1. A phosphoglyceride is always made up of

(a) only an unsaturated fatty acid esterified to a glycerol molecule to, which a phosphate group is also attached
(b) a saturated or unsaturated fatty acid esterified to a glycerol molecule to, which phosphate group is also attached
(c) a saturated or unsaturated fatty acid esterified to a phosphate group, which is also attached to a glycerol molecule
(d) only a saturated fatty acid esterified to a glycerol molecule to which a phosphate group is also attached

**Definition of phosphoglycerides.** Phosphoric diesters, esters of phosphatidic acids, generally having a polar head group (OH or NH₂) on the esterified alcohol which typically is 2-aminoethanol, choline, glycerol, inositol, serine. The term includes lecithins, cephalins.

The alcohol here is **glycerol**, to which two fatty acids and a phosphoric acid are attached as esters. This basic structure is a phosphatidate. Phosphatidate is an important intermediate in the synthesis of many phosphoglycerides.

<table>
<thead>
<tr>
<th>Phosphatidic acid (phosphatidate)</th>
<th>Phosphatidylinositol</th>
<th>Phosphatidylethanolamine</th>
<th>Phosphatidylcholine</th>
</tr>
</thead>
</table>

2. Transition state structure of the substrate formed during an enzymatic reaction is
(a) transient but stable  (b) permanent but unstable
(c) transient and unstable  (d) permanent and stable

By definition, the transition state is the transitory of molecular structure in which the molecule is no longer a substrate but not yet a product. All chemical reactions must go through the transition state to form a product from a substrate molecule. The transition state is the state corresponding to the highest energy along the reaction coordinate. It has more free energy in comparison to the substrate or product; thus, it is the least stable state. The specific form of the transition state depends on the mechanisms of the particular reaction.

In the equation \( S \rightarrow X \rightarrow P \), \( X \) is the transition state, which is located at the peak of the curve on the Gibbs free energy graph.

**Application to Enzymes**

The energy required in Transition state is lowered by enzyme. However, the energy levels of initial and final states remain unchanged.

Enzymes are usually proteins that act like catalysts. The enzyme's ability to make the reaction faster depends on the fact that it stabilizes the transition state. The transition state's energy or, in terms of a reaction, the **activation energy** is the minimum energy that is needed to break certain bonds of the reactants so as to turn them into products. Enzymes decreases activation energy by shaping its **active site** such that it fits the transition state even better than the substrate. When the substrate binds, the enzyme may stretch or distort a key bond and weaken it so that less activation energy is needed to break the bond at the start of the reaction. In many cases, the transition state of a reaction has a different geometry at the key atom (for instance, tetrahedral instead of trigonal planar). By optimizing binding of a tetrahedral atom, the substrate is helped on its way to the transition state and therefore lowers the activation energy, allowing more molecules to be able to turn into products in a given period of time. The enzyme stabilizes the transition state through various ways. Some ways an enzyme stabilizes is to have an environment that is the opposite charge of the transition state, providing a different pathway, and making it easier for the reactants to be in the right orientation for reaction.
3. Macro molecule chitin is
   (a) phosphorus containing polysaccharide
   (b) sulphur containing polysaccharide
   (c) simple polysaccharide
   (d) nitrogen containing polysaccharide

Chitin \((\text{C}_{\text{8}}\text{H}_{\text{13}}\text{O}_{\text{5}}\text{N})_n\) is a long-chain polymer of an \(\text{N-acetylglucosamine}\), a derivative of \text{glucose}, and is found in many places throughout the natural world. It is a characteristic component of the \text{cell walls} of \text{fungi}, the \text{exoskeletons} of \text{arthropods} such as \text{crustaceans} (e.g., \text{crabs}, \text{lobsters} and \text{shrimps}) and \text{insects}, the \text{radulae} of \text{molluscs}, and the \text{beaks} and \text{internal shells} of \text{cephalopods}, including \text{squid} and \text{octopuses} and on the scales and other soft tissues of \text{fish} and \text{lissamphibians}.\[^{[1]}\] The structure of chitin is comparable to the \text{polysaccharide} \text{cellulose}, forming crystalline nanofibrils or whiskers. In terms of function, it may be compared to the protein \text{keratin}. Chitin has proved versatile for several medicinal, industrial and biotechnological purposes.

