

10th Class 2018		
Biology	Group-I	Paper-II
Time: 1.45 Hours	(Subjective Type)	Max. Marks: 48

**(Part-I)**

**2. Write short answers to any FIVE (5) questions: (10)**

**(i) Explain stomata.**

**Ans** Stomata are the small pores within the epidermis of the leaves. These are surrounded by bean-shaped guard cells and open only in the presence of light.

**(ii) What is alveolus?**

**Ans** A sac-like structure present next to the alveolar duct in lungs, is called alveolus.

**(iii) Explain thermoregulation.**

**Ans** The maintenance of internal body temperature is called thermoregulation.

**(iv) Define osmosis.**

**Ans** Osmosis is the spontaneous net movement of solvent molecules through a semi-permeable membrane into a region of higher solute concentration, in the direction that tends to equalize the solute concentrations on the two sides.

**(v) Explain renal pelvis.**

**Ans** Renal pyramids project into a funnel-shaped cavity called renal pelvis, which is the base of ureter.

**(vi) Explain reflex arc.**

**Ans** Reflex arc is the nerve pathway over which the nerve impulses travel in a reflex action.



**(vii) What is myopia?**

**Ans** The elongation of eyeball results in myopia. Such persons cannot see the distant objects clearly. The image of an object is formed in front of retina. This problem can be solved by using concave lens.

**(viii) Explain oval window.**

**Ans** Oval window is the membrane which separates the middle ear from the inner ear.

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**3. Write short answers to any FIVE (5) questions: (10)**

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**(i) Differentiate between compact and spongy bone.**

**Ans** The hardest layer of the bone, on the outside, is called compact bone. The interior of bone is soft and porous. It is called spongy bone. Spongy bone contains blood vessels and bone marrow.

**(ii) What is meant by antagonism?**

**Ans** These body muscles always act opposite to each other. When one muscle contracts, the other relaxes. This mode of working is called antagonism.

**(iii) Write two advantages of vegetative propagation.**

**Ans** Two advantages of vegetative propagation are:

1. The offsprings produced through vegetative propagation are genetically identical. Therefore, beneficial characteristics can be preserved.
2. In vegetative propagation, there is no need of any mechanism of pollination.

**(iv) Write the functions of hilum and micropyle in seed.**

**Ans** There is a scar on seed coat, called hilum. It is where the seed is attached to ovary wall (fruit). At one end of hilum, there is micropyle. This is the same opening



through which the pollen tube entered ovule. Seed uses it for the absorption of water.

(v) Differentiate between epigeal and hypogeal germination.

**Ans** In epigeal germination, the hypocotyl elongates and forms a hook, pulling the cotyledons above ground. Beans, cotton and papaya are the examples of seeds that germinate this way. While in hypogeal germination, the epicotyl elongates and forms the hook. In this germination, the cotyledons stay underground. Pea, maize and coconut germinate this way.

(vi) Define traits, also give an example.

**Ans** "Inheritance means the transmissions of characteristics from parents to offspring. These characteristics are called the traits."

For example, in man, height, colour of the eyes, intelligence, etc. are all inheritable traits.

(vii) Differentiate between homozygous and heterozygous genotype.

**Ans** The genotype in which the gene pair contains two identical alleles (AA or aa), is called **homozygous** genotype.

The genotype in which the gene pair contains two different alleles (A a), is called **heterozygous** genotype.

(viii) What are breeds and cultivars?

**Ans** In artificial selection, the bred animals are known as breeds, while bred plants are known as varieties or cultivars.

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#### 4. Write short answers to any FIVE (5) questions: (10)

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(i) Define community.

**Ans** All the populations that live in a habitat and interact in different ways with one another is called as community.



**(ii) What is a food web?**

**Ans** A network of food chains which are interconnected at various trophic levels is called as food web.

**(iii) Define alcoholic fermentation.**

**Ans** Alcoholic fermentation is carried out by many types of yeast such as *Saccharomyces cerevisiae*. This process is quite important and is used to produce bread, beer, wine and distilled spirits.

