

# Bio201

### 1) difference between purine and pyrimidine?

**Purines** and **Pyrimidines** are nitrogenous bases that make up the two different kinds of **nucleotide** bases in **DNA and RNA**. The two-carbon nitrogen ring bases (adenine and guanine) are purines, while the one-carbon nitrogen ring bases (thymine and cytosine) are pyrimidines.

### 2) difference between Nucleoside and Nucleotide?

A **nucleoside** consists of a nitrogenous base covalently attached to a sugar (ribose or deoxyribose) but without the phosphate group. A **nucleotide** consists of a nitrogenous base, a sugar (ribose or deoxyribose) and one to three phosphate groups.

### 3) Define Chargaff's Rule?

**Chargaff's rules** state that DNA from any cell of all organisms should have a 1:1 ratio (**base Pair Rule**) of pyrimidine and purine bases and, more specifically, that the amount of guanine should be equal to cytosine and the amount of adenine should be equal to thymine.

### 4) What are PCR Requirements?

For **PCR** there are five chemical components needed, including a DNA template, DNA polymerase enzyme, primers, nucleotides and reaction buffer. These are described here in detail. 1. The DNA template is that particular DNA sequence which you want copied.

### 5) What are Helicase and Primase?

A **helicase-primase** complex (also **helicase-primase**, Hel/Prim, H-P or H/P) is a complex of enzymes including DNA **helicase** and DNA **primase**. ... The complex is used by herpesviruses in which it is responsible for lytic DNA virus replication

### 6) What is Function of DNA?

Double stranded helix Righthanded (threads on a screw) Antiparallel. Complementary base pairing A=T G=C Store an enormous amount of information and could account for species and individual differences. Susceptibility to change (mutate) Change bp. Precise Replication bp is specific. Expression of a phenotype A **phenotype** results from the **expression** of an organism's genetic code, its genotype, as well as the influence of environmental factors and the interactions between the two. When two or more clearly

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different **phenotypes** exist in the same population of a species, the species is called polymorphic.

### 7) What type of bacterial colonies F. Griffith was used in his experiment?

Griffith used two strains of pneumococcus (Streptococcus pneumoniae) bacteria which infect mice – a type III-S (smooth) which was virulent, and a type II-R (rough) strain which was nonvirulent. The III-S strain synthesized a polysaccharide capsule that protected itself from the host's immune system, resulting in the death of the host, while the II-R strain did not have that protective capsule and was defeated by the host's immune system.

### 8) Write the main three dilemma of DNA replication?

The three steps in the process of DNA replication are **initiation, elongation and termination**. Replication Basics. Replication depends on the pairing of bases between the two strands of DNA. ... Initiation. ... Elongation. ... Termination.

### 9) Enlist the requirements of Polymerase chain reaction?

For **PCR** there are five chemical components **needed**, including a DNA template, DNA **polymerase** enzyme, primers, nucleotides and **reaction** buffer. These are described here in detail. 1. The DNA template is that particular DNA sequence which you want copied.

### 10) What is techniques of genetic engineering?

1Process 2History 3Choosing target genes 4Gene manipulation 4.1Extraction from cells 4.2Gene isolation 4.3Modification 5Transformation 6Development 6.1Selection 6.2Regeneration 6.3Confirmation 7Gene targeting 8Gene trapping

### 11) What is cell cycle?

State	Phase	Abbreviation	Description
Resting	<u>Gap 0</u>	<b>G<sub>0</sub></b>	A phase where the cell has left the cycle and has stopped dividing.
<u>Interphase</u>	<u>Gap 1</u>	<b>G<sub>1</sub></b>	Cells increase in size in Gap 1. The <u>G<sub>1</sub> checkpoint</u> control mechanism ensures that everything is ready for <u>DNA</u> synthesis.
	<u>Synthesis</u>	<b>S</b>	<u>DNA replication</u> occurs during this phase.



