

**CET MODEL TEST PAPER -4****SUBJECT: BIOLOGY****"ANSWER KEY"**

| Que. No. | Answer | Que. No. | Answer | Que. No. | Answer | Que. No. | Answer |
|----------|--------|----------|--------|----------|--------|----------|--------|
| 1        | 1      | 16       | 2      | 31       | 4      | 46       | 4      |
| 2        | 4      | 17       | 1      | 32       | 1      | 47       | 2      |
| 3        | 2      | 18       | 1      | 33       | 4      | 48       | 4      |
| 4        | 3      | 19       | 3      | 34       | 3      | 49       | 2      |
| 5        | 4      | 20       | 3      | 35       | 1      | 50       | 3      |
| 6        | 2      | 21       | 1      | 36       | 1      | 51       | 1      |
| 7        | 2      | 22       | 3      | 37       | 4      | 52       | 3      |
| 8        | 1      | 23       | 3      | 38       | 3      | 53       | 1      |
| 9        | 1      | 24       | 2      | 39       | 3      | 54       | 1      |
| 10       | 4      | 25       | 2      | 40       | 2      | 55       | 3      |
| 11       | 1      | 26       | 4      | 41       | 2      | 56       | 3      |
| 12       | 4      | 27       | 1      | 42       | 4      | 57       | 2      |
| 13       | 1      | 28       | 2      | 43       | 4      | 58       | 4      |
| 14       | 1      | 29       | 4      | 44       | 1      | 59       | 1      |
| 15       | 3      | 30       | 2      | 45       | 3      | 60       | 3      |
|          |        |          |        |          |        |          |        |

# **CET MODEL TEST PAPER –4**

## **SUBJECT: BIOLOGY**

### **EXPLANATION FOR ANSWERS**

#### **Question No. 1**

**Answer** -1. A=r, B=s, C=v, D=u, E=t, F=p, G=q

#### **Question No. 2**

**Answer-4.** Exchange of genetic material between the homologous chromosomes.

**Explanation:** - Mitosis is a type of cell division [Also called **multiplication division**, it helps in **growth and repair**] that results in the formation of two daughter cells that have the same no. of chromosomes as that of the parent cell. This process does not involve linkage and crossing over. The linkage and crossing over between homologous chromosomes [Also called genetic recombination] is observed in Prophase-1 of Meiosis [Also called **Reduction division** that results in the formation of gametes]. Hence there is no exchange of genetic material between the homologous chromosomes during meiosis.

#### **Question No. 3**

**Answer-2.** All eukaryotic unicellular organisms.

**Explanation:** - The members of Kingdom Protista are popularly called "**Taxonomic misfits**" as these members are not included in Kingdom Metaphyta and Metazoa, even though they possess some characters of these two kingdoms. As Metaphyta and Metazoa include multicellular eukaryotes, the unicellular eukaryotes [Eg., Protozoa{Eg.Amoeba}, Algae{Eg.,Diatoms}] are grouped under Protista.

#### **Question No. 4**

**Answer-3.** The viroids are made up of ss RNA without a protein coat.

**Explanation:** - Viroids are single stranded, circular, naked RNA molecules that cause diseases in plants. Example: **Potato spindle tuber disease** caused by **potato spindle tuber viroid**.

**Question No. 5****Answer-4. *Volvariella volvacea***

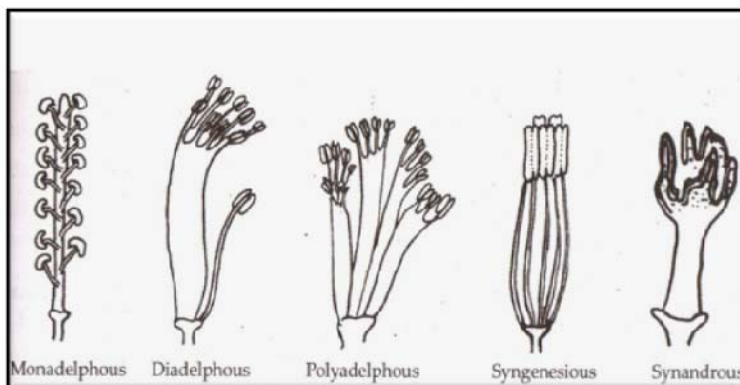
**Explanation:** - Mushrooms belong to Division Basidiomycota of Kingdom Mycota[Fungi]. They produce reproductive structures called Basidiocarps, that contain basidiospores. Hence Basidiocarp is also called fruiting body. Examples for such mushrooms are *Agaricus bisporus*, *Volvariella volvacea* [Oyster mushroom]. These mushrooms are edible in nature and hence cultivated in large scale now a days. They are rich in nutrients.