4. Which one of the following is polysaccharide?
   (a) Glycogen    (b) Sucrose    (c) Lactose    (d) Maltose

\text{Polysaccharides} such as \text{starch}, \text{glycogen}, and \text{dextrins} are all stored in the liver and muscles to be converted to energy for later use. \text{Amylose} and \text{Amylopectin} are \text{polysaccharides} of \text{starch}. \text{Amylose} has a linear \text{structure} made up of hundreds of \text{glucose} molecules that is linked by a alpha 1,4 \text{glycosidic linkage}. 
5. Which one is amino acid?
(a) Pepsin  (b) Proline  (c) Cysteine  (d) Renin

Amino acids are molecules used to build proteins. All amino acids have a central carbon atom surrounded by a hydrogen atom, a carboxyl group (COOH), an amino group (NH2), and an R-group. It is the R-group or side chain that differs between the 20 amino acids.

C3H7NO2S-cysteine

Cysteine (abbreviated as Cys or C) is a semi-essential proteinogenic amino acid with the formula HO2CCH(NH2)CH2SH. It is encoded by the codons UGU and UGC. The thiol side chain
in cysteine often participates in enzymatic reactions, as a nucleophile. The thiol is susceptible to oxidization to give the disulfide derivative cystine, which serves an important structural role in many proteins. When used as a food additive, it has the E number E920.

It can be seen as serine, but with one of the oxygen atoms replaced with sulfur; replacing said atom with selenium gives selenocysteine.

6. Enzymes often have additional parts in their structure that are made up of molecules other than proteins. When this additional chemical part is an organic molecule, it is called

(a) cofactor (b) Coenzyme (c) Both (a) and (b) (d) substrates

A cofactor is a non-protein chemical compound or metallic ion that is required for a protein’s biological activity to happen. These proteins are commonly enzymes, and cofactors can be considered "helper molecules" that assist in biochemical transformations.

Cofactors can be subdivided into either one or more inorganic ions, or a complex organic or metallo organic molecule called a coenzyme; most of which are derived from vitamins and from required organic nutrients in small amounts. A coenzyme that is tightly or even covalently bound is termed a prosthetic group. The two subcategories under coenzyme are cosubstrates and prosthetic groups. Cosubstrates are transiently bound to the protein and will be released at some point, then get back in. The prosthetic groups, on the other hand, are bound permanently to the protein. Both of them have the same function, which is to facilitate the reaction of enzymes and protein. Additionally, some sources also limit the use of the term "cofactor" to inorganic substances. An inactive enzyme without the cofactor is called an apoenzyme, while the complete enzyme with cofactor is called a holoenzyme.

Some enzymes or enzyme complexes require several cofactors. For example, the multienzyme complex pyruvate dehydrogenase[5] at the junction of glycolysis and the citric acid cycle requires five organic cofactors and one metal ion: loosely bound thiamine pyrophosphate (TPP), covalently bound lipoamide and flavin adenine dinucleotide (FAD), and the cosubstrates nicotinamide adenine dinucleotide (NAD⁺) and coenzyme A (CoA), and a metal ion (Mg²⁺).

7. Which of the following is not a conjugated protein?

(a) Peptone (b) Phosphoprotein (c) Lipoprotein (d) Chromoprotein

A conjugated protein is a protein that functions in interaction with other (non-polypeptide) chemical groups attached by covalent bonding or weak interactions.

Many proteins contain only amino acids and no other chemical groups, and they are called simple proteins. However, other kind of proteins yield, on hydrolysis, some other chemical component in addition to amino acids and they are called conjugated proteins. The non-amino part of a conjugated protein is usually called its prosthetic group. Most prosthetic groups are formed from vitamins. Conjugated proteins are classified on the basis of the chemical nature of their prosthetic groups.