**(iv) What is recombinant DNA?**

**Ans** Genetic engineering or recombinant DNA technology involves the artificial synthesis, modification, removal, addition and repair of the genetic material (DNA). If host organism is a microorganism, such as a bacterium, the transferred DNA is multiplied many times as the microorganism multiplies. Consequently, it is possible to obtain millions of copies of a specific DNA inside a bacterial cell.

**(v) What is beta endorphin and what is its use?**

**Ans** Beta-endorphin is a pain killer produced by the brain, has also been produced by genetic engineering techniques.

**(vi) What are pharmaceutical drugs?**

**Ans** Pharmaceutical drugs or medicinal drug is defined as any chemical substance used in the diagnosis, cure, treatment, or prevention of diseases.

**(vii) What is heroin? What is its effect on CNS?**

**Ans** Heroin is a semi-synthetic drug from morphine. It affects on central nervous system (CNS) and causes drowsiness.

**(viii) For what purpose vaccines are used?**

**Ans** Vaccines are used to produce immunity to a disease by stimulating the production of antibodies.



**NOTE: Attempt any TWO (2) questions.**

**Q.5.(a) Describe in detail osmotic adjustments in plants. (5)**

**Ans** **Osmotic Adjustments in Plants:**

On the basis of the available amount of water and salts, plants are divided into three groups:

**(i) Hydrophytes:**

These are the plants which live completely or partially submerged in freshwater. Such plants do not face the problem of water shortage. They have developed mechanisms for the removal of extra water from their cells. Hydrophytes have broad leaves with a large number of stomata on their upper surfaces. This characteristic helps them to remove the extra amount of water. The most common example of such plants is water lily.

**(ii) Xerophytes:**

They live in dry environments. They possess thick, waxy cuticle over their epidermis to reduce water loss from internal tissues. They have less number of stomata to reduce the rate of transpiration. Such plants have deep roots to absorb maximum water from soil. Some xerophytes have special parenchyma cells in stems or roots in which they store large quantities of water. This makes their stems or roots wet and juicy, called succulent organs. Cacti (Singular: Cactus) are the common examples of such plants.



### (iii) Halophytes:

They live in sea waters and are adapted to salty environments. Salts enter in the bodies of such plants due to their higher concentration in sea water. On the other hand, water tends to move out of their cells into the hypertonic sea water. When salts enter into cells, plants carry out active transport to move and hold large amount of salts in vacuoles. Salts are not allowed to move out through the semi-permeable membranes of vacuoles. So the sap of vacuoles remains even more hypertonic than sea water. In this way, water does not move out of cells. Many sea grasses are included in this group of plants.

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(b) Write a note on nerve cell or neuron. (4)

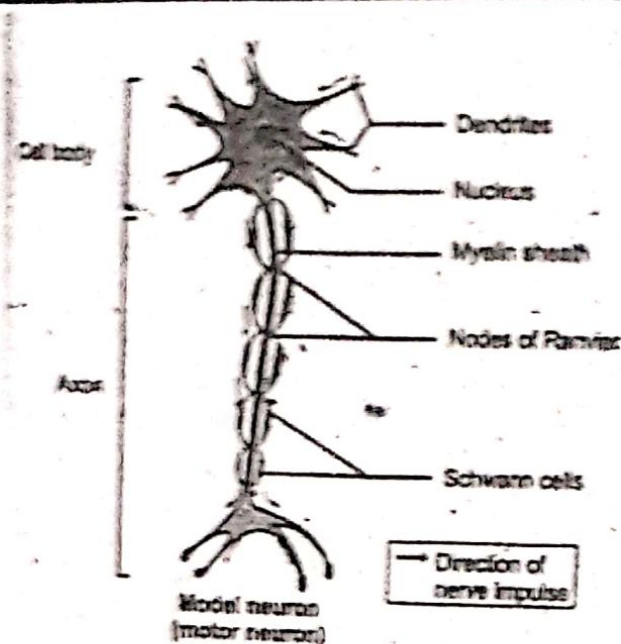
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**Ans** Nerve cell or neuron:

Nerve cell or neuron is the unit of the nervous system. The human nervous system consists of billions of neurons plus supporting cells. Neurons are specialized cells that are able to conduct nerve impulses from receptors to coordinators and from coordinators to effectors. In this way, they communicate with each other and with other types of body cells.