**Question No. 6****Answer- 2. A free-living gametophyte formed by the germination of spores in pteridophytes.**

**Explanation:** - In pteridophytes, the predominant phase in the life cycle is haploid sporophyte. Sporophyte is a free living plant body and differentiated into root, stem and leaves. The leaves bear sporangia which in turn contain spores [diploid]. The spores germinate and produce a free living gametophyte and it is called prothallus. Prothallus bears haploid spores. These spores undergo germination to produce the gametophyte called Prothallus. The prothallus bear sex organs i.e., Antheridia [produce male gamete] and Archegonia [produce female gamete].

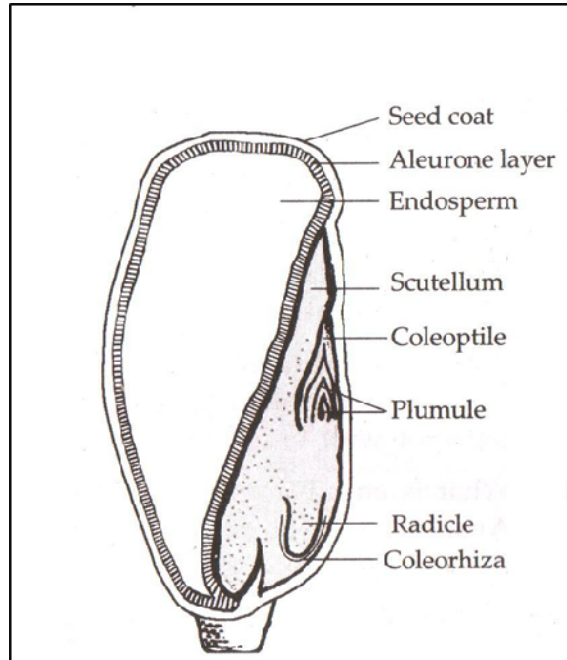
**Question No. 7****Answer- 2. The filaments of stamens are fused but the anther lobes are free.**

**Explanation:** - In angiosperms, the stamens are the units of male reproductive structures called **Androecium**. The stamens contain a filament and an anther lobe. The anther lobe bears pollen grains. In some plants [e.g., *Hibiscus*], the filaments of all stamens are fused while the anther lobes remain free. This is called **monadelphous** condition. If the filaments remain free and the anther lobes are fused, the condition is called **Syngeny**[Eg. *Helianthus*- Sunflower]. If the stamens are united all along their length, i.e., both anthers and filaments are fused [E.g., *Cucurbita*], this is called **Synandry**. If the stamens are attached to the corolla tube, it is called **epipetalous** condition [E.g., *Catharanthus roseus*].



**Question No. 8**

**Answer -- 1. A=Seed coat, B=Aleurone Layer, C=Endosperm, D=Scutellum, E=Coleoptile, F=Plumule, G=Radicle, H=Coleorhiza**

**Question No. 9**

**Answer - 1. Haemoglobin**

**Explanation:** - Proteins are classified into Simple proteins and conjugated proteins. **Simple proteins** consist of amino acids only. E.g., Albumin, Globulins, Histones, Actin and Myosin{muscle proteins}, Keratin, etc., **Conjugated proteins** on hydrolysis yield not only amino acids, but also non-proteinaceous substance called prosthetic group. Some of the conjugated proteins are:-Phosphoproteins{E.g., Casein of milk}, glycoprotein{Mucus of saliva}, **Chromoprotein** {**Haemoglobin**-carries oxygen, Cytochrome-Electron carrier, Myoglobin-oxygen binding muscle protein}.

**Question No. 10**

**Answer - 4. Random mating**

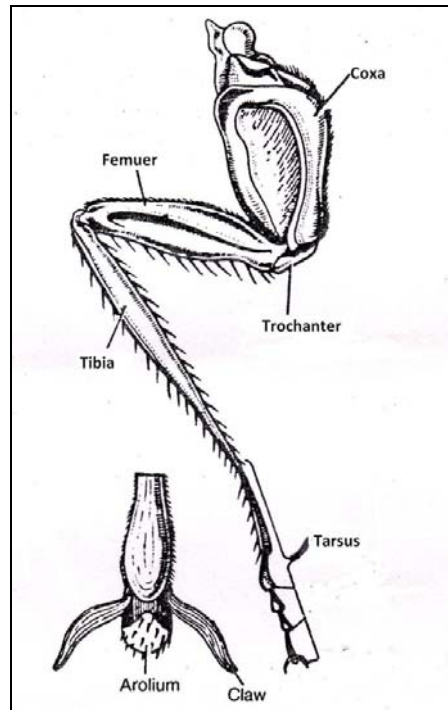
**Explanation:** - According to **Hardy-Weinberg law** of **genetic equilibrium**, the frequencies of genes in a randomly mating Mendelian population remains constant from generation to generation unless there are agencies to upset it. The evolutionary forces like gene flow, genetic drift, genetic recombination, chromosomal aberrations, mutations etc., can alter the rate of gene frequency. In the absence of these forces in a randomly mating population, the gene frequency remains constant.

