



INDIAN SCHOOL AL WADI AL KABIR

UNIT TEST (2023 - 24)

Class: XI
Date:01.06.2023

Sub: BIOLOGY (044)
Set - 1

Max Marks: 30
Time : 1 hour

General Instructions:

- (i) All questions are compulsory.
(ii) The question paper has five sections and 14 questions. All questions are compulsory.
(iii) Section–A has 6 questions of 1 mark each; Section–B has 3 questions of 2 marks each; Section– C has 3 questions of 3 marks each; Section– D has 1 case-based questions of 4 marks and Section–E has 1 question of 5 marks.
(iv) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
(v) Wherever necessary, neat and properly labeled diagrams should be drawn.

<u>SECTION – A</u>		
Q.No.	QUESTION	Marks
1	Which of the following are not membrane-bound? a) Ribosomes b) Mesosomes c) Vacuoles d) Lysosomes	1
2	Mitosis can be observed in _____. a) Polyploid individual b) Diploid individual c) Haploid individual d) All the above	1
3	The chemical nature of ‘Silk’ is a) Carbohydrate b) Lipid c) Protein d) Fatty acid	1
4	Which biomolecule is distributed more widely in cell? a) Chloroplast b) RNA c) DNA d) Spaherosomes	1

<p>Question No. 5 to 6 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:</p> <p>a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true and R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.</p>		
5	<p>Assertion: Eukaryotic cells have more DNA than prokaryotic cells. Reason: Eukaryotes are genetically more complex than prokaryotes.</p>	1
6	<p>Assertion: Due to inactivation of the cell cycle, some cells undergo G0 phase. Reason : G0 phase occurs due to non-availability of mitogen and energy rich compounds.</p>	1
<u>SECTION-B</u>		
7	<p>What is Chiasmata? Explain with a diagram. OR Give four differences between Meiosis and Mitosis.</p>	2
8	<p>What is the structure of an amino acids with different groups with the Alpha-Carbon atom. Explain with diagram.</p>	2
9	<p>Explain the ribosomes found in eukaryotic and prokaryotic cells.</p>	2
<u>SECTION-C</u>		
10	<p>What is a centromere? How does the position of centromere form the basis of classification of chromosomes. Support your answer with a diagram showing the position of centromere on different types of chromosomes.</p>	3
11	<p>From your understanding of proteins can you describe what happens when milk is converted into curd or yoghurt? OR How does activation energy change when enzymes are added to a reaction. Explain with a graph.</p>	3
12	<p>Explain six differences between SER and RER.</p>	3

SECTION-D

13	<p>CASE STUDY</p> <p>G1 phase corresponds to the interval between mitosis and initiation of DNA replication. During G1 phase the cell is metabolically active and continuously grows but does not replicate its DNA. S or synthesis phase marks the period during which DNA synthesis or replication takes place. During this time the amount of DNA per cell doubles. If the initial amount of DNA is denoted as 2C then it increases to 4C. However, there is no increase in the chromosome number; if the cell had diploid or 2n number of chromosomes at G1, even after S phase the number of chromosomes remains the same, i.e., 2n.</p> <p>In animal cells, during the S phase, DNA replication begins in the nucleus, and the centriole duplicates in the cytoplasm. During the G2 phase, proteins are synthesised in preparation for mitosis while cell growth continues.</p> <p>Cells in the adult animals do not appear to exhibit division (e.g., heart cells) and many other cells divide only occasionally, as needed to replace cells that have been lost because of injury or cell death. These cells that do not divide further exit G1 phase to enter an inactive stage called quiescent stage (G0) of the cell cycle. Cells in this stage remain metabolically active but no longer proliferate unless called on to do so depending on the requirement of the organism.</p>	
D)	<p>_____ is the procedure in which cell nucleus division occurs through series of events and the daughter chromosome get separated into two daughter nuclei.</p> <p>a) Cytolysis</p> <p>b) Karyokinesis</p> <p>c) Karyocytosis</p> <p>d) Cytokinesis</p>	1

ii)	_____ is the sequence of events through cell duplicates its genome, synthesises of cell constituent takes place and divides into daughter cells. a) Karyokinesis b) Cell-division cycle c) Replication d) Cytokinesis	1
iii)	Name the phase of cell cycle in which DNA replication occurs.	1
iv)	Define cytokinesis.	1
<u>SECTION-E</u>		
14	Explain each and every phase of Prophase I of Meiosis with labelled diagram. OR Explain each and every phase of Mitosis with labelled diagram.	5