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	<a href="#">Gap 2</a>	<b>G<sub>2</sub></b>	During the gap between DNA synthesis and mitosis, the cell will continue to grow. The <a href="#">G<sub>2</sub> checkpoint</a> control mechanism ensures that everything is ready to enter the M (mitosis) phase and divide.
<a href="#">Cell division</a>	<a href="#">Mitosis</a>	<b>M</b>	Cell growth stops at this stage and cellular energy is focused on the orderly division into two daughter cells. A checkpoint in the middle of mitosis ( <a href="#">Metaphase Checkpoint</a> ) ensures that the cell is ready to complete cell division.

### 12) What are mitochondrial features?

Mitochondria is **double membrane**-enclosed organelle. It contains its own **DNA, ribosomes**, and other components required for protein synthesis, most of its **proteins are encoded** in the **cell nucleus** and imported from the cytosol. There are two subcompartments in mitochondria: the **internal matrix space** and the **intermembrane space**.

### 13) What is restriction endonucleases?

Special bacterial enzyme can cut double stranded DNA at specific sites in a test tube. Restriction endonucleases (restriction enzymes) act as a kind of immune system, protecting the cell from the invasion of foreign DNA (virus). Many recombinant DNA technologies, which the field of biotechnology heavily relies on, are unlikely to have been developed without the discovery of restriction enzymes.

### 14) Why are macromolecules present in cell?

The four major types of **macromolecules found** in living **cells**—carbohydrates, lipids, proteins, and nucleic acids—are made of these smaller, repeating subunits called monomers. The monomers within one molecule are not always identical but they always have similar chemical structures.

### 15) Define Electronegativity?

**Electronegativity** The tendency of an atom to attract electrons towards itself.

### 16) Write Briefly note on cell cycle?

The **cell cycle** or **cell-division** cycle is the series of events that take place in a cell leading to its .... The relatively **brief** M phase consists of nuclear division (karyokinesis). It is a ..... **Note**, these fusions are fragments that contain a nuclear localization signal and ubiquitination sites for degradation, but are not functional proteins.

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[Prophase](#) · [Metaphase](#) · [Anaphase](#) · [G1 phase](#)

### 17) Define Genetic engineering ?

genetic engineering the deliberate modification of the characteristics of an organism by manipulating its genetic material.

### 18) Define Incomplete Dominance ?

**incomplete dominance** n. A heterozygous condition in which both alleles at a gene locus are partially expressed and which often produces an intermediate phenotype.

### 19) What is co dominance?

**Definition.** (genetics) A form of dominance in which the alleles of a gene pair in a heterozygote are fully expressed thereby resulting in offspring with a phenotype that is neither dominant nor recessive

### 20) What is Mutation?

the changing of the structure of a gene, resulting in a variant form which may be transmitted to subsequent generations, caused by the alteration of single base units in DNA, or the deletion, insertion, or rearrangement of larger sections of genes or chromosomes.

### 21) What is Epistasis ?

the interaction of genes that are not alleles, in particular the suppression of the effect of one such gene by another.

### 22) difference between dispersive, conservative , semi-conservative model of dna?

**Semi-conservative replication.** In this model, the two strands of DNA unwind from each other, and each acts as a template for synthesis of a new, complementary strand. This results in two DNA molecules with one original strand and one new strand.

**Conservative replication.** In this model, DNA replication results in one molecule that consists of both original DNA strands (identical to the original DNA molecule) and another molecule that consists of two new strands (with exactly the same sequences as the original molecule).

**Dispersive replication.** In the dispersive model, DNA replication results in two DNA molecules that are mixtures, or "hybrids," of parental and daughter DNA. In this model, each individual strand is a patchwork of original and new DNA.

### 23) difference between dna and rna?

Structurally, **DNA and RNA** are nearly identical. As mentioned earlier, however, there are three fundamental **differences** that account for the very different functions **of the** two molecules. **RNA** has a ribose sugar instead of a deoxyribose sugar like **DNA**. **RNA** nucleotides have a uracil base instead of thymine.

### 24) Describe process of mitosis?



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mitosis - explaining its position in the series of processes that, together, form the 'cell cycle' for somatic cells (*cells relating to the non-reproductive parts of the body*). The four stages of mitosis - prophase, metaphase, anaphase and telophase - are also listed and described. For an illustration of this process see the page - [diagram of mitosis](#).