**Question No. 11****Answer-** 1. A=s, B=q, C=p, D=r**Question No. 12****Answer-**4. Spongilla is a fresh water sponge.

**Explanation:** - Sponges belongs to the phylum **Porifera**. Some members are present in fresh water [Eg.. **Spongilla**], whereas most of the members are present in marine habitats {Eg. Sycon, etc.,}. The members are called sponges since they possess a number of minute microscopic pores on them. These members possess cellular grade of organization and the cells in their body are not organized into tissues. The cells are arranged in two layers: the inner layer called **Choanoderm**-consisting of **choanocytes** and outer layer called **Pinacoderm**-consisting of **pinacocytes**. Between these two layers, a non-cellular, jelly like substance called mesogloea is present. The sponges possess a characteristic **Canal system** in them in which the movement of water occurs inside the body, that helps in nutrition, respiration, reproduction and excretion.

**Question No. 13****Answer-**1. Both the statements A and B are correct and B is the reason for A.

**Explanation:** - Phylum **Coelenterata** [also called Cnidaria] includes animals with tissue grade of organization {Eg. Aurelia-jelly fish, Hydra, **Physalia**, Obelia, Corals, etc.}. The coelenterates exhibits a phenomena called Metagenesis[alternation of generation] in their life history, where in **Polyp**[asexual stage] produces Medusa[Sexual stage] asexually and **Medusa** produces Polyp through sexual reproduction. The coelenterates do possess cnidoblasts or stinging cells or nematocysts that help in catching and paralyzing the prey. Some coelenterates possess morphologically distinct different body forms or individuals called Zooids. This phenomenon is called **polymorphism**.

**Question No. 14****Answer-1.** A=Coxa, B=Femur, C=Trochanter, D=Tibia,E=Tarsus**The leg of cockroach****Question No. 15****Answer-3.** Amrithamahar

**Explanation:** - **Indigenous breeds** of cattle are those which are native [Desi varieties] to particular area that are fully acclimatized to their environment. The best indigenous milch breeds [known for high milk production] are **Sindhi, Sahiwal**. **Draught breeds** are those in which the cows are poor milkers but the bullocks are good draught animals and these provide support for transport and various agricultural operations like ploughing etc., Example for draught breed is **Amrithamahar**. Dual purpose breeds are those where the cows are good milkers and bullocks are good draught breeds. Example - **Ongole**. **Exotic breeds** are those that are imported from foreign countries.

**Question No. 16****Answer-2.** Phosphodiester bonds**Question No. 17****Answer-1.** DNA polymerase III can polymerize in 5'-3' direction only.

**Explanation:** - **DNA replication** is the process of production of exact copies of DNA molecules. This process is called semiconservative because, in the daughter DNA molecule, one of the strands

is the parental strand and the other strand is the newly synthesized strand. During the process of DNA replication, the synthesis of DNA occurs continuously on one strand and on the other strand, the synthesis is discontinuous. Because the **DNA polymerase III** enzyme, that synthesizes a new DNA strand can synthesize in only one direction, i.e, from 5'-3' direction on a 3'-5' template strand. Also, the two strands are arranged antiparallely, the synthesis occurs continuously on one strand [**Leading strand**] and discontinuously on another strand [**Lagging strand**]. On the lagging strand where the short segments of DNA are produced [**Okazaki fragments**], the short segments are joined later by **DNA ligase enzyme**.

### Question No. 18

**Answer – 1. Regulator protein to switch off structural gene transcription.**

**Explanation:** – In *Lac operon*, the mechanism of regulation of gene function depends on the presence or absence of lactose in the medium. When the lactose is absent in the medium, the regulator gene produces a protein called **repressor or regulator protein** that binds to the operator region and hence the structural genes or **cistrons** of *lac* operon are blocked. Hence transcription of structural genes does not occur. Hence lactose metabolizing enzymes are not produced. When the lactose is available in the medium, the lactose molecules act as inducers and bind to the regulator proteins. As a result, the regulator proteins cannot bind to the operator region. Hence the transcription and later, translation of structural genes occur resulting in the production of lactose metabolizing enzymes.

### Question No.19

**Answer – 3. S-strain [heat killed]-Injected to mice-Mice die.**

**Explanation:** – To prove DNA as the genetic material, Griffith conducted an experiment on bacterium *Streptococcus pneumoniae*. This bacterium causes pneumonia in animals including man. This experiment is called transformation experiment. There are two strains of Streptococcus.

**Rough[R]** strain of bacteria produces rough colonies on culture media. These are **non virulent**. The other strain produces smooth colonies on culture media. They are called **Smooth[S]** strain and they are virulent. Griffith conducted a series of experiments with Streptococcus on mice. A) He injected type R strain into the mice. The mice did not die. B) He injected the type S strain into the mice. The mice died of pneumonia. C) He injected heat killed type R strain to the mice. The mice did not die. D) When he injected the mixture of heat killed smooth bacteria(S strain) and living R strain of Streptococcus, the mice died as this process resulted in the transformation of Live R strain and converted R strain into S strain.

