Biology
Classified MCQ
Unit 2
2000 - 2020

Unit 2 – Chemical and cellular Basis of life

Investigates the chemical basis of life.

(1) Which of the following compounds is most abundant in living matter?
(1) Carbohydrates (2) Lipids (3) Proteins (4) Nucleic acids (5) Water
(2000)

(2) The 4 most common elements in living matter are:
(1) C,H,O,P (2) C,H,O,N (3) C,H,N,P (4) C,H,O,S (5) C,H,O,Ca
(2002)

(3) What are the elements necessary for synthesis of chlorophyll?
(1) S, N, Fe (2) S, Mg, Fe (3) S, N, Mg (4) S,N, Mg, Fe (5) Mg, N, Fe
(2002)

(4) A major function of K^+ in a plant is seen in
(1) stomatal movement (2) Chlorophyll synthesis (3) Cell division
(4) Election transport chain (5) Synthesis of vitamins (2003)

(5) Which of the following elements is not a micronutrient?
(1) Mn (2) Cu (3) S (4) Fe (5) Zn (2005)

(6) Which of the following statements in Incorrect?
(1) Nitrogen deficeency symptoms first appear in mature parts of the plant.
(2) Na, K, Ca, Mg are major nutrients of plants.
(3) Fe is necessary for synthesis of chlorophyll.
(4) Mg is used commonly as an enzyme activator.
(5) Ca is involved in the synthesis of cell walls of plants. (2006)

(7) Which one of the following is not a monosaccharide?
(1) ribose (2) galactose (3) glucose (4) maltose (5) fructose (2007)

(8) Which of the following connot be considered as a trace element in plants?
(1) Mg (2) Mn (3) Cl (4) B (5) Mo (2008)

(9) Which one of the following properties of water is most directly responible for maintaining body temperature of warm blooded animals?
(1) High latent heat of fusion (2) High adhesive and cohesive forces
(3) High latent heat of vaporization (4) High specific heat
(5) Polarity (2011)

(10) Which of the following chemical elements is the most abundant in living organisms by mass?
(1) Hydrogen (2) Carbon (3) Sodium (4) Oxygen (5) Nitrogen (2015)

(11) Which of the following polymers is found only in plants?
(1) Glycogen (2) Chitin (3) Ribonucleic acid (4) Inulin (5) Keratin (2015)

(12) The major role of trace elements to living organisms is to act as
1) cofactors of enzyme
2) components of cell structure
3) constituents of hormones
4) components of chlorophyll
5) reactants in metabolism
(2017-1)

(13) Which of the following statements regarding the elements found in living matter is correct?
1) There are 92 naturally occurring elements in living matter
2) Composition of elements in organisms is not constant.
3) Elements found in organisms in less than 0.1% in dry weight are considered as trace elements.
4) Iron is an example for a macroelement found in all organisms.
5) Carbon, hydrogen, oxygen, nitrogen, phosphorus and magnesium are the six most abundant elements of living matter.
(2018-4)

(14) Having strong adhesive and cohesive forces is an important physical property of water molecules. Which of the following functions of plants is not associated with this property?
1) Mechanical support in herbaceous plants
2) Absorption of water from, soil
3) Turgor movements
4) Transport of water within plant
5) Dissolving of materials in protoplasm
(2018-5)

Carbohydrates

(1) Collagen is a
(1) polysaccharide (2) protein (3) steroid (4) lipoprotein (5) glycoprotein
(2001)

(2) The hydrolysis of one molecule of sucrose produces
(1) two fractose molecules.
(2) one glucose molecule and fructose molecule.
(3) two glucose molecules.
(4) one glucose molecule and one galactose molecule.
(5) one fractose molecule and galactose molecule.
(2004)

(3) Which of the following has/have mainly a structural role in living organisms?
(A) Starch (B) Glycogen (C) Cellulose
(D) Phospholipid (E) Acetylcholine
(2004)

(4) Which is the monosaccharide composition of sucrose?
(1) glucose – glucose (2) glucose – ribose (3) glucose – fructose
(4) fructose – fructose (5) glucose - galactose
(2006)

(5) Which one of following substances in plants, has storage as the main function?
(1) glucose (2) cellulose (3) starch (4) pectin (5) phospholipid (2007)

(6) Which of the substances is found only in animals?
(1) Chitin (2) Glycogen (3) Lactose (4) Pectin (5) Hyaluronic acid
(2009)

(7) Which on of the following is a disaccharide?

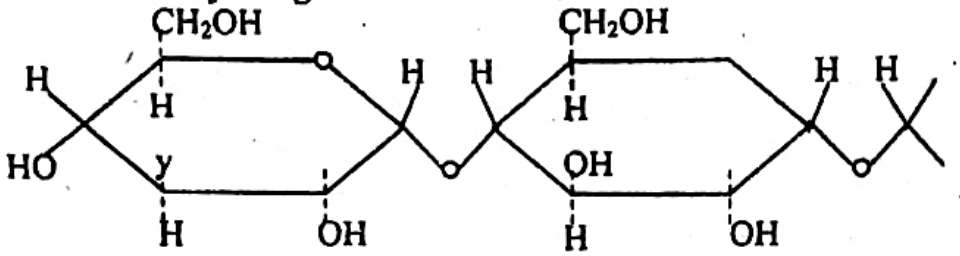
(1) Fructose (2) Maltose (3) Ribose (4) Galactose (5) Glyceraldehyde

(2011)

(8) Which one of the following is the incorrect combination regarding carbohydrates?

(1) Transport in plants – Sucrose
(2) Transport in humans – Glucose
(3) Food storage in plants – Cellulose
(4) Constituent of ATP – Ribose
(5) Constituent of fungal cell walls – Chitin (2012)

(9) Stucture of a part of a polysaccharide molecule is shown in the diagram. What is the type of bond involved in joining the monosaccharide molecules?



(1) Peptide bonds (2) Hydrogen bonds (3) Disulphide bonds
(4) Glycosidic bonds (5) Ionic bonds (2013)

(10) Carbohydrates are commonly stored as starch in plant storage organs. Which of the following properties of starch make/makes it a useful storage material?

(A) It is osmotically inactive. (B) It is easily translocated.
(C) It is chemically non-reactive. (D) It is insoluble in water.
(E) It is a macromolecule. (2015)

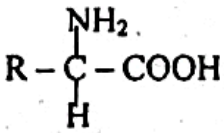
11) Which of the following is/are not a polymer/polymers of glucose?

