

BIOLOGY L3 MOCK EXAM TRIMESTER 2

2016 – 2017

QUESTION 1	
	28 MARKS

Choose the correct answer for each of the following questions by circling:

- How do you know when a physical reaction has taken place? [2]
A. Formation of a new solid
B. Production of heat
C. Production of light
D. A change in state of matter
- Which of the following statements is **correct** about chemical equations? [2]
A. The reactants are on the right side of the arrow
B. The products are on the left side of the arrow
C. The number of atoms of the same element, are equal on both sides of the equation
D. The number of atoms in the product is double that of the reactants
- Which of the following molecules has the general formula $(\text{CH}_2\text{O})_n$? [2]
A. Carbohydrate
B. Protein
C. Fat
D. Nucleic Acid
- What distinguishes the molecule of protein from other large biological molecules? [2]
A. They contain carbon and oxygen
B. They contain carbon and hydrogen
C. They contain hydrogen and oxygen
D. They contain sulphur and nitrogen
- Which of the following molecules is inorganic? [2]
A. Cellulose
B. Water
C. Hemoglobin
D. Testosterone
- Which of the bonds in ATP produces the highest amount of energy when broken? [2]
A. Between ribose and the first phosphate group
B. Between the first and second phosphate group
C. Between the second and third phosphate group
D. Between ribose and adenine base

Answer the following questions:

- Explain the large number of different types of proteins in an organism's body. [2]

- Explain the unlimited variety of shapes and structure of organic compounds. [2]

9. Complete the table.

[12]

Biological Molecules (Macromolecules)	Building Blocks (Monomers)	Example	One Function of the given Example
		Cellulose cell wall	
	Glycerol and Fatty Acid		
Protein			
			Store, communicate and transfers genetic information

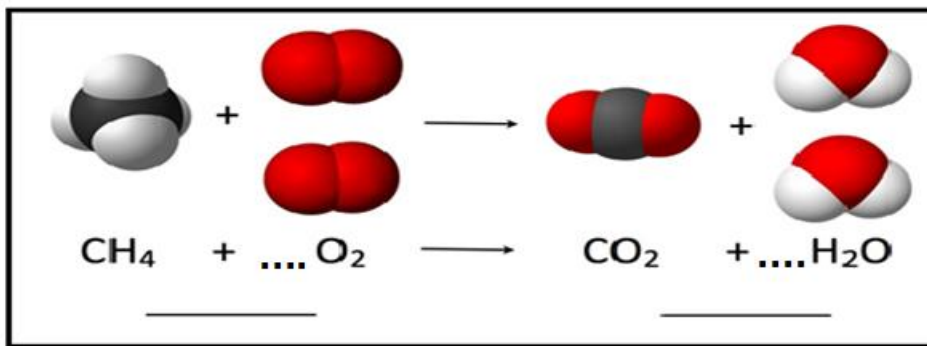
QUESTION 2	
	23 MARKS

10. Choose the appropriate term from **column 2** and write the number in **column 1**.

[5]

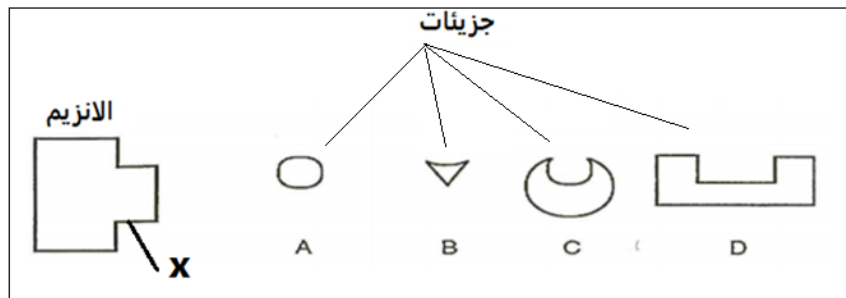
Column 1	Column 2
Organisms obtain energy from inorganic substances such as Hydrogen Sulphide ()	1. Activation Energy
Molecules made from repeating small units linked together by covalent bonds ()	2. Chemical Reaction
A process by which chemical bonds are broken or made to create new substances ()	3. ATP
The minimum amount of energy needed for a chemical reaction to occur ()	4. Chemoautotrophs
The flow and transformation of energy in the universe ()	5. Polymers
()	6. Thermodynamics

In the following chemical reaction:



11. Identify the reactants by writing **R** and the products by writing **P**, on the blank lines in the image above. [1]
12. Balance the equation. [1]
13. Explain the significance of balanced equations. [1]

The diagram shows an enzyme and four different molecules (**A**, **B**, **C**, **D**) in a solution in a beaker.