**Question No.20****Answer- 3. Radioactive labelled ss DNA**

**Explanation:** –In **DNA fingerprinting**, the single stranded DNA present on the nitrocellulose membrane are made to hybridize with readily available single stranded, radioactively labelled DNA. The **probe** is a fragment of DNA of variable length (usually 100-1000 bases long )The probe DNA consists of  $^{32}\text{P}$  (a radioactive isotope of phosphorus incorporated into the probe DNA). This **radioactive probe** with specific nucleotide sequence, pairs with the complementary nucleotides of VNTRs present in the single stranded DNA. This helps in the detection of VNTRs.

**Question No.21****Answer- 1. Phytoene synthase and Lycopene Cyclase**

**Explanation:** –**Golden rice** is a variety of *Oryza sativa* rice produced through genetic engineering to biosynthesize **beta-carotene**, a precursor of **pro-vitamin A** in the edible parts of rice. Golden rice was developed as a fortified food to be grown in areas where there is a **shortage of dietary vitamin A**. Golden rice was created by transforming rice with three beta-carotene biosynthesis genes: **psy (phytoene synthase)** and **lyc (lycopene cyclase) gene from daffodil (*Narcissus pseudonarcissus*)** and **crt I (Carotene desaturase) from the soil bacterium *Erwinia uredovora***.

**Question No.22****Answer- 3. They can be used as homozygous lines and can be diplotized**

**Explanation:** –Anther, a male reproductive part, is diploid in chromosome numbers. As a result of microsporogenesis, tetrads of microspores are formed from a single spore mother cell. They are known as **pollen grains** after release from tetrads. The aim of pollen culture is to get haploid plants by induction of embryogenesis. Haploid plants have single complete set of chromosomes that in turn may be useful for the improvement of many crop plants. Moreover, chromosome set of these haploids can be doubled by mutagenic chemicals (**e.g. colchicine**) or regeneration technique to obtain fertile homozygous diploids.

**Question No.23****Answer-3. They can develop into any tissue in the body.**

**Explanation:** –**Stem cells** are biological cells found in all multicellular organisms, that can divide (through mitosis) and differentiate into diverse specialized cell types and can self-renew to produce more stem cells. The different types of stem cells are: a) **Totipotent stem cells**-these stem



cells can differentiate into embryonic and extraembryonic cell types. Such cells can construct a complete, viable organism. b) **Pluripotent stem cells**-These cells are descendants of totipotent stem cells and can give rise to cells of the three germ layers: endoderm, mesoderm, and ectoderm, resulting in the formation of any cell type or tissue. c) **Multipotent Stem cells**- These stem cells are the descendants of pluripotent stem cells and can differentiate into a number of cells, but only those of a closely related family of cells.

### Question No.24

**Answer-2. Preventing multiplication of bacteriophage in bacteria.**

**Explanation:** -A **restriction enzyme** (or **restriction endonuclease**) is an enzyme that cuts DNA at specific **recognition nucleotide sequences** (with Type II restriction enzymes cutting double-stranded DNA) known as restriction sites. Such enzymes, found in bacteria and archaea, are thought to have evolved to provide a defence mechanism against invading viruses. This phenomenon is called **host restriction**.

### Question No.25

**Answer-2. II and IV**

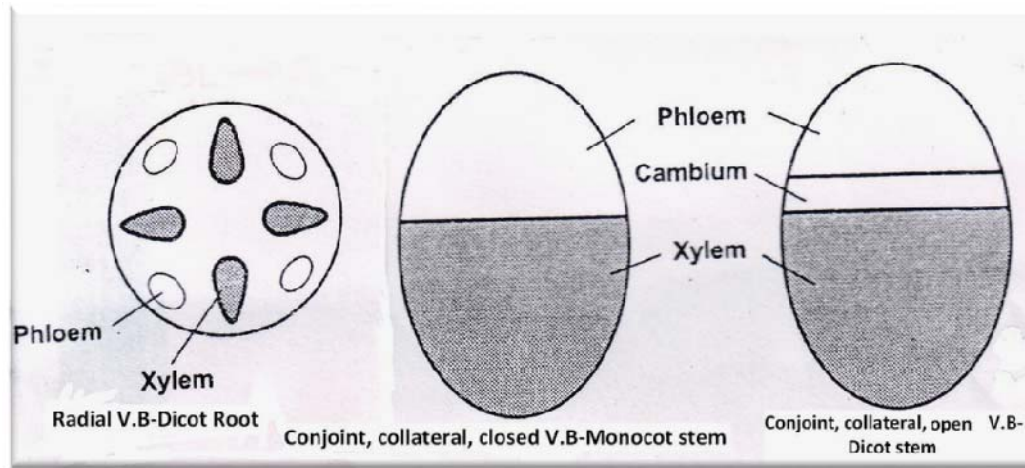
**Explanation:** -Vascular Tissues like **xylem** (Water conduction) and **Phloem** (Food conduction) found in pteridophytes, gymnosperms and angiosperms consist of different cell types. The xylem is composed of **Tracheids**, **Treachery Elements**, **Xylem fibers** and **Xylem parenchyma**. The tracheids are found in pteridophytes and gymnosperms. Treachery Elements, also called xylem vessel elements are found in angiosperms. The tracheary elements are more advanced than tracheids and possess perforated end walls with wider lumen. In phloem, the different cell types like **Sieve cells**, **Sieve tube elements**, **Companion cells**, **Phloem fibres** and **phloem parenchyma** are present. Sieve cells are present in pteridophytes and gymnosperms and are associated with specialized parenchymatous cells called albuminous cells. The sieve tube elements are present in angiosperms and are associated with companion cells. The sieve tube element and a companion cell are originated from the same mother cell, where as sieve cells and **albuminous cells** are originated from different mother cells. The sieve tube elements are enucleated and possess cytoplasmic streaming. They have perforated end walls or cross walls and it is called sieve plate. The sieve plates contain sieve pores. Surrounding the sieve pores, a plant polysaccharide called Callose is deposited. It is composed of glucose residues.