#### **Dendrites and Axons:**

The nucleus and most of the cytoplasm of a neuron is located in its cell body. Different processes extend out from cell body. These are called dendrites and axons. Dendrites conduct impulses towards cell body and axons conduct impulses away from cell body.



**Fig. Neurons.**

### **Schwann Cells:**

Schwann cells are special neurological cells located at regular intervals along axons.

### **Myelin sheath:**

Schwann cells secrete a fatty layer called myelin sheath, over axons.

### **Nodes of ranvier:**

Between the areas of myelin on an axon, there are non-myelinated points, called the nodes of ranvier.

### **Saltatory impulses:**

Myelin sheath is an insulator so the membrane coated with this sheath does not conduct nerve impulse. In such a neuron, impulses 'jump' over the areas of myelin going from node to node. Such impulses are called saltatory (jumping) impulses. This increases the speed of nerve impulse.

### **Types of neurons:**

On the basis of their functions, neurons are of three types:



**(i) Sensory neurons:**

These neurons conduct sensory information from receptors towards the CNS. Sensory neurons have one dendrite and one axon.

**(ii) Interneurons:**

Interneurons form brain and spinal cord. They receive information, interpret them and stimulate motor neurons. They have many dendrites and axons.

**(iii) Motor neurons:**

Motor neurons carry information from interneurons to muscle or glands (effectors). They have many dendrites but only one axon.

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**Q.6.(a) What is skeleton? Explain the components of human skeleton. (4)**

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**Ans** **Skeleton:**

Skeleton is defined as the framework of hard, articulated structures that provide physical support, attachment for skeletal muscles, and protection for the bodies of animals.

**Components of Human Skeleton:**

The 206 bones in the adult human skeleton are organized into a longitudinal axis *i.e.*, axial skeleton, to which appendicular skeleton is attached.

**(i) Axial Skeleton:**

Axial skeleton consists of the 80 bones in the head and trunk of body. It is composed of five parts. Skull contains 22 bones out of which 8 are cranial bones (enclosing the brain) and 14 are facial bones. There are 6 middle ear ossicles (3 in each ear). There is also a hyoid bone in neck. Vertebral column contains 33 bones



(vertebrae). The chest is made of a chest bone called sternum and 24 (12 pairs) ribs.

## (ii) Appendicular Skeleton:

Appendicular skeleton is composed of 126 bones. Pectoral (shoulder) girdle is made of 4 bones. Arms have 6 bones. Both hands have 54 bones. Pelvic girdle (hips) has 2 bones. Legs have 6 bones. Both feet have 54 bones.