MARKING SCHEME

Q. No.	Answer	Marks
Section - A		
1	Ribosomes	1
2	All the above	1
3	Protein	1
4	RNA	1
5	(a) Eukaryotic cells have more DNA than prokaryotic cells because in eukaryotic cells complex chromosomes are composed of DNA and histone proteins. But in prokaryotic cells, histone protein is absent.	1
6	(a) The phase in which cells do not undergo S-phase after G1-phase is known as G0 phase or quiescent stage. It occurs due to non-availability of mitogen and energy rich compounds. The cells remain metabolically active, but no longer proliferate unless called on to do so depending on the requirement of the organisms.	1

Section – B

7 Chiasmata is an X shaped structure where the two homologous chromosomes are attached to each other after recombination.

2

OR

MEIOSIS	MITOSIS
It relates to cell division, which produces four daughter cells, each with half the number of chromosomes as the parent cell.	It defines the cell division that results in the formation of two daughter cells, each with the same number and type of chromosomes as the parent cell.
In meiosis, this kind of cell division takes place (specialized cells) as compared to mitosis.	All cell types, including sex cells, undergo this sort of cell division.
In germ cells, meiosis occurs.	In somatic cells, mitosis takes place.
Meiosis is divided into four stages: prophase I, metaphase I, anaphase I, and telophase I.	Prophase, metaphase, anaphase, and telophase are different stages.
There are two nuclear groups.	There is just one division of nuclear weapons.
The number of chromosomes is decreased by half.	The number of chromosomes remains unchanged.
There is always a diploid mother cell.	Both haploid and diploid mother cells are possible.

8

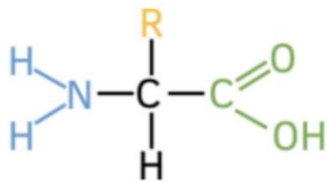


Fig 1. General Structure of an Amino Acid. Different amino acids are told apart by their different R groups.

The Structure of Amino Acids

2

9 Eukaryotes - 80S(60S + 40S)
Prokaryotes - 70S (50S + 30S)

2

Section – C

10

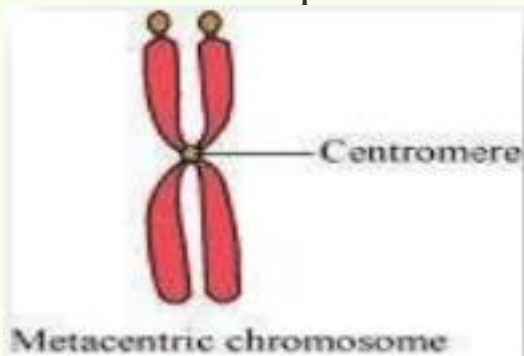
3

Centromere is a primary constriction present on the chromosome where the chromatids are held together.

Chromosomes are divided into four types based on the position of the centromere.

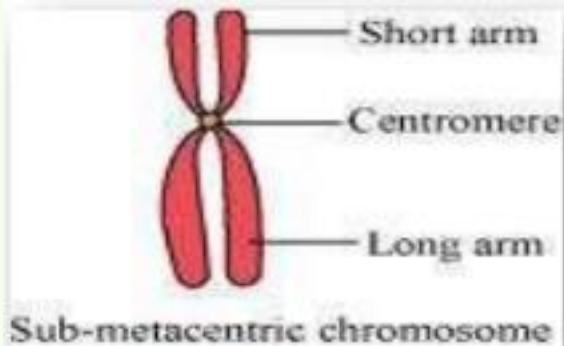
(i) Metacentric chromosome

The chromosomes in which the centromere is present in the middle and divides the chromosome into two equal arms.



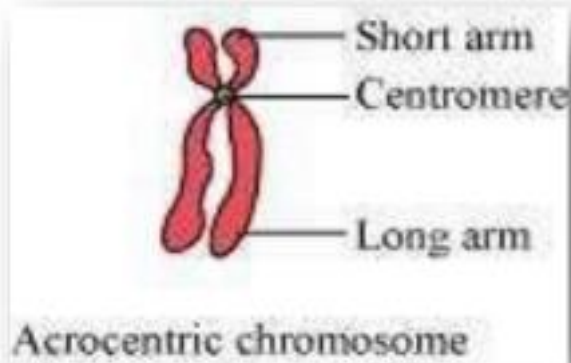
(ii) Sub-metacentric chromosome

The chromosome in which the centromere is slightly away from the middle region is known as a sub-metacentric chromosome. In this, one arm is slightly longer than the other.



