AP Board Class 10 Science Paper II 2016 Question Paper with Solutions

Biological Sciences

Part- A

Section-I **4 X 1 = 4**

1. **Write the names of any two excretory organs in human beings.**

   Answer: Lungs and Kidney are the two excretory organs that are found in human beings.

2. **Write the names of producers and consumers in the food chain you have observed.**

   Answer: In a food chain including grass, grasshopper, frog, snake and hawk, the grass is the producer in a food chain. Consumers can be of three types, the primary, secondary and tertiary. Grasshoppers can be a primary consumer. Here, the frog will be the secondary consumer and snake the tertiary consumer.

3. **Which blood vessels carry blood from the heart to the body parts?**

   Answer: There are two kinds of blood vessels, the arteries and the veins. The arteries carry blood from the heart to the body parts.

4. **Which plants in your surroundings are useful for the production of medicines?**

   Answer: Papaver somniferum (Opium) plant is used as a good painkiller, while Nicotiana tobacum (Tobacco) and Chrysanthemum are used as insecticides. Azadirachta indica(neem) is also a good antiseptic.

5. **How do you get the characters from your parents and grandparents?**

   Answer: Characters are inherited via the genes present in chromosomes. It is seen that traits are passed to gametes, which fuse during fertilisation. One set of chromosomes come from father and another set from mother. From grandparents, it is passed to parents and then to us. Every individual possesses a pair of alleles (assuming only a pair is present) for any particular trait. Also, each parent is expected to pass a randomly selected copy (allele) of only one of these to an offspring. The offspring then receives its own pair of alleles for that trait, one each from both parents. Transmission or passing of characters or traits from parent to offspring is called ‘Heredity’ and the process in which traits are passed from one generation to another generation is called ‘Inheritance’

6. **Write the functions of the spinal cord from the information collected from your school library and the internet.**

Answer: The spinal cord helps the brain to communicate with different parts of the body, and vice versa. Meanwhile, important functions of the Spinal Cord are mentioned below:

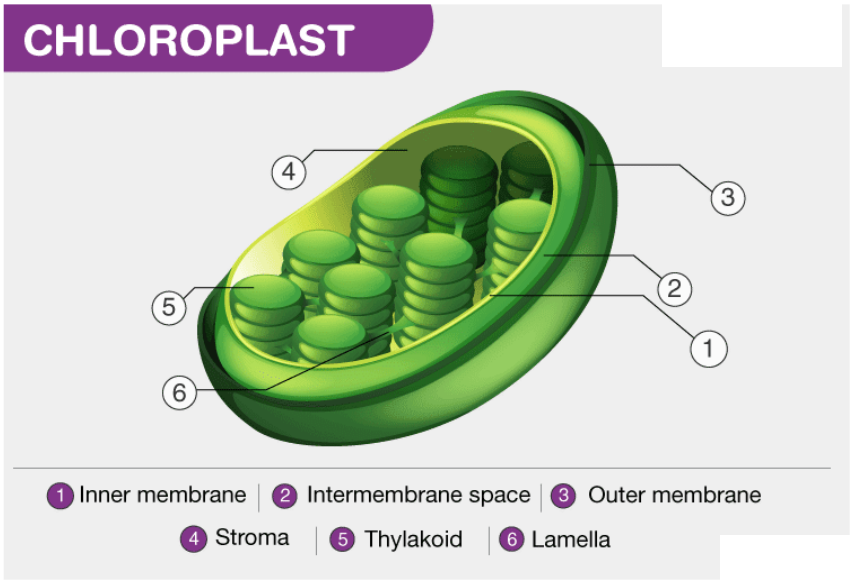
- Forms a connecting link between the brain and the PNS
- Provides structural support and builds a body posture
- Facilitates flexible movements
- Myelin present in the white matter acts as an electrical insulation
- Communicates message from the brain to different parts of the body
- Coordinates reflex
- Receives sensory information from receptors and approaches towards the brain for processing