A) Pectin B) Inulin C) Glycogen D) Chitin E) Cellulose

(2016-42)

Protein

(1)



The chemical formula given above represents the basic constituent unit of

(1) Lipids (2) proteins (3) nucleic acids (4) cellulose (5) starch

(2003)

(2) Which one of the following statements is correct regarding proteins?

(1) Quaternary structure of a protein is produced by folding of a single ploypeptide chain.
(2) Some amino acids found in proteins may contain more than one amino group or carboxyl group.
(3) Linkages between amino acids and proteins are known as glycosidic bonds.
(4) Proteins give, a red colour with biuret reagent.
(5) During heat denaturation of proteins disulphide bonds are broken. (2007)

(3) Which one of the following contains sulphur?
(1) DNA (2) Lipids (3) Proteins (4) Chitin (5) Inulin (2012)

(4) Which one of the following represents the composition of elements of albumin?
(1) CHO (2) CHONPS (3) CHONS (4) CHONP (5) CHOP (2014)

(5) Proteins
1) form the secondary structure due to disulphide bonds.
2) are made up of 26 different amino acids
3) are composed of C, H, O, N, S and P
4) would not be denatured by detergents
5) contribute to transport of materials (2020-2)

Nucleic Acid

(1) Which one of the following features of the DNA molecule determines the genetic information specific for a character?
(1) The spiral nature of the molecule
(2) The sequence of bases of DNA molecule.
(3) The ratio of different bases.
(4) The length of the molecule
(5) The nature of hydrogen bonds between base pairs (2004)

(2) Which one of the following biological molecules is not a polymer?
(1) RNA (2) Stach (3) ATP (4) Glycogen (5) Cellulose (2004)

(3) Which of the following is not a biological polymer?
(1) DNA (2) Protein (3) Cellulose (4) ATP (5) Starch (2006)

(4) Which of the three nitrogenous bases are common to both RNA and DNA?
(1) cytosine, uracil, adenine (2) cytosine, uracil, thymine
(3) guanine, adenine, thymine (4) cytosine, adeniñe, thymine
(5) cytosine, guanine, adenine (2008)

(5) Select the correct symbolic base pairing of DNA.
(A) A = T (B) C ≡ G (C) A ≡ T (D) C = T (E) A = U (2009)

(6) Which of the following is not an essential step in a procedure for cloning a foreigh gene in a bacterium?
(1) DNA molecules are cut into pieces with restriction enzymes.
(2) Agarose gel electrophoresis is used to sepatate pieces of DNA.
(3) DNA pieces in the gel are blotted into nitrocellulose membranes.
(4) Different SNA molecules are joined with ligase enzymes.
(5) Plasmids are used as vectors to introduce DNA into bacterial cells. (2010)

(7) Three types of RNA are involved in the synthesis of proteins in cells. Which of the following shows the correct sequence of the paricipation of the three types of RNA in protein synthesis?

(1) mRNA , tRNA, rRNA (2) rRNA, tRNA, mRNA (3) tRNA, mRNA, rRNA
(4) tRNA, rRNA, mRNA (5) rRNA, mRNA, tRNA (2011)

(8) Which of the following is/are not found in all organisms?

(A) Cytoskeleton (B) MItochondria (C) Ribosomes
(D) Presence of DNA outside the nucleus (E) RNA (2012)

(9) Phosphorous is a structural element in which of the following?

(A) Proteins (B) Carbohydrates (C) Lipids
(D) Nucleic acids (E) Chlorophylls (2013)

(10) Which of the following features is/are common to both DNA and RNA?

(A) Both are polymets of nucleotides. (B) Both have identical sugare molecules.
(C) Both are genetic material. (D) Both have pyrimidine and purine bases.
(E) Both are double stranded. (2013)

(11) The base Adenine (A) o DNA of an organism forms 23.3% of its composition. Which of the following is the most likely base composition of its DNA?

(1) A = T 23.3% and G = C 23.3% (2) A = T 26.7% and G = C 26.7%
(3) A = T 23.3% and G = C 26.7% (4) A = T 26.7% and G = C 23.3%
(5) A = T 23.3% and G = C 76.7% (2016-3)

(12) Some nucleotides

1) contain hexose sugars 2) act as organic cofactors
3) serve as enzymes 4) act as oxygen carriers
5) serve as food reserves (2019-2)

Simple laboratory test for identify carbohydrate, lipid and protein

(1) Three test tuves were prepared as given bellow:

I. Glucose solution
II. Sucrose solution + dilute HCl
III. Starch solution + Amylase

After one hour, Benedict's solution was added to all three test tuves and heated gently in a water bath. A red precipitate was observed in

(1) I only (2) II only (3) I and II only (4) II and III only (5) I, II and III (2000)

(2) Which of the following statements is correct?

(1) Sucrose given a brick red precipitate when heated with Fehling's solution.
(2) Albumin given a violet colour when heated with alkaline copper sulphate.
(3) Lignin stains yellow with safranin.
(4) Coconut oil is stained yellow with sudan III.
(5) Glycogen gives a yellow precipitate with Millon's reagent. (2001)

• Question 3 and 4 are based on the followingexperiments and observations.

Experiment	X solution	Y solution
Fehling's test	Brick red ppt	No colour change
Iodine test	Dark blue colour	Dark blue colour
Biuret test	No colour change	Purple colour

(3) Based on above observations, X contains
(1) glucose and starch only (2) sucrose and starch only
(3) starch and reducing sugars only (4) glycogen and glucose only
(5) fructose and starch only (2002)

(4) Based on above observations only, Y contains
(1) starch and proteins only (2) glucose and proteins only
(3) amino acids and starch only (4) sucrose and proteins only
(5) sucrose, starch and proteins only (2002)

(5) Which of the following tests is/are useful in determining the presence of protein in a sample of food?
(A) Biuret test (B) Millons test (C) Fehling test
(D) Sudan III test (E) Benedict test (2004)

(6) Which of the following carbohydrates give/gives a positive reaction with Fehling's test?
(A) Glucose (B) Sucrose (C) Fructose (D) Maltose (E) Lactose (2009)

(7) Which of the following carbohydrates gives/give a positive reaction in Benedict's test?
(A) Lactose (B) Glucose (C) Sucrose (D) Maltose (E) Ribose (2012)

(8) Which one of the following chemical tests can be used to show the presence of glucose in a solution?
(1) Biuret test (2) Benedict test (3) Iodine test
(4) Sudan test (5) Methylene blue test (2014)

Contribution of the cells and tissues to the functioning of organism.

Contribution of microscopes.