Some examples of conjugated proteins are lipoproteins, glycoproteins, phosphoproteins, hemoproteins, flavoproteins, metalloproteins, phytochromes, cytochromes, opsins and chromoproteins.
Peptones

Peptones are derived from animal milk or meat digested by proteolysis. In addition to containing small peptides, the resulting spray-dried material includes fats, metals, salts, vitamins and many other biological compounds. Peptones are used in nutrient media for growing bacteria and fungi.

Peptides (from, peptós "digested"; derived from, pésséin "to digest") are biologically occurring short chains of amino acid monomers linked by peptide (amide) bonds.

Hemoglobin contains the prosthetic group known as heme. Each heme group contains an iron ion (Fe²⁺) which forms a co-ordinate bond with an oxygen molecule (O₂), allowing hemoglobin to transport oxygen through the bloodstream. As each of the four protein subunits of hemoglobin possesses its own prosthetic heme group, each hemoglobin can transport four molecules of oxygen.

8. Which one is diaminomonocarboxylic amino acid?

(a) Cystine  (b) Lysine  (c) Cysteine  (d) Aspartic acid

In chemistry, a diamino acid, also called a diamino carboxylic acid, is a molecule containing at least one carboxyl and two amine functional groups. Diamino acids belong to the class of amino acids.

Biochemical function

Asparagine, glutamine and lysine are proteinaceous diamino acids which are components of proteins. These three diamino acids are coded by codons of the genetic material and belong therefore to the cationic amino acids.

Ornithine and 2,6-diaminopimelic acid are non-proteinaceous diamino acids.

In biochemistry, diamino acids are of particular interest. Diamino acids are used for the synthesis of specific peptide nucleic acids, such as daPNA. Artificial peptide nucleic acids are capable of forming duplex structures with individual DNA- and RNA-strands and are, therefore, not only called DNA-analog, but also they are considered as candidates for the first genetic material on Earth. The corresponding diamino acids such as 2,3-diaminopropanoic acid were detected in the Murchison meteorite and in a simulated comet.
9. Cellulose, the most important constituent of plant cell wall is made up of

(a) branched chain of glucose molecules linked by a $\alpha - 1, 6$ glycosidic bond at the site of branching
(b) unbranched chain of glucose molecules linked by $\alpha - 1, 4$ glycosidic bond
(c) branched chain of glucose molecules linked by $\beta - 1, 4$ glycosidic bond in straight chain and $\alpha - 1, 6$ glycosidic bond at the site of branching
(d) unbranched chain of glucose molecules linked by $\beta - 1, 4$ glycosidic bond

Amylose and Amylopectin are polysaccharides of starch. Amylose has a linear chain structure made up of hundreds of glucose molecules that is linked by a alpha 1,4 glycosidic linkage. For example, cellulose is a major component in the structure of plants. Cellulose is made of repeating beta 1,4-glycosidic bonds.

Although mammals cannot digest cellulose, it and other plant forms are necessary soluble fibers that mammals can eat. Pectin, for example, slows down the movement of food molecules in the digestive tract, which thereby allows for more necessary nutrients to be absorbed by the body instead of being quickly passed through as waste. Likewise, insoluble fibers like cellulose expedite the digestive movement of food molecules, which is imperative in the quick removal of harmful toxins.

Humans can't digest cellulose because we lack cellulases that would allow us to cleave the beta 1,4 linkages. However, some animals do eat and obtain energy from cellulose. One example of that is termites. These animals digest cellulose in a stepwise manner, using a combination of their own cellulases (produced in the foregut) and those of a microbial community resident in the distal parts of their digestive tract. This is a great example of a symbiotic relationship.