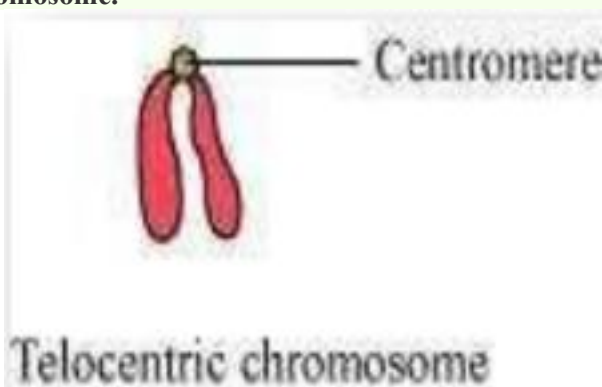
(iii) Acrocentric chromosome

The chromosome in which the centromere is located close to one of the terminal ends is known as an acrocentric chromosome. In this, one arm is extremely long and the other is extremely short.



(iv) Telocentric chromosome

The chromosome in which the centromere is located at one of the terminal ends is known as a telocentric chromosome.



11 Milk is inoculated with lactic acid bacteria. They convert milk sugar lactose into lactic acid. Lactic acid acts on globular milk protein casein, causes its denaturation and conversion to fibrous state. The protein fibers form a reticulum which holds milk fat: This changes milk into curd or yoghurt.

OR

In relation to biology (such as biochemistry), the activation energy (or energy of activation) pertains to the energy needed to initiate a reaction. For instance, the activation energy required to breakdown glucose into pyruvic acid in respiration is two ATP. Accordingly, enzymes speed up chemical reactions by reducing the activation energy of a reaction. Moreover, this reduction by an enzyme allows biological reactions to proceed rapidly at relatively low temperatures tolerable by living organisms.

3

12	<table border="1"> <thead> <tr> <th data-bbox="456 215 663 349">BASIS FOR COMPARISON</th> <th data-bbox="663 215 1015 349">SMOOTH ENDOPLASMIC RETICULUM</th> <th data-bbox="1015 215 1366 349">ROUGH ENDOPLASMIC RETICULUM</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 349 663 595">Meaning</td> <td data-bbox="663 349 1015 595">Smooth ER appears like containing many circular marks which are the interlocking tubular sheets and they may be varied in look and function as well.</td> <td data-bbox="1015 349 1366 595">Rough ER looks like the arrangement of the double membranes which are spotted with the ribosomes all over. They appear consisting of the parallel sheets of membrane.</td> </tr> <tr> <td data-bbox="456 595 663 696">Found near</td> <td data-bbox="663 595 1015 696">Smooth ER is found near the cell membrane.</td> <td data-bbox="1015 595 1366 696">Rough ER is found near the cytoplasm.</td> </tr> <tr> <td data-bbox="456 696 663 819">Originates from</td> <td data-bbox="663 696 1015 819">Rough endoplasmic reticulum by giving off the ribosomes.</td> <td data-bbox="1015 696 1366 819">From nuclear membrane.</td> </tr> <tr> <td data-bbox="456 819 663 887">Ribosomes</td> <td data-bbox="663 819 1015 887">They do not have ribosomes.</td> <td data-bbox="1015 819 1366 887">They have ribosomes.</td> </tr> <tr> <td data-bbox="456 887 663 976">Composed of</td> <td data-bbox="663 887 1015 976">Tubules.</td> <td data-bbox="1015 887 1366 976">Cisternae.</td> </tr> <tr> <td data-bbox="456 976 663 1077">It mainly produces</td> <td data-bbox="663 976 1015 1077">Lipids and Proteins.</td> <td data-bbox="1015 976 1366 1077">proteins.</td> </tr> </tbody> </table>	BASIS FOR COMPARISON	SMOOTH ENDOPLASMIC RETICULUM	ROUGH ENDOPLASMIC RETICULUM	Meaning	Smooth ER appears like containing many circular marks which are the interlocking tubular sheets and they may be varied in look and function as well.	Rough ER looks like the arrangement of the double membranes which are spotted with the ribosomes all over. They appear consisting of the parallel sheets of membrane.	Found near	Smooth ER is found near the cell membrane.	Rough ER is found near the cytoplasm.	Originates from	Rough endoplasmic reticulum by giving off the ribosomes.	From nuclear membrane.	Ribosomes	They do not have ribosomes.	They have ribosomes.	Composed of	Tubules.	Cisternae.	It mainly produces	Lipids and Proteins.	proteins.	3
BASIS FOR COMPARISON	SMOOTH ENDOPLASMIC RETICULUM	ROUGH ENDOPLASMIC RETICULUM																					
Meaning	Smooth ER appears like containing many circular marks which are the interlocking tubular sheets and they may be varied in look and function as well.	Rough ER looks like the arrangement of the double membranes which are spotted with the ribosomes all over. They appear consisting of the parallel sheets of membrane.																					
Found near	Smooth ER is found near the cell membrane.	Rough ER is found near the cytoplasm.																					
Originates from	Rough endoplasmic reticulum by giving off the ribosomes.	From nuclear membrane.																					
Ribosomes	They do not have ribosomes.	They have ribosomes.																					
Composed of	Tubules.	Cisternae.																					
It mainly produces	Lipids and Proteins.	proteins.																					