(1) Which of the following statement is not included in the cell theory?
(1) All organisms are composed of one or more cells.
(2) The basic structural unit of an organism is the cell.
(3) The cell is the basic functional unit of an organism.
(4) All cells arise from pre-exiting cells.
(5) All cells are microsco pic (2000)

(2) Which combination of eyepiece x objective lens combination is the best to clearly observe stomate of a leaf?

(1) 5 x 10 (2) 5 x 40 (3) 10 x 100 (4) 10 x 10 (5) 10 x 40 (2009)

(3) Which one of the following is incorrect regarding prokaryotic cells?

(1) All prokaryotic cells have 70 S type of ribosomes.
(2) All prokaryotic cells have peptidoglycans in the cell wall.
(3) All prokaryotic cells do not have a cytoskeleton.
(4) All prokaryotic cells do not have membrane bound organelles.
(5) All prokaryotic cells contain lipids in the cell membranes. (2014)

(4) Which of the following is incorrect regarding living cells?

(1) All organisms are composed of cells.
(2) The basic structural unit of life is the cell.
(3) The basic functional unit of life is the cell.
(4) All cells have a cytoskeleton.
(5) Any organisational level of matter below the level of the cell is not considered as living. (2015)

(5) Which of the following cannot be soon in a typical plant cell when observed under a light microscope?

(1) Chloroplasts (2) Starch granules (3) Nucleus
(4) Mitochondria (5) Vacuoles (2018-2)

(6) Basic structural and functional unit of life is

(1) macromolecule (2) organelle (3) cell (4) tissue (5) organ (2019-1)

(7) Which of the following statements regarding microscopes is correct?

(1) In a light microscope, visible light is passed through the objective lens and then through the specimen.
(2) Projection of a light beam through a vacuum is the principle of an electron microscope.
(3) Scanning electron microscope is used to study the internal structure of cells.
(4) Transmission electron microscope is used for detail studies of living specimens.
(5) Magnification and resolution power are important properties of all microscopes. (2019-3)

(8) Steps involved in observing an onion peel mounted on a glass slide and placed on the stage of a compound light microscope are as follows

A – Adjusting the mirror
B – Use of fine focussing knob
C – Use of coarse focussing knob

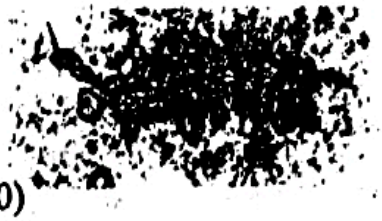
The correct sequence of above steps are

(1) A and Bonly (2) A, C and B (3) B, A and C
(4) C, A and B (5) C, B and A (2020-3)

Structure and functions of the sub cellular units.

(1) Which of the following is only found in prokaryotes
(1) Cytoplasm containing membrane bound organelles
(2) Intracellular matrix of proteins called cytoskeleton
(3) Cell membranes made up of phospholipids and proteins
(4) Ability to fix atmospheric nitrogen
(5) Microbodies containing digestive enzymes (2000)

(2) This figure is an electronimicrograph of a



(1) golgi complex (2) cytoskeleton (3) mitochondrion
(4) lysozome (5) nucleus (2000)

(3) Which of the following is common in plant, animal and bacterial cell?
(1) Mitochondria (2) Cytoskeleton (3) Golgi comlex
(4) Ribosomes (5) Centriole (2001)

(4) Which of the following organelle/organelles is/are involved in detoxification?
(A) Smooth endoplasmic reticulum (B) Peroxisomes (C) Golgi complex
(D) Glyoxisomes (E) Lysosomes (2001)

(5) Which of the following statements is incorrect regarding lysosomes?
(1) They are derived from Golgi complex
(2) They are double membrane bound organelles.
(3) They contain different types of digestive enzymes.
(4) They help in recycling cellular materials.
(5) They are found only in eukaryotic cells. (2001)

(6) Which of the following is considered as the basicunit of life?
(1) Atom (2) Amino acids (3) DNA (4) Proteins (5) Cell (2003)

(7) Ribosomes found in the chloroplasts of a plant cell
(1) are of the same size and composition to those seen in bacteria.
(2) are larger than those seen in bacteria but similar in composition.
(3) are smaller than those in bacteria and different in composition.
(4) are of the same size as those seen in bacteria but different in composition.
(5) are similar in size and composition to those found in the cytoplasm of that eucaryotic cell. (2003)

(8) Which of the following statements is/are correct regarding endoplasmic reticulum?
(A) It consists of a gilayer of lipids and proteins.
(B) It regulates the exit of waste material from the cell.
(C) It is responsible for lipid synthesis and detoxification of toxic substances.
(D) It maintains osmotic balance of cells.
(E) It receives information and generates signals to coordinate activities between cells.
(2004)

(9) Which of the following organelles in the cell is involved in lipid synthesis?
(1) Golgi bodies (2) Microbodies (3) Smooth endoplasmic reticul
(4) Rough endoplasmic reticulum (5) Lysosomes (2005)

(10) Which of the following statement/statements is/are correct regarding cell membranes?
(A) Cell membranes are not permeable to gases.
(B) Inorganic ions enter the cellspassively through cell membranes along with water.
(C) Chemical substances that selectively inhibit cell respiration inhibit passage of mineral ions through cell membranes.
(D) Extracellular enxymes secreted by certain pathogenic bacteria destroy cell membranes.
(E) Transport of water through cell membranes take place against a concentration gradient. (2005)

(11) Which one of the following is a type of inter-cellular connection found in plant cells?
(1) Desmosome (2) Gap junction (3) Tight juction
(4) Middle lamella (5) Plasmodesmata (2006)

(12) Which cell organelle is not bound by a membrane?
(1) mitochondrion (2) chloroplast (3) ribosome
(4) lysosome (5) golgi body (2006)

(13) Which of following is incorrect regarding mitochondria?
(1) They contain enzymes. (2) They contain ribosomes.
(3) They contain DNA. (4) They are found in all living organisms.
(5) They are found in large numbers in heart muscle cells. (2006)

(14) Which one of the following structures in the cell does not contain RNA?
(1) ribosomes (2) nucleolus (3) mitochondria
(4) lysosome (5) chloroplast (2007)

(15) Which one of the organelles in the cell synthesizes lipids?
(1) golgi complex (2) endoplasmic reticulum (3) peroxisomes
(4) lysosomes (5) chloroplasts (2007)

(16) In a plant cell, ATP synthesis can occur in the
(A) cytoplasm (B) cell membrance (C) chloroplast
(D) mitochondria (E) endoplasmic reticulum (2008)

(17) Which one of the following organelles does not have a membrane?
(1) Mitochondria (2) Golgi bodies (3) Lysosomes
(4) Plastids (5) Ribosomes (2010)

(18) Which one of the following structure – function relationships is incorrect?