### Question No.26

**Answer- 4. II, III, IV**

**Explanation:** -A vascular bundle is consists of a strand like portion having xylem and phloem. According to the arrangement of xylem and phloem, there are different types of vascular bundles present. They are Radial vascular Bundle, Conjoint vascular Bundle and Concentric vascular bundle.

In radial vascular bundle, the xylem and phloem form separate bundles and they lie in alternate radii (Eg., Roots of seed plants-Dicot and Monocot). In conjoint vascular bundle, the xylem and phloem are present together in the same bundle on the same radius. The conjoint vascular bundles are either collateral or bicollateral. In collateral vascular bundle, the xylem and phloem lie together on the same radius. The xylem lie inwards and phloem outwards. The Conjoint, collateral vascular bundles are present in Stems of seed plants. The conjoint, collateral vascular bundle may consists of cambium (Open vascular bundle-Dicot stem) or may not consists of cambium (closed vascular bundle-Monocot stem).



### Question No.27

**Answer-** 1. Absence of nucleus.

### Question No.28

**Answer-3. Statement A is correct but B is wrong.**

**Explanation:** -Transpiration occurring in the leaves is the major phenomena that results in the upward conduction of sap in xylem that creates transpiration pull. According to Transpiration pull theory, the cohesive and adhesive properties of water results in the formation of a continuous unbroken column of water in the xylem vessel elements. This is pulled upwards due to transpiration pull. On the other hand, the stomata opens during day time due to the photosynthetic utilization of CO<sub>2</sub> in the guard cells, that result in various activities and finally endosmosis occur in guard cells. Opening of stomata results in transpiration.

**Question No.29**

**Answer- 4. Movement of water from root hair into xylem of the root.**

**Explanation:** -In plants, water moves from the soil into the root hair by osmosis as the water potential of the cell sap in the root hair is less than that of the soil solution. **Water taken up by the root hair cells move through the cortex, endodermis [passage cells], pericycle and finally into the xylem of the root.** This is called radial movement of water and the water moves in three different pathways and finally reaches the xylem of the root. They are **apoplast, symplast and vacuolar pathways**. The xylem of the root is directly connected with the xylem of the stem. The upward movement of water from root xylem to stem xylem and to leaf xylem occurs due to transpiration pull.

**Question No.30**

**Answer-2. The rate of absorption should be slightly higher than rate of transpiration.**

**Explanation:** -In a healthy and well growing plant, there is a continuous process of absorption of water in roots along with continuous transpiration from the leaves. However, since the plant showing a good growth, which needs water, it can be assumed that the rate of absorption is slightly higher than the rate of transpiration.

**Question No.31**

**Answer-4. A plant with astomatic leaves**

**Explanation:** -In plants, the transpiration occurs through stomata, lenticels and through cuticle. In plants with **hypostomatic** condition, the transpiration occurs more from the lower surface of the leaf. In plants with **amphistomatic** condition, the transpiration takes place equally from both the upper and lower surface. In plants with **astomatic** condition [Where stomata are absent], the transpiration can take place only through cuticle. Hence the rate of transpiration is lowest.