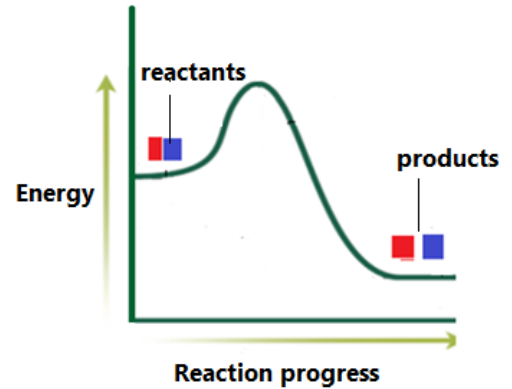
14. What does **X** indicate on the enzyme, in the above diagram? _____ [1]
15. Which of the molecules (**A**, **B**, **C** or **D**) will successfully form an enzyme-substrate complex. [2]
Justify your answer.

16. Describe how enzymes work to reduce the energy required to start a chemical reaction. [2]

Use the diagram below to answer **Q17** and **Q18**.

17. Draw a dotted line on the given graph, to show the energy level in the absence of enzymes. [1]

18. Is the chemical reaction endothermic or exothermic? [2]
Justify your answer.

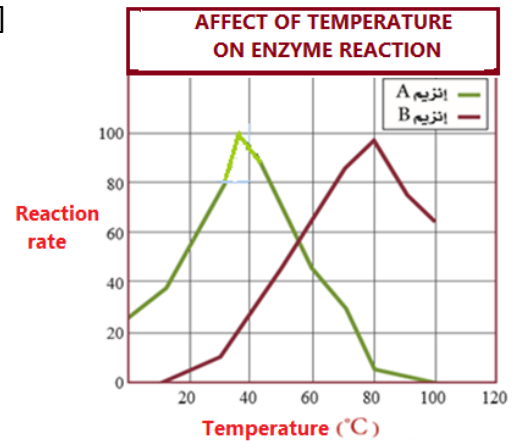


Use the graph to answer the **Q19**, **Q20**, **Q21** and **Q22**.

19. Identify the temperature at which enzymes A and B work best at. [1]
A _____ and B _____.

20. Which enzyme (A or B) would be found in the Human body and which enzyme (A or B) would be found in bacteria located in hot springs. [1]

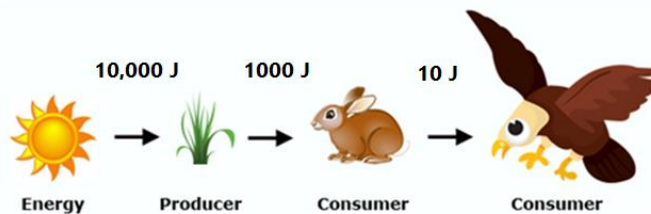
Human : _____ Bacteria : _____



21. Use the graph to describe the relationship between temperature and enzyme activity. [2]

22. Name one other factor that affects enzyme action. _____ [1]

23. Explain how the food chain is an example of the second law of thermodynamics. [2]



QUESTION 3	
	24 MARKS

Choose the correct answer for each of the following questions by circling:

24. What do the steps of the twisted ladder of the DNA molecule form? [2]
 A. Five carbon sugar
 B. Phosphate
 C. Nitrogen-based pairs
 D. Joined sugar and phosphate
25. What does 3' and 5' indicate in a DNA strand? [2]
 A. The length of the DNA strand
 B. The base pair rule
 C. The number of phosphate atoms
 D. The orientation or the numbered carbons in a DNA molecule
26. What is produced from DNA replication? [2]
 A. Two completely new DNA molecules
 B. One completely new mRNA molecule
 C. Two molecules of DNA each contains a strand from the original (parent)
 D. One completely new DNA molecule and one complete original DNA molecule
27. What is produced from the transcription process? [2]
 A. Amino acid chain
 B. mRNA molecule
 C. Complementary DNA strand
 D. Okazaki fragments

Use the table to answer **Q28, Q29** and **Q30**.