(1) Nucleus – Rubosome syntesis
(2) Microbodies – Photorespiration in plants
(3) Lysosomes – Detoxification
(4) Mitochondria – Synthesis of ATP
(5) Golgi complex – Synthesis of glycolipids (2011)

(19) Which one of the following connot be seen under a light microscope?

(1) Starch grains (2) Yeast cells (3) Plasmids
(4) Chloroplasts (5) Stomata (2012)

(20) Which of the following is/are not surrounded by a membrane?

(A) Nucleus (B) Lysosome (C) Ribosome
(D) Plasmid (E) Peroxisome (2013)

(21) Which of the following are found only in plants?

(1) 80 S ribosomes (2) Endoplasmic reticulum
(3) Disulphide bonds (4) Glyoxisomes
(5) Golgi complex (2013)

(22) Which of the following processes takes place in the inner membrane of mitochondria?

(1) Conversion of pyruvate to acetyl co-enzyme A
(2) Production of NADH
(3) Ethanol fermentation.
(4) Oxidative phosphorylation
(5) Release of CO_2 (2015)

(23) Which of the following organelles in plant cells converts fats into carbohydrates?

(1) Lysosomes (2) Peroxisomes (3) Glyoxisomes
(4) Endoplasmic reticulum (5) Golgi complex (2016-1)

(24) Which of the following is correct regarding prokaryotic organisms?

(1) All prokaryotic organisms are heterotrophic.
(2) All prokaryotic organisms do not have peptidoglycans in their cell walls.
(3) All prokaryotic organisms can fix atmospheric nitrogen.
(4) All prokaryotic organisms do not have ribosomes.
(5) All prokaryotic organisms are not microorganisms. (2016-2)

(25) Which of the following "structure-function" combinations is incorrect?

	structure	function
(1)	Nucleolus	Ribosome production
(2)	Glyoxisomes	Photorespiration in plants
(3)	Cytoskeleton	Determines the shape of the cell.
(4)	Vacuoles	Store soluble substances needed for cellular activities
(5)	Golgi complex	Produces lysosomes (2016-4)

(26) In eukaryotic cells, in addition to nucleus, DNA is present in
(1) ribosomes and centrioles (2) mitochondria and chloroplasts
(3) nucleolus and peroxisomes (4) microbodies and Golgi bodies
(5) glyoxisomes and endoplasmic reticulum (2017-2)

(27) Which of the following is not a function or smooth endoplasmic reticulum?
(1) Storing of Ca^{2+} (2) Packaging of materials
(3) Synthesis of lipids (4) Synthesis of carbohydrates
(5) Synthesis of proteins (2017-5)

(28) Which of the following is the best combination of cell junction, its location and function?
(1) Tight junction, gut epithelium, communication
(2) Anchor junction, skin epithelium, preventing leakage
(3) Tight junction, gut epithelium, preventing leakage
(4) Gap junction, nervous tissue, preventing leakage
(5) Anchor junction, skin epithelium, communication (2017-7)

(29) Glycolipids are synthesized by which of the following organelle / organelles?
(A) Lysosome (B) Microbody (C) Golgi complex
(D) Endoplasmic reticulum (E) Mitochondrium (2018-42)

(30) Which of the following is/are found only in plant tissues?
(A) Glyoxisomes (B) Plasmodesmata (C) Lysosomes
(D) Peroxisomes (E) Tight junctions (2018-43)

(31) In the cytoskeleton,
(1) microtubules are formed by actin
(2) keratin is not present
(3) microtubules are involved in the movement of organelles.
(4) microfilaments are involved in the movement of chromosomes during cell division.
(5) intermediate filaments provide channels to secrete materials from the cell.
(2019-4)

(32) Some features of cells are as follows.
A - Presence of plasma membrane
B - Presence of 70S ribosomes
C - Occurrence of mitosis
D - Presence of subcellular components suspended in cytosol.
Which of the above features are common to prokaryotic and eukaryotic cells?
(1) A and B only (2) B and C only (3) B and D only
(4) A, B and C only (5) A, B and D only (2020-4)

Importance of cell division.

(1) The point of the attachment of two sister chromatids in the chromosome during propbase of mitrosis is
(1) centriole. (2) centromere. (3) basal body. (4) spindle fibre. (5) chiasma. (2000)

(2) Which is the false statement regarding meiosis
(1) Meiosis occurs during gametogenesis.
(2) Daughter cells contain only half the number of maternalchromosomes.
(3) During embryonic development, the cells multiply by meiosis.
(4) Meiosis causes variations in the progeny.
(5) During meiosis, four daughter cells are formed from one mother cell. (2002)

(3) Rapid mitotic division of cells can be best observed in a prepared slide of which one of the following structures?
(1) Epidermis of leaf (2) Cortex of root
(3) Seminiferous tubules of human testes (4) Endosperm of *Cycas*
(5) Onion root tip (2004)

(4) Which of the following statements is incorrect regarding meiosis?
(1) It ensures that the number of chromosomes of a species remains constant.
(2) Pairing of homologous chromosomes occursat prophase.
(3) It occurs only in diploid and polyploidy cells.
(4) Prophase is the longest phase.
(5) Centromeresfivide during the anaphase. (2004)

(5) In mitosis, the movement of chromosomes from the equatorial plane to the poles occur during.
(1) Prophase (2) Metaphase (3) Anaphase (4) Telophase (5) Interphase (2006)

(6) Which one of the following events takes place in the metaphase of mitosis?
(1) Condensation of chromosomes
(2) Disappearance of nucleolus
(3) Alignment of chromosomes in the middle of the cell
(4) Breaking down of nuclear membrane
(5) Formation of spindle (2007)

(7) Which of the following stages of the cell cycle is seen in the diagram given below?
(1) anaphase (2) prophase (3) metaphase
(4) teophase (5) interphase (2008)

(8) The following are some steps occurring during the process of meiosis.

A –Formation of four daughter cells B – Separation of homologous chrromosomes

C – Exchange of genetic material D – Duplication of chromosomes

E – Division of cytoplasm F – Pairing of homologous chromosomes

Which of the following is the correct order of steps of meiosis?

(1) DCBEFA (2) FDBCEA (3) DFCBEA (4) FDECBA (5) DBFEBA

(2011)

(9) At which of the following stages of the cell cycle does DNA synthesis take place?