### 25) Describe the techniques used by Mendel in his experiment.?

Gregor **Mendel** conducted hybridization **experiments** on around 29,000 pea plants. Peas were an ideal choice for **Mendel** to **use** because they had easily observable traits there were 7 of which he could manipulate. He began **his experiments** on peas with two conditions.

### 26) What is Role of lipids?

The main biological **functions of lipids** include storing energy, signaling, and acting as structural components of cell membranes. ... Although the term "**lipid**" is sometimes used as a synonym for **fats**, **fats** are a subgroup of **lipids** called triglycerides.

### 27) Difference b/w meiosis and mitosis?

The processes **differ** in two fundamental. **Meiosis** has two rounds of genetic separation and cellular division while **mitosis** only has one of each.

In **meiosis** homologous chromosomes separate leading to daughter cells that are not genetically identical. ... two cells **with** no net change in the number of chromosomes.

### 28) define aquaporins?

**Aquaporin**: A water channel. **Aquaporins** form pores in the membranes of cells and selectively conduct water molecules through the membrane, while preventing the passage of ions (such as sodium and potassium) and other small molecules. **Aquaporins** are typically composed of identical subunit proteins.

### 29) What is law of inheritance?

Gregor Mendel, through his work on pea plants, discovered the fundamental **laws of inheritance**. He deduced that genes come in pairs and are **inherited** as distinct units, one from each parent. Mendel tracked the segregation of parental genes and their appearance in the offspring as dominant or recessive traits.

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### 31) What is role of protein?

Every cell in your body contains protein, so meeting your protein requirement is essential for your health. Building Tissues and Muscles.

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Protein is necessary in building and repairing body tissues. ... Hormone Production. ... Enzymes. ... Immune Function. ... Energy.

### 32) What are tages of meiosis 1

Therefore, **meiosis** includes the **stages of meiosis I** (prophase I, metaphase I, anaphase I, telophase I) and **meiosis II** (prophase II, metaphase II, anaphase II, telophase II). **Meiosis** generates gamete genetic diversity in two ways: (1) Law of Independent Assortment.

### 33) What are PCR applications?

The polymerase chain reaction has been elaborated in many ways since its **introduction** and is now commonly used for a wide variety of applications including genotyping, cloning, mutation detection, sequencing, microarrays, forensics, and paternity testing. Typically, a PCR is a three-step reaction.

### 34) ENLIST OF CELL organells?

- Nucleolus.
- Nucleus.
- Ribosome (little dots)
- Vesicle.
- Rough endoplasmic reticulum.
- Golgi apparatus (or "Golgi body")
- Cytoskeleton.
- Smooth endoplasmic reticulum.

### 35) define threshold effect and write the rate of accuracy first degree of relative and identical twins?

A **threshold effect** is a sudden and radical change in a phenomenon which often occurs after surpassing a quantitative limit, called the **threshold**. It may refer to: Renormalization\_group#Threshold\_effect, a particle physics calculation. **Threshold effect** (genetics), a trait in genetics. **Twins** are two offspring produced by **the same** pregnancy. **Twins** can be either monozygotic ("**identical**"), meaning that they develop from one zygote, which splits and forms two embryos, or dizygotic ("**fraternal**"), meaning that they develop from two different eggs.

### 36) What is denature of protein struture ?

Since **denaturation** reactions are not strong enough to break the peptide bonds, the primary **structure** (sequence of amino acids) remains the same after **adenaturation** process. **Denaturation** disrupts the normal alpha-helix and beta sheets in a **protein** and uncoils it into a random shape.

### 37) Differenece between Klienefelter syndrom and tumorsyndrom ?

**Klinefelter syndrome** (KS) also known as 47,XXY or XXY, is the set of symptoms that result from two or more X chromosomes in males. The primary features are sterility and small testicles. Often, symptoms may be subtle and



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many people do not realize they are affected. ... **Klinefelter syndrome** usually occurs randomly.

**Turner syndrome** is a chromosomal condition that affects development in females. The most common feature of **Turner syndrome** is short stature, which becomes evident by about age 5. An early loss of ovarian function (ovarian hypofunction or premature ovarian failure) is also very common.