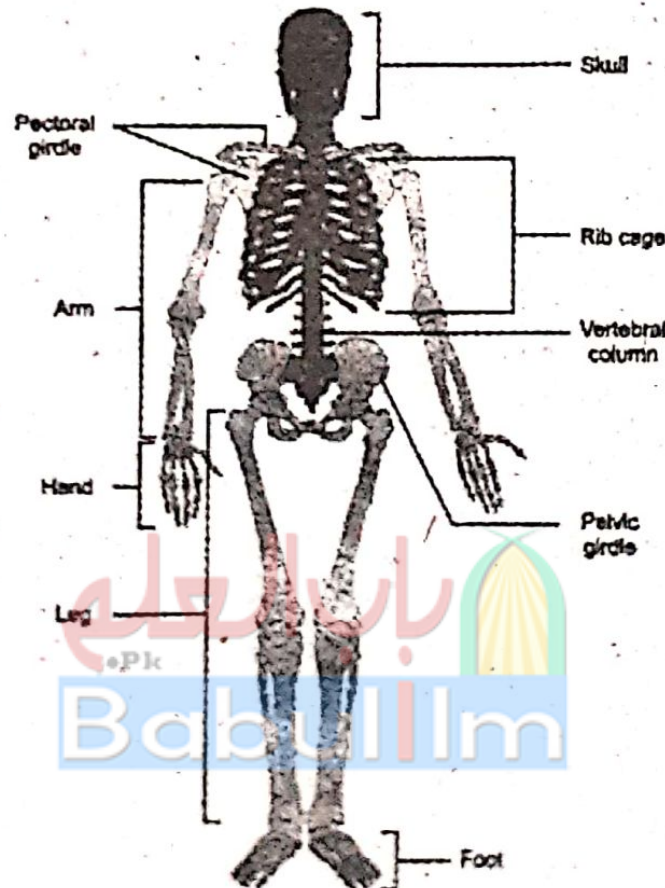


Fig. Human Skeleton.

(b) What is seed germination? Explain conditions for seed germination. (4)

**Ans** Germination:

Seed germination is a process by which a seed embryo develops into a seedling. During germination, embryo soaks up water which causes it to swell, splitting the seed coat.

Root is the first structure that emerges from the radicle present in seed. It grows rapidly and absorbs water and nutrients from soil. In the next phase, plumule



develops into tiny shoot which elongates and comes out of soil.

On the basis of the elongation of hypocotyl and epicotyl, there are two types of germination:

**(i) Epigeal germination:**

In epigeal germination, the hypocotyl elongates and forms a hook, pulling the cotyledons above ground. Beans, cotton and papaya are the examples of seeds that germinate this way.

**(ii) Hypogeal germination:**

In hypogeal germination, the epicotyl elongates and forms the hook. In this germination, the cotyledons stay underground. Pea, maize and coconut germinate this way.

**Conditions for Seed Germination:**

Seed germination depends on both internal and external conditions. The internal conditions include a living embryo and sufficient food storage. The most important external conditions include water, oxygen and favourable temperatures.

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**Q.7.(a) Describe in detail the biotic components of ecosystem. (4)**

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**Ans Biotic Components:**

The biotic components comprise the living part (organisms) of the ecosystem. Biotic components are further classified as producers, consumers and decomposers.

**Producers:**

The producers are the autotrophs present in an ecosystem. Producers include plants, algae and photosynthetic bacteria. These organisms are able to synthesize complex organic compounds (food) from inorganic raw materials. Producers form the basis of any ecosystem. In terrestrial ecosystems, plants are the main producers. In aquatic ecosystems, the main producers are



the floating photosynthetic organisms (mainly algae) called phytoplankton and shallow water-rooted plants.

### **Consumers:**

The consumers are heterotrophs. They cannot synthesize their food and so depend upon producers for food. Consumers include all animals, fungi, protozoans and many of the bacteria. The animals are the major consumers of ecosystems. They are further classified as herbivores and carnivores. Herbivores e.g., cattle, deer, rabbit, grasshopper, etc. feed on plants. They are the primary consumers. They feed directly on plants or products of plants. Carnivores feed on other animals. Primary carnivores (secondary consumers) feed on herbivores. Fox, frog, predatory birds, many fishes, snakes, etc. are primary carnivores. Secondary carnivores (tertiary consumers) feed on primary carnivores. Wolf, owl, etc. are secondary carnivores. Tertiary carnivores e.g., lion, tiger, etc. feed on secondary carnivores.

### **Decomposers:**

Decomposers or reducers break down the complex organic compounds of dead matter (of plants and animals) into simple compounds. They secrete digestive enzymes into dead and decaying plant and animal remains to digest the organic material. After digestion, decomposers absorb the products for their own use. The remaining substances are added to environment. Many types of bacteria and fungi are the principal decomposers of biosphere.

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**(b) What are the objectives of genetic engineering?**

**(4)**

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**Ans** Objectives of Genetic Engineering:



The important objectives of genetic engineering are as follows:

- (i) Isolation of a particular gene or part of a gene for various purposes such as gene therapy.
- (ii) Production of particular RNA and protein molecules.
- (iii) Improvement in the production of enzymes, drugs and commercially important organic chemicals.
- (iv) Production of varieties of plants having particular desirable characteristics.
- (v) Treatment of genetic defects in higher organisms.