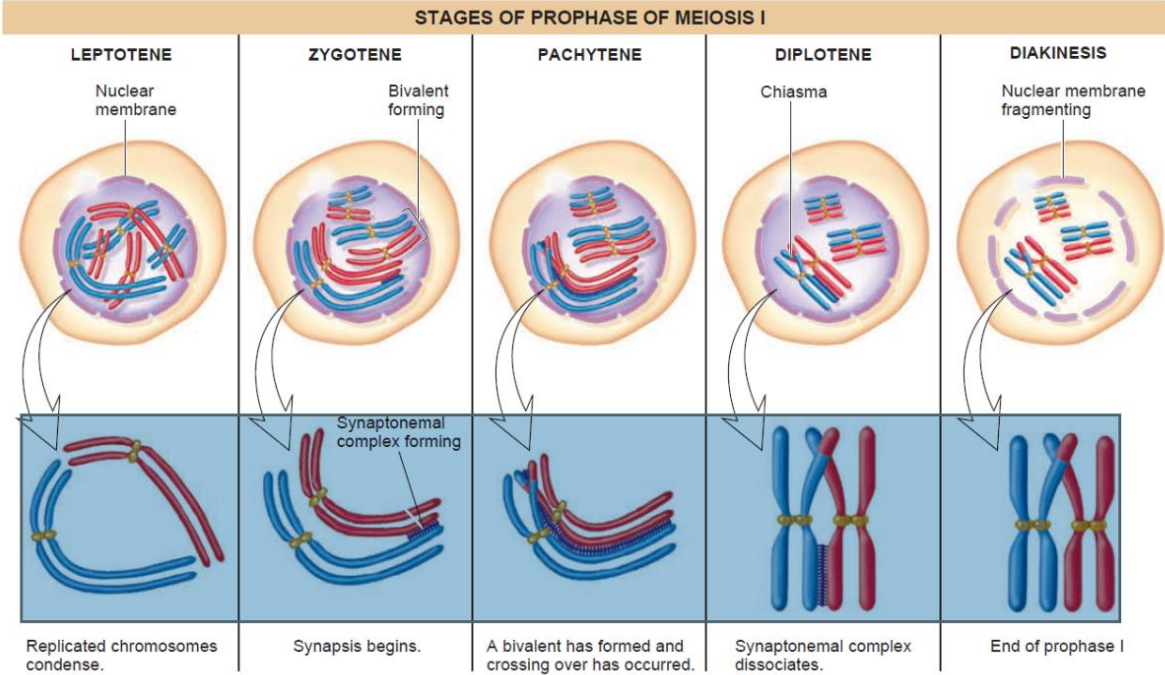
Section – D

13	<p>i) b) Karyokinesis</p> <p>ii) b) Cell-Division Cycle</p> <p>iii) S-Phase (Synthesis Phase)</p> <p>iv) Cytokinesis the physical process of cell division, which divides the cytoplasm of a parental cell into two daughter cells.</p>	1X4=4
----	---	-------

Section-E

14

5



OR

Mitosis, or somatic cell division