(1) Interphase (2) Prophase (3) Metaphase

(4) Anaphase (5) Telophase (2015)

(10) In meiosis, a daughter cell differs from the mother cell as well as from other daughter cells due to which of the following?

(A) Independent assortment (B) Crossing – over

(C) Synapsis (D) Segregation

(E) Formation of the spindle (2017-48)

(11) Which of the following takes place in the metaphase of mitosis?

(1) Formation of spindle

(2) Condensation of chromosomes

(3) Disappearance of nucleolus

(4) Aligning chromosomes in the middle of the cell

(5) Breaking down of nuclear membrane (2018-01)

(12) In the cell cycle,

(1) DNA synthesis takes place during G_1 phase

(2) protein synthesis occurs during G_2 phase.

(3) formation of spindle begins during metaphase

(4) condensation of chromatin fibres takes place during S phase.

(5) division of the cytoplasm occurs during anaphase. (2019-5)

(13) Which of the following statements regarding eukaryotic cell cycle is correct?

(1) Crossing over takes place in metaphase of meiosis I.

(2) Formation of chromatin occurs in G_2 phase.

(3) DNA replication occurs in G_2 phase.

(4) Nuclear envelope reforms during cytokinesis.

(5) Formation of mitotic spindle begins in prophase. (2020-5)

Energy relationships in metabolic processes.

(1) Which one of the following metabolic processes is exergonic?

(1) $ADP + P_i \rightarrow ATP + H_2O$ (2) $6CO_2 + 6H_2O \rightarrow C_6H_{12}O_6 + 6O_2$

(3) $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$ (4) Amino acids → Protein

(5) Glycerol + Fatty acids→Fat (2011)

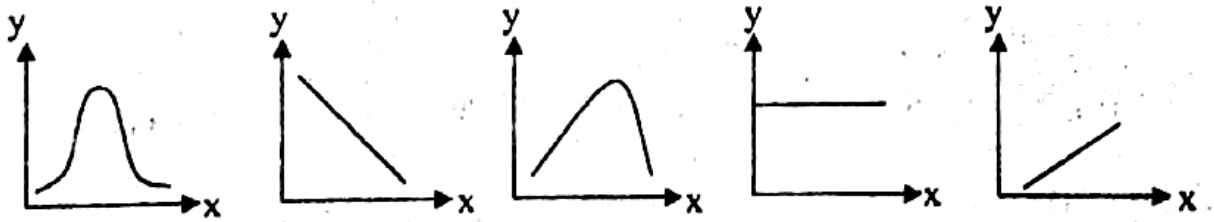
(2) Which of the following processes in cellular metabolism require/requires energy in the form of ATP?
(A) Glycolysis (B) Light reactions of photosynthesis.
(C) Reactions of Krebs cycle. (D) Dark reactions of photosynthesis.
(E) Electron transport in aerobic respiration. (2015)

(3) Which of the following biochemical processes requires ATP?
(1) Photolysis of water during photosynthesis
(2) Absorption of K^+ into root hair cells from soil solution
(3) Diffusion of oxygen into living cells through cell membrane
(4) Attaching a carbon dioxide molecule to RuBP in the Calvin cycle
(5) Conversion of pyruvate to PEP in C_4 pathway (2018-3)

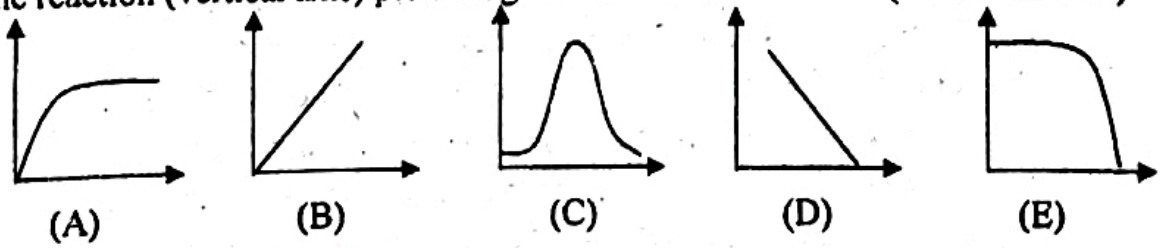
(4) ATP
(1) is a nucleoside containing pentose sugar, adenine and phosphate groups.
(2) can be produced by oxidative phosphorylation using solar energy.
(3) hydrolyses to ADP releasing 30.5 kJ/mol of energy.
(4) is formed in pyruvate oxidation through substrate level phosphorylation.
(5) contains deoxyribose. (2020-6)

Role of enzymes

(1) Which of the above graphs best shows the effect of relative humidity on the tate of transpiration of plants?
(X axis = relative humidity ; Y axis = rate of transpiration) (2000)



- Question 02 and 03 are based on the following graphs (A-E), which show the rate of enzyme reaction (vertical axis) plotted against an unlabelled factor (horizontal axis)



(2) Which one of the above graphs shows the relationship between rate of an enzyme reaction and pH?
(1) A (2) B (3) C (4) D (5) E (2003)

(3) Which one of the above graphs shows the relationship between rate of an enzyme reaction and substrate concentration?

(1) A (2) B (3) C (4) D (5) E (2003)

(4) Which of the following statements is incorrect regarding enzymes?

(1) Enzymes are made up of aminoacids.
(2) Enxyme reactions are reversible.
(3) Enzymes do not alter the nature of end products of the reactions.
(4) Some enzymes contain non-protein parts in their structure.
(5) Enzyme molecules are usually smaller than substrate molecules. (2005)

(5) Competitive inhibitors stop an enzyme activity by

(1) changing the shape of the enzyme.
(2) combining with the substrate.
(3) blocking the active site of the enzyme.
(4) combining with the products of the reaction.
(5) disrupting peptide bonds of the enzyme. (2012)

(6) Which of the following is a characteristic of enzymes?

(1) They do not alter the nature of end products.
(2) They increase the activation energy of a reaction.
(3) They are not substrate specific.
(4) A small amount of enzyme is used up during the reaction.
(5) Any part of the enzyme molecule can catalyze a reaction. (2020-7)

Photosynthesis.

(1) Which of the following is the first stable product formed in C_4 photosynthetic pathway?

(1) Oxaloacetate (2) Phosphoglyceric acid (3) Glucose
(4) Starch (5) Ribulose bisphosphate (2000)

(2) Which of the following statements about photosynthesis is incorrect?