Cellulose is insoluble in water and aqueous solutions. It forms crystals and hydrogen bonds with amino acids. This quality of using intra and intermolecular hydrogen bonds to make crystals renders cellulose excessively insoluble in water and aqueous solutions. However, individual strands of cellulose aren't very hydrophobic as compared to other polysaccharides. It is the property of forming crystals that makes cellulose so insoluble.

10. Enzymes, vitamins and hormones can be classified into a single category of biological chemicals, because all of these

(a) enhance oxidative metabolism       (b) are conjugated proteins
(c) are exclusively synthesised in the body of a living organism at present
(d) help in regulating metabolism
Functions of Vitamins:

Control agent to cell metabolism – Enzymes and coenzymes control specific chemical reactions by acting as necessary catalysts – e.g., B vitamins, thiamin, niacin, and riboflavin help turn glucose to energy.

Component of body tissue construction – Vit C helps synthesize collagen. Also act as antioxidants to protect cell structure and prevent free radical damage.

Prevent specific nutritional deficiency disease – e.g., scurvy due to lack of Vit C.

Functions of Hormones:

- Chemical management system for the body
- Chemicals produced by cells in one part of the body that regulate the processes of cells in another part of the body
- Chemical messengers – act on cells from another part of the body
- Local regulators (paracrine) – act on nearby cells
- Self-regulators (autocrine) – cells that produce chemicals to stimulate their own cellular processes

11. The complex formed by a pair of synapsed homologous chromosomes is called

   (a) kinetochore   (b) bivalent   (c) axoneme   (d) equatorial plate

A bivalent, sometimes referred to as a tetrad, is the association of a pair of homologous chromosomes physically held together by at least one DNA crossover. This physical attachment allows for alignment and segregation of the homologous chromosomes in the first meiotic division.

The formation of a bivalent occurs during the first division of meiosis (in the pachynema stage of Meiotic prophase 1). In most organisms, each replicated chromosome (composed of two identical sister chromatids) elicits formation of DNA double-strand breaks during the leptotene phase. These breaks are repaired by homologous recombination, that uses the homologous chromosome as a template for repair. The search for the homologous target, helped by numerous proteins collectively referred as the synaptonemal complex, cause the two homologs to pair, between the leptotene and the pachytene phases of Meiosis I. Resolution of the DNA recombination intermediate into a crossover exchanges DNA segments between the two homologous chromosomes at a site called chiasma (or chiasmata). This physical strand exchange and the cohesion between the sister chromatids along each chromosome ensure robust pairing of the homologs in Diplotene phase. The structure, visible by microscopy, is called a bivalent.

12. During gamete formation, the enzyme recombinase participates during

   (a) metaphase I   (b) anaphase II   (c) prophase I   (d) prophase II
13. Selected the correct option with respect to mitosis.
   (a) Chromatids starts moving towards opposite poles in telophase
   (b) Golgi complex and endoplasmic reticulum are still visible at the end of prophase
   (c) Chromosomes move to the spindle equator and get aligned along equatorial plate in metaphase
   (d) Chromatids separate, but remains in the centre of the cell in anaphase

14. Which of the protein is found in spindle fibre?
   (a) Tubulin  (b) Albumin  (c) Mucin  (d) Haemoglobin

**Tubulin** in *molecular biology* can refer either to the tubulin protein superfamily of globular proteins, or one of the member proteins of that superfamily. α- and β-tubulins polymerize into *microtubules*, a major component of the eukaryotic cytoskeleton. *Microtubules* function in many essential cellular processes, including *mitosis*. *Tubulin-binding drugs* kill *cancerous* cells by inhibiting microtubule dynamics, which are required for DNA segregation and therefore *cell division*.

15. Longest phase of meiosis, is
   (a) prophase I  (b) Prophase II  (c) anaphase I  (d) metaphase II

**Prophase I** is typically the *longest phase of meiosis*. During **prophase I**, homologous chromosomes pair and exchange DNA in a process called homologous recombination. This often results in chromosomal crossover.