**Question No.32**

**Answer-1. Phosphoenol pyruvate**

**Question No.33**

**Answer-4. ATP and H<sub>2</sub>O**

**Explanation:** -**Oxidative phosphorylation** the process of addition of inorganic phosphate to ADP to produce **ATP** with the help of energy released during the oxidation of substrates [Food materials]. Although the many forms of life on earth use a range of different nutrients, almost all

aerobic organisms carry out oxidative phosphorylation to produce ATP, the molecule that supplies energy to metabolism. During oxidative phosphorylation, electrons are transferred from electron donors to electron acceptors such as oxygen, in red-ox reactions. These red-ox reactions release energy, which is used to form ATP. In eukaryotes, these red-ox reactions are carried out by a series of protein complexes within mitochondria, whereas, in prokaryotes, these proteins are located in the cells' inner membranes. One of the enzyme complexes present in the electron transport system i.e., **Cytochrome c oxidase**, also known as *complex IV*, is the final protein complex in the electron transport chain. It mediates the final reaction in the electron transport chain and transfers electrons to oxygen, while pumping protons across the membrane.<sup>[40]</sup> The final electron acceptor oxygen, which is also called the *terminal electron acceptor*, is reduced to water.

### Question No.34

**Answer** – 3. Cytoplasm

**Explanation:** – **Glycolysis** (from *glycose*, an older term for glucose + *-Lysis* degradation) is the metabolic pathway that converts glucose, into pyruvate. It occurs, with variations, in nearly all organisms, both aerobic and anaerobic. The wide occurrence of glycolysis indicates that it is one of the most ancient known metabolic pathways. It occurs in the cytoplasm [cytosol] of the cell.

### Question No.35

**Answer** – 1. Both the statements A and B are correct and A is the reason for B

**Explanation:** – Lactic acid fermentation is a single step reaction catalyzed by the enzyme **lactate dehydrogenase** under anaerobic conditions. This process occurs in lactic acid bacteria like *Lactobacillus* and also in muscle cells. During this process, **neither O<sub>2</sub> is absorbed nor is CO<sub>2</sub> synthesized**. Hence there is no foaming.

### Question No.36

**Answer** – 1. A=t, B=r, C=s, D=q

### Question No.37

**Answer** – 4. Exponential phase

**Explanation:** – Any population growing exponentially starts off slowly, goes through a rapid growth phase, and then levels off once the carrying capacity of the area is reached. Plotting a graph of such a population yields an S-shaped curve. This curve can be divided into three phases: Lag phase, Log or exponential phase, and steady phase. **Lag phase:** Population growth begins slowly from a few individuals. **Log phase:** Exponential growth occurs, the conditions are ideal and maximum growth rate is reached. **Steady phase:** During this phase, the growth has almost stopped and the size of the body remains fairly constant over a long period of time.

**Question No.38**

**Answer-** 3. Both mother and father are heterozygous for "A" and "B" group respectively.

**Explanation:** - ABO blood group in humans is an example for multiple allelism. The genotype of the person with "O" blood group is  $I^O I^O$  or  $ii$ . Since the mother and father possess A and B blood groups respectively, their genotypes should be heterozygous.  $I^A$  and  $I^B$  are dominant genes responsible for A and B blood group respectively. Hence the genotype of mother with "A" blood group is  $I^A I^O$  or  $I^A i$  and the genotype of father is  $I^B I^O$  or  $I^B i$ .

**Question No.39**

**Answer-** 3. Phenotypes-4 and Genotypes-9

**Explanation:** - Dihybrid cross shows a phenotypic (appearance) ratio of 9:3:3:1. For example, In a cross involving two parents having Yellow(Y) round(R) seed and Green(y) wrinkled(r) seed, in the **F<sub>1</sub> Generation**, all plants possess yellow, round seeds. In the **F<sub>2</sub> Generation produces plants with a ration of : 9 Yellow, Round, 3 Yellow, Wrinkled, 3 Green, Round, 1 Green, Wrinkled.** Hence there are 4 different phenotypes produced in the F<sub>2</sub> generation. Amongst these, totally 9 different genotypes are produced. They are **ROUND YELLOW** -RRYY, Rryy, RRYy, RrYy. **WRINKLED YELLOW** -rrYY, rrYy. **ROUND, GREEN**-RRyy, Rryy. **WRINKLED, GREEN**-rryy.

**Question No.40**

**Answer-** 2. Klinefelter's syndrome is an example for autosomal hyper- aneuloidy.

**Explanation:** - Klinefelter's syndrome, (47A+ XXY) or **XXY syndrome** is a condition in which human males have an extra X chromosome. Hence it can be called as a sex chromosomal disorder. **Down syndrome** or **Down's syndrome**, (also known as **trisomy 21**), is a chromosomal condition caused by the presence of all or part of an extra 21st chromosome (44A+XX or 44A+XY). Down's syndrome is caused by a meiotic non-disjunction event. With non-disjunction (non-separation), a gamete (*i.e.*, a sperm or egg cell) is produced with an extra copy of chromosome 21; the gamete thus has 24 chromosomes. When combined with a normal gamete from the other parent, the embryo now has 47 chromosomes, with three copies of chromosome 21. **Turner syndrome** (45A+ XO), is seen in human females, of which monosomy X (absence of an entire sex chromosome, *i.e.*, X chromosome) is most common. **Cri du chat syndrome** is a rare genetic disorder due to a missing part of chromosome 5. **Cri du chat syndrome** refers to the characteristic cat-like cry of affected children.