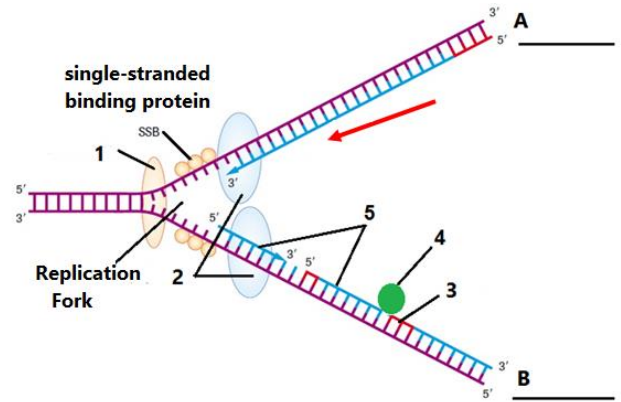
Nitrogen Base	A	T	C	G
Organisms				
Human	30.9	29.4	19.8
Mouse	28.6	28.4	21.5

28. Write the expected percentage of Guanine in Humans and mice, in the table. [1]

29. Infer the relationship between the nitrogen bases. [2]

30. Write the expected percentage of Uracil in mRNA transcribed from Human DNA. Justify your answer. [2]

Use the diagram to answer **Q31 - Q34**.



31. Name the process illustrated in the diagram.
 _____ [1]

32. Complete the table to name parts **1, 2, 3** and **5** in the diagram.
 (4 has been given). [4]

1.	4. DNA ligase
2.	5.
3	

33. (i) On the diagram, identify which chain (**A or B**) is the leading strand and the lagging strand. [1]

(ii) Describe two observational points from the diagram to justify your answer. [2]

34. Complete the table to show the roles of the enzymes involved in the process above. [3]

Enzyme 1	
Enzyme 2	
Ligase (Enzyme 4)	

QUESTION 4	
	25 MARKS

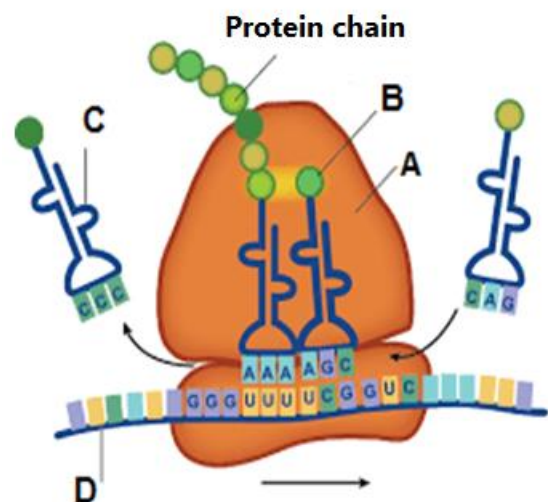
Use the diagram to answer **Q35 - Q38**.

35. Name the process illustrated in the diagram. [1]

36. Where does this process occur? [1]

37. Name structures **A – D** [4]

A _____ B _____
 C _____ D _____



38. Look at the diagram. Explain briefly how structure C is structurally adapted to its function in the process illustrated in the diagram. [2]

39. What will happen if the codon AUG (methionine) did not exist? [1]

40. Compare between each pair. [4]

(i)	Codon	Anti-codon
(ii)	Nucleosome	Nucleotide

The codon of some Amino acids are:

GCU :Alanine	UGU :Cysteine	Methionine AUG:	UAU :Thyrosine	CGA: Arginine	GUC: Valine
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41. Infer the sequence of amino acids of a polypeptide chain for this segment of DNA strand; [6]

3`-G-C-T-C-G-A-A-C-A-5`

42. Some codons do not code for amino acids. Explain. [1]

43. The table below illustrates three types of possible mutations. Complete the table to identify the type of mutation. [3]

Nucleotide Sequence of a Segment of DNA Strand		Type of Mutation
① <u>9 bases</u> GAGACTTAC	
② <u>9 bases</u> GAGACTTAC	
③ <u>9 bases</u> GAGACTTAC	

44. The diagram in the table below shows a mutation in a Human chromosome. [2]

- (i) Name the type of syndrome
- (ii) State the cause of the mutation

<p>Normal chromosome</p>	<p>Abnormal chromosome</p>	(i) Type of syndrome: _____ (ii) Cause: _____ _____ _____ _____ _____
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