This process is critical for pairing between homologous chromosomes and hence for accurate segregation of the chromosomes at the first meiosis division. The new combinations of DNA created during crossover are a significant source of *genetic variation*, and result in new combinations
of alleles, which may be beneficial. The paired and replicated chromosomes are called bivalents or tetrads, which have two chromosomes and four chromatids, with one chromosome coming from each parent. The process of pairing the homologous chromosomes is called synapsis. At this stage, non-sister chromatids may cross-over at points called chiasmata (plural: chiasma). Prophase I has historically been divided into a series of substages which are named according to the appearance of chromosomes.

**Leptotene**

The first stage of prophase I is the leptotene stage, also known as leptonema, from Greek words meaning "thin threads". In this stage of prophase I, individual chromosomes—each consisting of two sister chromatids—become "individualized" to form visible strands within the nucleus. The two sister chromatids closely associate and are visually indistinguishable from one another. During leptotene, lateral elements of the synaptonemal complex assemble. Leptotene is of very short duration and progressive condensation and coiling of chromosome fibers takes place.

**Zygotene**

The zygotene stage, also known as zygonema, from Greek words meaning "paired threads", occurs as the chromosomes approximately line up with each other into homologous chromosome pairs. In some organisms, this is called the bouquet stage because of the way the telomeres cluster at one end of the nucleus. At this stage, the synapsis (pairing/coming together) of homologous chromosomes takes place, facilitated by assembly of central element of the synaptonemal complex. Pairing is brought about in a zipper-like fashion and may start at the centromere (procentric), at the chromosome ends (proterminal), or at any other portion (intermediate). Individuals of a pair are equal in length and in position of the centromere. Thus pairing is highly specific and exact. The paired chromosomes are called bivalent or tetrad chromosomes.

**Pachytene**

The pachytene (pronounced PAK-ə-teen) stage, also known as pachynema, from Greek words meaning "thick threads", occurs as the chromosomes condense further. At this point a tetrad of the chromosomes has formed known as a bivalent. This is the stage when chromosomal crossover (crossing over) occurs. Nonsister chromatids of homologous chromosomes may exchange segments over regions of homology. Sex chromosomes, however, are not wholly identical, and only exchange information over a small region of homology. At the sites where exchange happens, chias mata form. The exchange of information between the non-sister chromatids results in a recombination of information; each chromosome has the complete set of information it had before, and there are no gaps formed as a result of the process. Because the chromosomes cannot be distinguished in the synaptonemal complex, the actual act of crossing over is not perceivable through the microscope, and chiasmata are not visible until the next stage.

**Diplo tene**

During the diplotene stage, also known as diplonema, from Greek words meaning "two threads", the synaptonemal complex degrades and homologous chromosomes separate from one another a little. The chromosomes themselves uncoil a bit, allowing some transcription of DNA. However, the homologous chromosomes of each bivalent remain tightly bound at chiasmata, the regions where crossing-over occurred. The chiasmata remain on the chromosomes until they are severed at the transition to anaphase I.

In mammalian and human fetal oogenesis all developing oocytes develop to this stage and are arrested before birth. This suspended state is referred to as the dictyotene stage or dictyate. It lasts until meiosis is resumed to prepare the oocyte for ovulation, which happens at puberty or even later.

**Diakinesis**

Chromosomes condense further during the diakinesis stage, from Greek words meaning "moving through". This is the first point in meiosis where the four parts of the tetrads are actually visible. Sites of crossing over entangle together, effectively overlapping, making chiasmata clearly visible. Other
than this observation, the rest of the stage closely resembles prometaphase of mitosis; the nucleoli disappear, the nuclear membrane disintegrates into vesicles, and the meiotic spindle begins to form.

**Synchronous processes**

During these stages, two centrosomes, containing a pair of centrioles in animal cells, migrate to the two poles of the cell. These centrosomes, which were duplicated during S-phase, function as microtubule organizing centers nucleating microtubules, which are essentially cellular ropes and poles. The microtubules invade the nuclear region after the nuclear envelope disintegrates, attaching to the chromosomes at the kinetochore. The kinetochore functions as a motor, pulling the chromosome along the attached microtubule toward the originating centrosome, like a train on a track. There are four kinetochores on each tetrad, but the pair of kinetochores on each sister chromatid fuses and functions as a unit during meiosis I.