### Question No.41

**Answer** – 2. Plasma that is separated from clotted blood.

**Explanation:** – In blood, the **serum** is the component that is neither a blood cell (serum does not contain white or red blood cells) nor a clotting factor; it is the blood plasma with the fibrinogens removed. Serum includes all proteins not used in blood clotting (coagulation) and all the electrolytes, antibodies, antigens, hormones, and any exogenous substances.

### Question No.42

**Answer** – 4. National park

**Explanation:** – **In-situ conservation** is on-site conservation or the conservation of genetic resources in natural populations of plant or animal species, such as forest genetic resources in natural populations of tree species. It is the process of protecting an endangered plant or animal species in its natural habitat, either by protecting or cleaning up the habitat itself, or by defending the species from predators. Examples for in-situ conservation methods are **1. Setting up of Biosphere reserves, 2. National Parks, 3. Wild life sanctuaries.** **Ex-situ conservation** means literally, "off-site conservation". It is the process of protecting an endangered species of plant or animal outside of its natural habitat; for example, by removing part of the population from a threatened habitat and placing it in a new location, which may be a wild area or within the care of humans. Ex-situ conservation methods include cryopreservation [cryopreservation is a process where cells or whole tissues are preserved by cooling to low sub-zero temperatures, such as (typically) 77 K or  $-196\text{ }^{\circ}\text{C}$  (the boiling point of liquid nitrogen)], Seed bank and Zoos.

### Question No.43

**Answer** – 4. Both the statements A and B are wrong.

**Explanation:** – Acid rain is a rain or any other form of precipitation that is unusually acidic. Acid rain is caused by emissions of carbon dioxide, sulfur dioxide and nitrogen oxides which react with the water molecules in the atmosphere to produce acids. The main sources of  $\text{NO}_2$  and  $\text{SO}_2$  are forest fires, combustion of coal and petroleum through cars, trucks, and power plants. The health effects of  $\text{SO}_2$  and  $\text{NO}_2$  are  $\text{SO}_2$  and  $\text{NO}_2$  both can cause lung disease in humans. In plants, the acid rain can damage leaves and retard their growth.

### Question No.44

**Answer** – 1. Appiko movement.

**Explanation:** – The Appiko movement was a revolutionary movement based on environmental conservation in India. The Chipko movement (Hug the Trees Movement) in Uttarakhand in the Himalayas inspired the villagers of the district of Karnataka province in southern India to launch a similar movement to save their forests. In September 1983, led by **Panduranga**

**Hegde**, men, women and children of Salkani "hugged the trees" in Kalase forest. (The local term for "hugging" in Kannada is appiko.) Appiko movement gave birth to a new awareness all over southern India. **Project Tiger**, launched in 1973-74, is one of our most successful conservation ventures in the recent times. The project aims at tiger conservation in specially constituted 'tiger reserves', which are representative of various bio-geographical regions falling within our country. It strives to maintain a viable tiger population in the natural environment. **Narmada Bachao Andolan** is social movement consisting of tribal people, *adivasis*, farmers, environmentalists and human rights activists against the Sardar Sarovar Dam being built across the Narmada river, Gujarat, India.

## Question No.45

**Answer- 3. Reducing worldwide emissions of green house gases**

**Explanation:** - **Global warming** is the rising average temperature of Earth's atmosphere and oceans since the late 19th century and its projected continuation. The **greenhouse effect** is a natural process by which thermal radiation from a planetary surface is absorbed by atmospheric greenhouse gases, and is re-radiated in all directions. Since part of this re-radiation is back towards the surface and the lower atmosphere, it results in an elevation of the average surface temperature above what it would be in the absence of the gases. The **Kyoto Protocol** is a protocol to the United Nations Framework Convention on Climate Change (UNFCCC or FCCC), aimed at **fighting global warming**. The UNFCCC is an international environmental treaty with the goal of achieving the "**stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system**". The **Montreal Protocol on Substances That Deplete the Ozone Layer** (a protocol to the Vienna Convention for the Protection of the Ozone Layer) is an international treaty designed to protect the ozone layer by phasing out the production of numerous substances believed to be responsible for ozone depletion.

## Question No.46

**Answer-4. Tears.**

**Explanation:** - The **non specific body defenses** does not act on only one or two specific invaders but act on anything that is non self. It includes species resistance, mechanical and chemical barriers, inflammation, phagocytosis, natural killer cells [NK cells], Interferons and complement. The Mechanical and chemical barriers include surface barriers such as skin, mucus membrane, keratin of the epidermis, sweat and sebum, etc. **Tears**, a **secretion** of lachrymal glands contain **lysozyme**, an **antibacterial enzyme** that destroys bacteria by damaging bacterial cell wall.