(1) Photosynthesis can be considered an energy releasing process.
(2) Red and blue light are the most effective in photosynthesis.
(3) Chlorophyll is not the only pigment participating in photosynthesis.
(4) The oxygen relased during photosynthesis originates from water.
(5) Carbon dioxide fixation can take place during day time. (2000)

(3) Which of the following is incorrect regarding RuBP carboxylase enzyme?

(1) It is present in the chloroplast. (2) It uses carbon dioxide as a substrate.
(3) It is absent in C_4 plants. (4) It catalyses the production of PGA.
(5) It participates in photosynthesis. (2001)

(4) Which of the following statements is incorrect regarding the light reactions of photosynthesis?

(1) They take place in the thylakoid membrane of grana in the chloroplast.
(2) The e.ectrons lost by P_{680} in photosystem I is replaced by electrons from photolysis of water.
(3) Photosystem II provides energy in the form of ATP for dark reactions.
(4) Photosystem I provides $NADPH_2$ for the dark reactions.
(5) Electron acceptors and carriers involved in light reactions are located whithin thylakoid membrane. (2001)

(5) Which is the correct statement regarding the photosynthesis?

(1) Oxygen is formed in photosynthesis II of the light reaction.
(2) CO_2 is fixed in grana of chloroplast.
(3) ATP is produced in photosystem I of light reaction.
(4) NADPH and H^+ are produced in photosystem II of light reaction.
(5) Light reaction occurs in the stroma of choloroplast. (2002)

(6) C_4 type of photosynthesis is more efficient than C_3 type bacause, in C_4 plants

(A) Carbon dioxide acceptor is more efficient.
(B) Photorespiration does not occur.
(C) Calvin cycle does not occur.
(D) Photolysis of water and productionof carbon dioxide occur in different cell.
(E) Carbon dioxide absorbed by the mesophyll cells is transported to cells of the bundle sheath. (2002)

(7) What zones of the visible spectrum of light, are most useful for photosynthesis?

(1) red and violet (2) red and green (3) green and blue
(4) blue and violet (5) red and blue (2002)

(8) Which one of the following represents the first stable product of C_4 photosynthesis?

(1) Phosphoglyceric acid (2) Oxaloacetate (3) Malic acid
(4) Phosphoenol pyruvate (5) Glycolate (2003)

(9) Which of the following compounds is/are produced during light reaction of photosynthesis?

(A) Oxygen (B) $NADPH_2$ (C) $NADH_2$ (D) ATP (E) Starch (2003)

(10) Which one of the following statements regarding RUBP carboxylase enzyme is/are correct?

(A) It is essential for photosynthesis of plants.
(B) PEP is a better CO_2 acceptor than RUBP.
(C) It is needed for bothC_3 photosynthesis and C_4 photosynthesis.
(D) Phosphoglyceraldehyde is the product of its reaction.
(E) It is found attached to thylakoid membranes of chloroplasts. (2005)

(11) Whic of the following is and icorect statement?
(1) In mesophyll cells of C_4 plants, CO_2 is fixed by PEP.
(2) C_4 plants do not use RuBp for CO_2 fixation.
(3) Synthesis of starch in C_4 plants takes plance in bundle sheath cells.
(4) RiBp carboxylase enzyme is found in the stroma of the chloroplast.
(5) In photo-respiration, RUBP is oxidized by RuBp carbosylase. (2006)

(12) Which of the following statements is incorrect?
(1) In photosystem II of photosynthesis, electorns from water molecules are transferred to $NADH^+$.
(2) Light energy absorbed gy accessory pigments of photosyn-thesis should be transferred to chlorophyll-a molecules, if it is be used in photpsynthesis.
(3) Chloroplast can synthesize ATP only in the presence of sun light.
(4) Both red and blue light need not be present together for light reactions of photosynthesis to take place.
(5) ATP is synthesized by the thylakoid membranes of chloro-plast. (2006)

(13) Photosynthesis is most efficient in
(1) green and blue light. (2) red and blue light. (3) green and red light.
(4) violet and red light. (5) orange and blue light. (2007)

(14) The first stable product formed during carbon dioxide fixation in C_3 photosynthesis is,
(1) phosphoglyceraldehyde (PGAL) (2) glucose (3) ghosphoglyceric acid (PGA)
(4) ribulose bisphosphate (RuBp) (5) oxaloacetate (2007)

(15) When the intensity of light falling on a leaf is gradually increased, its rate of photosynthesis increases up to a point, and then remains unchanged. Which of the following statements is are incorrect regarding this obsevation?
(A) At the beginning, the intensity of light was liniting the rate of photosynthesis.
(B) Concentration of CO_2 sould have become the limiting factor during the the second stage.
(C) At higher light intensities, rate of respirtion may have balanced the rate of photosynthesis.
(D) At higher light intensities, an increase in temperature could have prevented the increase in the reate of photosynthesis.
(E) At higher light intensities, the rate of dark reaction may have become a limiting factor. (2007)

(16) Which of the following is incorrect regarding the leaves of *Zea mays*
(1) Mesophyll cells have well developed grana.
(2) Liberation of O_2 takes place mainly in bundle sheath cells.
(3) Bundle sheath cells have well develpped chloroplasts.
(4) Bundle sheath cells produce pyruvate in the presence of light.
(5) Mesophyll cells have low amounts of RuBp carboxylase. (2010)

(17) Which of the following is/are correct regarding photosynthesis?
(A) The light reactions of photosynthesis provide ATP and $NADPH_2$ for the Calvin cycle.
(B) The correct sequence of flow of electrons during photosynthesis is $H_2O \rightarrow P_{680} \rightarrow$ electron acceptors $\rightarrow P_{700} \rightarrow$ electron acceptors $\rightarrow$ NADP
(C) CO_2 fixation during photosynthesis takes place in the thylakoid membrane.
(D) In C_4 photosynthesis, CO_2 is fixed twice.
(E) The red and green areas of the spectrum are the most efective in photosynthesis.
(2010)

(18) The action spectrum of photsynthesis is a graph showing
(1) the amount of light absorbed by pigments at different wavelengths of light.
(2) the amount of light absorbed by pigments at different times of the day.
(3) the rate photosynthesis at different wavelengths of light.
(4) the amount CO_2 absorbed at different wavelengths of light.
(5) the rate of photosynthesis at different light intensities. (2011)

(19) Which one of the following is involved in the fixation of atmospheric CO_2 in C_4 plants?
(1) PEP carboxylase (2) RUBISCO (3) RUBP
(4) NAd (5) Cytochrome oxidase (2014)

(20) Which of the following organelle/organelles is/are involved in photorespiration in plants?
(A) Chloroplasts (B) Mitochondria (C) Peroxisomes
(D) Lysosomes (E) Golgi complex (2014)