Microtubules that attach to the kinetochores are known as kinetochore microtubules. Other microtubules will interact with microtubules from the opposite centrosome: these are called nonkinetochore microtubules or polar microtubules. A third type of microtubules, the aster microtubules, radiates from the centrosome into the cytoplasm or contacts components of the membrane skeleton.

![Cell division stages](image)

16. Synapsis occurs between

(a) a male and a female gamete
(b) mRNA and ribosomes
(c) spindle fibres and centromere
(d) two homologous chromosomes

**Synapsis** (also called syndesis) is the pairing of two homologous chromosomes that occurs during meiosis. It allows matching-up of homologous pairs prior to their segregation, and possible chromosomal crossover between them. Synapsis takes place during prophase I of meiosis. When homologous chromosomes synapse, their ends are first attached to the nuclear envelope. These end-membrane complexes then migrate, assisted by the extranuclear cytoskeleton, until matching ends have been paired. Then the intervening regions of the chromosome are brought together, and may be connected by a protein-RNA complex called the synaptonemal complex. Autosomes undergo synapsis during meiosis, and are held together by a protein complex along the whole length of the chromosomes called the synaptonemal complex. Sex chromosomes also undergo Synapsis, however the synaptonemal protein complex that holds the homologous chromosomes together is only present at one end of each sex Chromosome.

This is not to be confused with mitosis. Mitosis also has prophase, but does not ordinarily do pairing of two homologous chromosomes.
17. Best material for the study of mitosis in laboratory is
   (a) tubulin   (b) root tip   (c) leaf tip   (d) ovary

Onion roots are ideal for studying mitosis because onions have larger chromosomes than most plants, making the observation of cells easier. The roots of plants also continue to grow as they continue to search for water and nutrients. This also makes it easy to find cells in the roots of onion plants at different stages of mitosis. The chromosomes in onion roots also stain dark, which makes them easy to see using light compound microscope. The observation of mitosis using onion roots is done in biology classes as a means demonstrating the stages of cell division. Apart from onion roots, ginger roots are also used.

The part of the roots that is placed on a microscopic slide is usually taken from the tips called the apical meristems. The onion root tips are where the growth and cell division of plants take place at a very fast rate, so the chance of being able to observe cells in all the five stages of cell division will be high.

Mitosis is the process of cell division where the chromosomes divide and create exact duplicates of itself. This cell cycle is important for the development, growth, regeneration and reproduction of most living things. The stages of mitosis are interphase, prophase, metaphase, anaphase and telophase.

18. **Assertion** Reduction division occurs in anaphase I. So there is no need of meiosis.  
**Reason** Meiosis II occurs to separate homologous chromosomes.
   (a) Both Assertion and Reason are true and Reason is the correct explanation of the Assertion  
(b) Both Assertion and Reason are true, but the Reason is not the correct explanation of Assertion  
(c) Assertion is true, but Reason is false  
(d) Both Assertion and Reason are false

19. In meiosis I, a bivalent is an association of
   (a) four chromatids and four centromeres  
   (b) two chromatids and two centromeres  
   (c) two chromatids and one centromere  
   (d) four chromatids and two centromeres

   Explained in the previous question-answer as bivalent.

20. Centromere is required for
   (a) transcription  
   (b) crossing over  
   (c) cytoplasmic cleavage  
   (d) movement of chromosomes towards poles
The **kinetochore**, is a protein structure on **chromatids** where the **spindle fibers** attach during cell division to pull **sister chromatids** apart. Their proteins help to hold the sister chromatids together and also play a role in chromosome editing.

The kinetochore forms in **eukaryotes**, assembles on the **centromere** and links the **chromosome** to **microtubule** polymers from the **mitotic spindle** during **mitosis** and **meiosis**.