## Question No.47

**Answer-2. Cardiac muscle fiber.**

**Explanation:** - **Cardiac muscle** (heart muscle) is a type of involuntary striated muscle found in the walls of the heart, specifically the myocardium. Cardiac muscle is one of three major types of muscle, the

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others being skeletal and smooth muscle. **Cardiac muscle exhibits cross striations** formed by alternating segments of thick and thin protein filaments. **Intercalated discs** are complex adhering structures present in cardiac muscles and intercalated discs are an identifying feature of cardiac muscle. (Note: Recollect the observations made during Biology Practicals).

### Question No.48

**Answer- 4. HCl is secreted by the parietal cells of gastric glands.**

**Explanation:** - Gastric glands are tubular glands present in the mucus membrane of stomach. It is provided three types of cells namely **Chief or Peptic cells** which secrete proenzymes, **Oxyntic cells** or parietal cells which secrete HCl and **Goblet cells or mucus cells** which secrete mucus. Enterokinase is an enzyme produced by cells of the duodenum and involved in the process of digestion in humans. It is secreted from intestinal glands (the crypts of Lieberkühn). It converts inactive trypsinogen into active trypsin. Bile salts [Sodium and potassium glycocholates and taurocholates] are essential for the emulsification of fat. Bile pigments (Bilirubin and Biliverdin) are the breakdown products of Heme of Haemoglobin.

### Question No.49

**Answer-2. Virus.**

**Explanation:** - **Hepatitis B** is an infectious inflammatory illness of the liver caused by the hepatitis B virus (HBV) that affects humans.

### Question No.50

**Answer-3.Chordae Tendinae.**

### Question No.51

**Answer- 1. Both statements are correct and B is the reason for A.**

**Explanation:** - **Myocardial infarction (MI)** commonly known as a **heart attack**, results from the interruption of blood supply to a part of the heart, causing heart cells to die. This is most commonly due to blockage of a coronary artery. **Myocardial ischemia** is an imbalance between myocardial oxygen supply and demand.



## Question No.52

**Answer** – 3. Increase in intra-pulmonary pressure

**Explanation:** – Inspiration or inhaling is the process of taking in the atmospheric air. This process involves contraction of muscles. The external intercostals muscles undergo contraction. Simultaneously, the diaphragm muscles also contract and it becomes flattened sheet. This increases the thoracic volume and decreases the pleural pressure [from 756mm Hg to 754 mmHg] and also the intra pulmonary pressure [from 760mmHg to 758mmHg].

## Question No.53

**Answer** – 1. The inflammation of bronchi

**Explanation:** – **Bronchitis** is inflammation of the **mucous membranes of the bronchi**, the airways that carry airflow from the trachea into the lungs. **Emphysema** is a type of chronic obstructive pulmonary disease (COPD) involving damage to the air sacs (alveoli) in the lungs. **Rhinitis** is a medical term for irritation and inflammation of the mucous membrane inside the nose.

## Question No.54

**Answer** – 1. Conservation of water.

**Explanation:** – In the kidney, the **loop of Henle** (or **Henle's loop**) is the portion of a nephron that leads from the proximal convoluted tubule to the distal convoluted tubule. The major function of the loop of Henle is the recovery of water and sodium chloride from the urine. This helps in the production of urine that is far more concentrated than blood, limiting the amount of water needed as intake for survival. Many species that live in arid environments such as deserts have highly efficient loops of Henle.

## Question No.55

**Answer** – 3. Glomerular Hydrostatic pressure- {Capsular hydrostatic pressure + Blood colloidal pressure}

## Question No.56

**Answer** – 3. Of decreased anti-diuretic hormone release.

**Explanation:** – Alcohol reduces secretion of ADH/Vasopresin, so less water is reabsorbed into the body from nephrons of kidney. This increases the volume of urine produced.

### Question No.57

**Answer-2.** Parkinson's disease.

**Explanation:** - Parkinson's disease is a degenerative disorder of the central nervous system. It results in tremors and muscular stiffness. One of the reasons for this is the degeneration of substantia nigra present in the mid brain that secretes dopamine. **Alzheimer's disease** that results in dementia [memory loss] is mainly due to the loss of neurons in the cerebral cortex and hippocampus that are important in learning and memory. **Huntington's disease (HD)** is a neurodegenerative genetic disorder that affects muscle coordination and leads to cognitive decline and psychiatric problems. It typically becomes noticeable in mid-adult life. HD is the most common genetic cause of abnormal involuntary writhing movements called chorea, and indeed the disease used to be called **Huntington's chorea**.

### Question No.58

**Answer-4.** Secondary oocyte.

### Question No.59

**Answer-1.** Progesterone.

### Question No.60

**Answer-3.** A=Archenteron, B=Dorsal Lip, C=Yolk plug, D=Blastocoel