### 38) What is Abbreviation of VNTRs?

Variable Number of Tandem Repeats (genetics)

### 39) What is Ionic bond?

Ionic bonding is a type of chemical bonding that involves the electrostatic attraction between oppositely charged ions, and is the primary interaction occurring in ionic compounds

### 40) What is Pcrs requirement?

The first **step** in a **PCR** cycle is the denaturation **step**. This is the **PCR step** in which the hydrogen bonds holding the complementary strands of DNA together are broken. The second **step** in a **PCR** cycle is the annealing **step**. The annealing **step** is the **PCR step** in which the primers anneal, or attach, to the DNA template.

### 41) What are Co enzyme. Co factor and prosthetic group

Metal ions are usually **cofactors**. **Coenzymes** are a specific type of helper or partner that are organic molecules required for enzyme function that bind loosely to an enzyme. They are often, though not always, derived from vitamins. **Prosthetic groups** are enzyme partner molecules that bind tightly to an enzyme.

### 42) What is active site in an enzyme?

In biology, the **active site** is the region of an **enzyme** where substrate molecules bind and undergo a chemical reaction. The **active site** consists of residues that form temporary bonds with the substrate (**binding site**) and residues that catalyse a reaction of that substrate (**catalytic site**)

### 43) Define carbohydrates. Also write their classification.

On the basis of the number of forming units, three major classes of **carbohydrates** can be defined: monosaccharides, oligosaccharides and polysaccharides. Monosaccharides or simply sugars are formed by only one polyhydroxyaldehyde or ketonic unit.

### 44) Define polyploid and aneuploid with examples.

Cells (and their owners) are **polyploid** if they contain more than two haploid ( $n$ ) sets of chromosomes; that is, their chromosome number is some multiple of  $n$  greater than the  $2n$  content of diploid cells. For **example**, triploid ( $3n$ ) and tetraploid cell ( $4n$ ) cells are **polyploid**. Chromosomes in Down syndrome, the most common human condition due to **aneuploidy**. Notice the three copies of

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chromosome 21 in the last row. **Aneuploidy** is the presence of an abnormal number of chromosomes in a cell, for **example** a human cell having 45 or 47 chromosomes instead of the usual 46.

- 45) Write down the functions of cellular membrane. Write down the requirements of PCR?

It consists of a lipid bilayer with embedded proteins. The basic function of the **cell membrane** is to protect the **cell** from its surroundings. The **cell membrane** controls the movement of substances in and **out** of cells and organelles. In this way, it is selectively permeable to ions and organic molecules.

- 46) What is function of cell?

The human **body** is composed of trillions of cells. They provide **structure** for the **body**, take in nutrients from food, convert those nutrients into **energy**, and carry out specialized functions. Cells also contain the body's hereditary material and can make copies of themselves.

- 47) What is function of cell membrane

Biological **membranes** have three primary **functions**: (1) they keep toxic substances out of the **cell**; they contain receptors and channels that allow specific molecules, such as ions, nutrients, wastes, and metabolic products, that mediate **cellular** and extracellular activities to pass between organelles and between the ...

- 48) What are types of cristae golgi apparatus?

**Cristae Membrane** Cristae Junctions

- 49) What are mitosis steps ?

Mitosis occurs in four phases, called **prophase**, **metaphase**, **anaphase**, and **telophase**.

- 50) What is gel electrophoresis ?

**Electrophoresis** is a technique commonly **used in** the lab to separate charged molecules, like DNA, according to size. Gel **electrophoresis** is a technique commonly **used in** laboratories to separate charged molecules like DNA<sup>?</sup>, RNA<sup>?</sup> and proteins<sup>?</sup> according to their size.

- 51) What is down syndrome ?

**Down syndrome** (DS or DNS), also known as trisomy 21, is a genetic disorder caused by the presence of all or part of a third copy of chromosome 21. It is typically associated with physical growth delays, characteristic facial features, and mild to moderate intellectual disability.