*Monocentric* organisms, including vertebrates, fungi, and most plants, have a single centromeric region on each chromosome which assembles one kinetochore. *Holocentric* organisms, such as **nematodes** and some plants, assemble a kinetochore along the entire length of a chromosome.

**Directions** (Q.Nos. 21-30) In the following questions, more than one of the answers given may be correct. Select the correct answers and mark them according to the codes given below:

**Codes:**
- (a) 1, 2 and 3 are correct
- (b) 1 and 2 are correct
- (c) 2 and 4 are correct
- (d) 1 and 3 are correct

**21.** Which of the following statements are correct?

1. Monosaccharides on hydrolysis give compounds other than carbohydrates
2. Oligosaccharides on hydrolysis yield three to nine monosaccharide units
3. Polysaccharides on hydrolysis given 10-15 monosaccharide units
4. Polysaccharides on hydrolysis yield many oligosaccharide units

**22.** The enzymes

1. are protein with catalytic activities
2. functional with prosthetic groups are called conjugated enzymes
3. working with in the cell are called simple enzymes
4. increase the activation energy of the reactions they catalyse

**23.** Which of the following can bring about the denaturation of proteins?

1. Exposure to salt of heavy metal ions
2. Exposure to acid and bases
3. Exposure to inorganic neutral salts
4. Exposure to temperature below −5°C

**Denaturation** is a process in which **proteins** or **nucleic acids** lose the **quaternary structure**, **tertiary structure** and **secondary structure** which is present in their **native state**, by application of some external stress or compound such as a strong **acid** or **base**, a concentrated **inorganic** salt, an **organic** solvent (e.g., **alcohol** or **chloroform**), radiation or **heat**. If proteins in a living cell are denatured, this results in disruption of cell activity and possibly cell death. Protein denaturation is also a consequence of cell death. Denatured proteins can exhibit a wide range of characteristics, from **conformational change** and loss of solubility to **aggregation** due to the exposure of **hydrophobic** groups.

**24.** **Coenzymes**
(1) Are needed for the function of particular enzymes
(2) are inorganic molecules
(3) participate in enzyme catalysed reaction by transporting hydrogen atoms and molecules from one enzyme to another
(4) FAD and FMN contain niacin, while NAD and NADP contain riboflavin

25. The biomolecules are
(1) carbohydrates   (2) proteins   (3) lipid   (4) mitochondria

ans a

26. Interphase of cell cycle includes
(1) $G_1$   (2) A phase   (3) $G_2$ phase   (4) M phase

Image of the cell cycle. Interphase is composed of G1 phase (cell growth), followed by S phase (DNA synthesis), followed by G2 phase (cell growth). At the end of interphase comes the mitotic phase, which is made up of mitosis and cytokinesis and leads to the formation of two daughter cells.

27. At anaphase stage of mitosis
(1) the centromeres split into two and the spindle fibres pull the daughter centromeres to opposite poles
(2) chromosomes shorten and thicken by coiling and tighten packaging of their components
(3) the separated chromatids are pulled along behind the centromeres
(4) chromosomes line up around the equator of the spindle

Sister chromatids separate, and the now-daughter chromosomes move to opposite poles of the cell. Anaphase begins when the duplicated centromeres of each pair of sister chromatids separate, and the now-daughter chromosomes begin moving toward opposite poles of the cell due to the action of the spindle.
28. Prophase of meiosis division includes
   (1) leptotene   (2) pachytene   (3) cytokinesis   (4) karyokinesis
   ans b

29. In meiosis,
   (1) every chromosome behaves independently
   (2) homologous chromosomes show pairing
   (3) found in somatic cells
   (4) crossing over occurs
   ans c

30. Synapsis
   (1) is pairing of homologous chromosomes
   (2) is also called syndesis
   (3) when begins at the centromere and proceeds towards the ends, is called proterminal
   (4) when begins at and proceeds towards centromere, is called procentric
   ans b

As explained in the above mentioned questions.