(21) Which of the following comparisons between C_3 and C_4 photosynthesis in plants is incorrect

	C_3	C_4
(1)	CO_2 fixation occurs only once.	CO_2 fixation occurs twice.
(2)	Major CO_2 acceptor is RuBP.	Major CO_2 acceptor is PEP.
(3)	CO_2 fixation enzyme is RuBP carboxylase.	CO_2 fixing enzyme is PEP carboxylase.
(4)	Photosynthetic yield is high.	Photosynthetic yield is usually low.
(5)	First product of Photosynthesis is PGA.	First product of Photosynthesis is oxaloacetate. (2016-6)

(22) Which of the following does not occur in the chloroplast during the light reaction of photosynthesis?
(1) Release of electrons from photosystems I and II.
(2) Photorespiration.
(3) Cyclic photophosphorylation.
(4) Non – cyclic photophosphorylation
(5) Photolysis (2017-6)

(23) Which of the following statements regarding chlorophyll is correct?
(1) Chlorophyll absorbs violet, blue and red light.
(2) Chlorophyll-b is the main light capturing pigment in plants.
(3) Chlorophyll-a is most efficient for capturing green light.
(4) Chlorophyll-a is involved in absorption and dissipation of excessive light energy.
(5) In photosystem-I, chlorophyll-a absorbs light at 680 nm wavelength. (2019-6)

Cellular respiration.

(1) Which of the following biological conversions taking place in the cell yields the highest amount of energy in the form of ATP?
(1) Glucose → pyruvic acid (2) Glucose → lactic acid
(3) Glucose → $CO_2 + H_2O$ (4) Glucose → ethyl alcohol
(5) CO_2 → glucose (2000)

(2) Which of the following statements is incorrect regarding ATP?
(1) ATP is the nucleotide.
(2) ATP is produced during photosynthesis.
(3) In aerobic respiration most ATP per molecular of glucose is produced during Kreb's cycle.
(4) ATP is used in muscle contraction.
(5) ATP is utilized in both respiration and photosynthesis. (2001)

(3) Which one of the following metabolicpathways is common to both fermentation and aerobic respiration?
(1) Glycolysis (2) Conversion of pyruvate to alcohol
(3) Electron transport chain (4) Kreb's cycle
(5) Synthesis of acetyl Co-A from pyruvate (2001)

(4) The incorrect statement regarding ATP is...
(1) ATP is a nucleotide.
(2) ATP is required to synthesis macro molecules.
(3) ATP is required to convert glucose to pyruvic acid during glycolysis.
(4) ATP contains d, high energy phosphate bonds.
(5) A greater amount of ATP is produced during aerobic respiration than in fermentation. (2002)

(5) The source of oxygen which acts as the terminal electron acceptor in the electron transport chain of aerobic organism is
(1) water (2) glucose (3) acetyl Co-A
(4) molecular oxygen (5) pyruvic acid (2003)

(6) Which one of the following biological processes does not require energy in the form of ATP?

(1) Conversion of glucose to pyruvic acid in glycolysis.
(2) Conversion of starch to sugar during seed germination.
(3) Conversion of carbon dioxide to sugar in photosynthesis.
(4) Conversion of amino acids to proteins during protein synthesis.
(5) Transport of sugar from mesophyll cells to sieve tube elements in phloem translocation. (2004)

(7) Which of the statements in the following comparison between Calvin'scycle and Kreb's cycle is incurret?

	Calvin cycle	Kreb's cycle
(1)	CO_2 is absorbed	CO_2 is released
(2)	PGA is an intermediate product	PGA is not an intermediate product
(3)	ATP is used	ATP is produced
(4)	Light is necessary	Light is not necessary
(5)	Takes place in the stroma of chloroplast	Take place in the stroma of mitochondria

(2005)

(8) Oxygen taken up during aerobic respiration in living organisms is incorporated into
(1) CO_2 (2) Water (3) Carbohydrates (4) Pyruvic acid (5) ATP (2005)

(9) Whic of the following is an incorrect statement?

(1) CO_2 may be produced without the use of O_2 in the respirtion of some organisms.
(2) Mitochondria are not necessary for aerobic oxidation of glucose in some organisms.
(3) ATP is the most important product of respiration.
(4) Ethanol is the final product of glycolysis.
(5) ATP is used to activate glucose before it is broken down in glycolysis. (2006)

(10) Which of the following biochemical processed require/requires ATP?

(A) Conversion of glucose to pyruvic acid in glycolysis.
(B) Photolysis of water in photosynthesis.
(C) Absorption of K^+ into root hair cells from soil solution.
(D) Diffusion of O_2 into living cells through the cell membrane.
(E) Transport of sucrose produced in the leaf into sieve tubes during phloem translocation. (2007)

(11) Which of the following statements is incorrect regarding respiration?

(1) Glycolysis produces more ATP under aerobic conditions than under anaerobic conditions.
(2) Growth rate of yeast cells under aerobic conditions is higher than that under anaerobic conditions.
(3) Glycolysis of muscle cells under aerobic conditions dones not yield lactic acid.
(4) The net ATP production during aerobic respiration of glucose is less than 38 mol ecules per molecule of glucose in some cells.
(5) Carbohydrates, lipids and proteins, can act as respiratory substrates in aerobic respiration. (2008)

(12) Which of the following compounds is an intermediate in both respiration and photsynthesis
(1) malate (2) phosphoglycerate (3) acetyl co –A (4) lactate (5) citrate (2008)

(13) Which one of the following molecules on oxidation will yield the greates amount of energy for a cell?
(1) Ethanol (2) ATP (3) Glucose (4) Sucrose (5) Pyruvic acid (2009)

(14) Which statement of comparison between cellular respiration and photorespiration is incorrect?
(1) Cellular respiration is a useful process while photorespiration is a wasteful process.
(2) In both processes, carbohydrate is oxidised by O_2.
(3) Both processes need mitochondria.
(4) Cellular respiration occurs in all plants but photorespiration occurs in only some plants.
(5) PGA is an intermediate in both processes. (2009)

(15) Which of the following statements of comparisons between photophosphorylation and oxidative phosphorylation is incorrect?
(1) Photophosphorylation takes place in chloroplasts while oxidative phosphorylation takes place in mitochondria.
(2) Photophosphorylation may be accompanied by release of O_2 while oxidative phosphorylation in accompanied by the utilisation of O_2.
(3) Photophosphorylation may be accompanied by reduction of co-enzymes while oxidative phosphorylation is accompanied by oxidation of reduced co-enzymes.
(4) Both processes use ADP as and electron acceptor.
(5) Phtophosphorylation can take place only in the presence of light while oxidative phosphorylation can take place at any time. (2009)