- 52) What are lysosome and heat shock protein?

an organelle in the cytoplasm of eukaryotic cells containing degradative enzymes enclosed in a membrane. a protein induced in a living cell in response to a rise in temperature above the normal level.

- 53) What are types of cristea in golgi bodies?

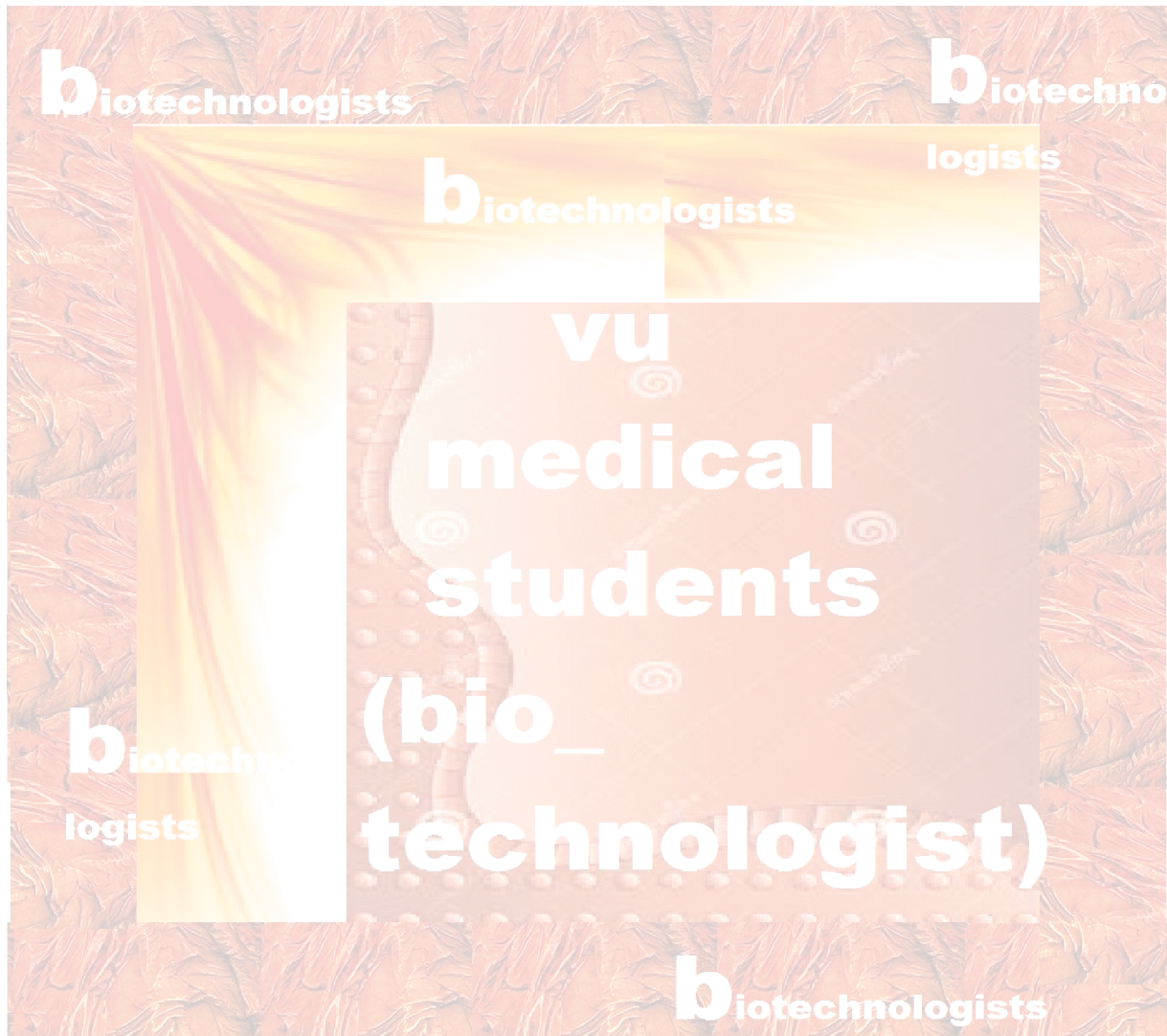


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