   * ***Q15****: Account the functions for all component helps to make the DNA replications. (10 Marks)*   ***Q16:*** *Write what you know about DNA extraction from blood samples. (10 Marks* |
| ***Q17/ Another type of examinations:***  ***Q:*** *Account* *for the following phrases*: *(7 Marks)*   1. *Using the 1% and 3% of agarose gel to test the genome DNA and part of DNA, respectively.* 2. *You must add the Ethidium bromide to the gel or to become covered on it, when you need to take DNA photo.* 3. *DNA sample must mixed with 6X Loading Buffer when load it in the gel electrophoresis.* 4. *Adding the DNA Ladder Standard to the right side of the gel.* 5. *Using the electric field in the DNA running on the agarose gel.* 6. *Using isopropanol in DNA extraction.* 7. *The sticky end in DNA fragment is best than Blunt end in cloning process.* |