(16) Which of the following requires/require ATP?
(A) Glycolysis in aerobic respiration.
(B) Calvin cycle in photosynthesis.
(C) Photolysis in photsynthesis.
(D) Electron transport system in aerobic respiration.
(E) Krebs cycle in aerobic respiration. (2009)

(17) The final electron acceptor in anaerobic respiration leading to the formation of ethyl alcohol is
(1) ATP (2) NAD (3) pyruvate (4) Oxygen (5) Acetaldehyde (2010)

(18) MOst of the CO_2 liberated during respiration of glucose arise from the reaction of
(1) Krebs cycle. (2) glycolysis. (3) alcohol fermentation.
(4) oxidative phosphorylation. (5) lactic acid fermentation. (2010)

(19) Which of the following acts as the final electron acceptor in ethanol fermentation?
(1) Acetaldehyde (2) Pyruvate (3) Acetyl coenzyme – A
(4) Molecular oxygen (5) Glucose (2012)

(20) Appeoximately what percentage of ATP is produced by electron transport system in cellular aerobic respiration of glucose?
(1) 63% (2) 58% (3) 89% (4) 11% (5) 79% (2013)

(21) Which of following is incorrect regarding glycolysis?
(1) ATP is produced. (2) ATP is utilized (3) $NADH_2$ is produced.
(4) CO_2 is released. (5) Occurs in the cytosol. (2013)

(22) Which of the following final products are formed during anaerobic respiration of glucose in yeast?
(1) Ethanol and water (2) Ethanol and CO_2 (3) Pyruvic acid and CO_2
(4) Lactic acid and CO_2 (5) CO_2 and water (2014)

(23) Which one of the following is the final electron acceptor in the electron transport chain in animal respiration?
(1) NAD (2) Oxygen (3) Cytochrome C (4) Water (5) NADP (2014)

(24) Which one of the following cellular processes produces ATP from glucose in the absence of oxygen?
(1) Krebs cycle (2) Glycolysis (3) Electron transport chain
(4) Photophosphorylation (5) CO_2 fixation (2014)

(25) Which of the following is common to lactic acid fermentation, alcoholic fermentation and aerobic respiration?
(1) Glycolysis (2) Krebs cycle
(3) Electron transport chain (4) Production of acetyl co-enzyme A from pyruvate
(5) Oxidation of glucose to CO_2 and water (2016-5)

(26) Which of the following is/are the end product / products of oxidative phosphorylation?
(A) ATP (B) Oxygen (C) NAD^+ (D) H_2O (E) CO_2
(2016-41)

(27) Which of the following compounds would yield the maximum amount of energy to a cell by oxidation of one molecule?
(1) Citric acid (2) Oxaloacetic acid (3) NADH
(4) Sucrose (5) Pyruvic acid (2017-4)

(28) A compound formed during ethyl alcohol fermentation, lactic acid fermentation and aerobic
respiration is
(1) oxaloacetate. (2) citrate. (3) acetaldehyde
(4) acetyl CoA. (5) pyruvate (2019-7)

(29) Which of the following statements regarding energy relations in organisms is/are correct?
(A) In cellular respiration, photophosphorylation and oxidative phosphorylation occur
(B) During metabolic reactions, ATP oxidises to ADP.
(C) Energy stored in ATP can be converted to electrical energy.
(D) Substrate phosphorylation occurs in Krebs cycle.
(E) All metabolic reactions release energy. (2019-41)

Answers
Unit 2 – Chemical and cellular Basis of life

Investigates the chemical basis of life.

(1)	5	(2)	2	(3)	5	(4)	1	(5)	3	(6)	2
(7)	4	(8)	1	(9)	4	(10)	4	(11)	4	(12)	1
(13)	2	(14)	5								

Carbohydrates

(1)	2	(2)	2	(3)	4	(4)	3	(5)	3	(6)	3/5
(7)	2	(8)	3	(9)	4	(10)	2	(11)	1		

Protein

(1)	2	(2)	2	(3)	3	(4)	3	(5)	3		

Nucleic Acid

(1)	2	(2)	3	(3)	4	(4)	5	(5)	3	(6)	3
(7)	1	(8)	3	(9)	4	(10)	2	(11)	3	(12)	2

Simple laboratory test for identify carbohydrate, lipid and protein

(1)	5	(2)	2	(3)	3	(4)	1	(5)	3	(6)	5
(7)	5	(8)	2								

Contribution of microscopes.

(1)	5	(2)	5	(3)	2	(4)	4	(5)	4	(6)	3
(7)	5	(8)	2								

Structure and functions of the sub cellular units.

(1)	4	(2)	1	(3)	4	(4)	3	(5)	2	(6)	5
(7)	1	(8)	5	(9)	3	(10)	4	(11)	5	(12)	3
(13)	4	(14)	4	(15)	2	(16)	2	(17)	5	(18)	3
(19)	3	(20)	4	(21)	4	(22)	4	(23)	3	(24)	2
(25)	2	(26)	2	(27)	5	(28)	3	(29)	4	(30)	3
(31)	3	(32)	5								

Importance of cell division.

(1)	2	(2)	3	(3)	5	(4)	all	(5)	3	(6)	3
(7)	3	(8)	3	(9)	1	(10)	1	(11)	4	(12)	2
(13)	5										

Energy relationships in metabolic processes.

(1)	3	(2)	5	(3)	5	(4)	3

Role of enzymes

(1)	3	(2)	3	(3)	1	(4)	5	(5)	3	(6)	1

Photosynthesis.

(1)	1	(2)	1	(3)	3	(4)	2	(5)	1	(6)	5
(7)	5	(8)	2	(9)	1	(10)	5	(11)	2	(12)	1
(13)	2	(14)	3	(15)	4	(16)	2	(17)	1	(18)	3
(19)	1	(20)	5	(21)	4	(22)	2	(23)	1		

Cellular respiration.

(1)	3	(2)	3	(3)	1	(4)	4	(5)	4	(6)	2
(7)	4, 5	(8)	2	(9)	4	(10)	5	(11)	1	(12)	2
(13)	4	(14)	all	(15)	4	(16)	3	(17)	5	(18)	1
(19)	1	(20)	3	(21)	4	(22)	2	(23)	2	(24)	2
(25)	1	(26)	2	(27)	4	(28)	5	(29)	4		