Section-II **5 X 2 = 10**

Group-A

7. Explain the structure of a chloroplast with the help of a rough diagram

Answer:



8. Which characters in the pea plant were selected by Mendel, for his experiments?

Answer: Mendel had chosen 7 pairs of contrasting characters in the plants to be used for his study:

1. The difference in the form of the ripe seeds. These are either round or deeply wrinkled.
2. The difference in the colour of the seed albumen (endosperm). The albumen of the ripe seeds is either pale yellow, bright yellow and orange coloured, or it possesses a more or less intense green tint. This difference of colour is easily seen in the seeds as their coats are transparent.

3. The difference in the colour of the seed coat. This is either white with the character of white flowers are constantly correlated, or it is grey, grey-brown, leather-brown, with or without violet spotting.
4. The difference in the form of the ripe pods. These are either simply inflated, not constricted in places, or they are deeply constricted between the seeds and more or less wrinkled.
5. The difference in the colour of the unripe pods. They are either light to dark green, or vividly yellow.
6. The difference in the position of the flowers. They are either axial, that is, distributed along the main stem, or they are terminal, that is, bunched at the tip of the stem.
7. The difference in the length of the stem. The length of the stem is varied in some forms. In experiments with this character, in order to discriminate with certainty, the long axis of 6 to 7 feet. was always crossed with the short one of 3/4 to 1 and 1/2 feet. (Popularly called the tall and dwarf varieties).

9. What are the control measures for the eradication of mosquito population?

Answers: Given here are some control measures for the eradication of the mosquito population:

- Remove the stagnant water in the surrounding areas
- Keep gutters clean and unclogged
- In case it is impossible to remove complete water, treat the remaining water and refresh the necessary water frequently
- Make your yard inhospitable for mosquitoes
- Use suitable pesticides
- Apply insect repellent and protect yourself from mosquitoes

10. What will happen if a plant is placed near the window of your classroom? What is this process called?

Answer: If you observe the growth of a plant placed near the window of a classroom, you will see that the plant will bend towards sunlight. Such type of response of a plant to light is called phototropism (photo means light, tropism means movement).

Group B

11. What questions do you ask a doctor to know about different birth control methods?

Answer: These are the questions to ask a doctor to know about different birth control methods:

1. How do you know if you are pregnant?
2. What are the birth control methods that we can adapt?
3. What is the most effective method of birth control?
4. What is a contraceptive?
5. Is birth control safe for me to follow? What are the expected side effects?
6. What is the failure rate of birth control?
7. When do I need to take the medication for birth control?

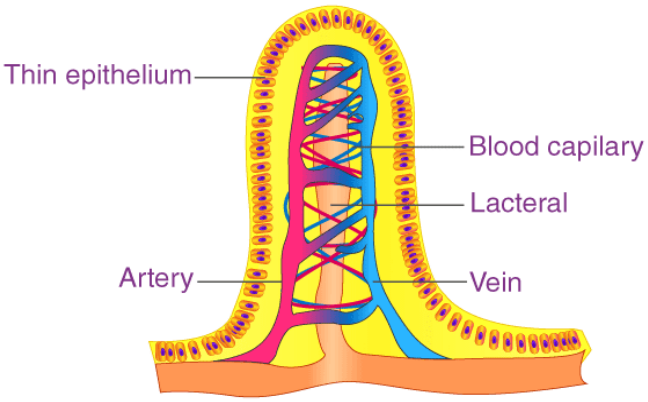
8. What will happen, if I fail to take birth control?

12. How did you prepare a matchstick stethoscope in your school?

Answer: It is effortless to prepare a matchstick stethoscope with the help of a button and matchstick. For this, first, take a shirt button and insert a matchstick into it. Then place it on the wrist and observe movements in the matchstick to get the pulse rate.

13. Draw the diagram of villi in the small intestine and label its parts.

Answer:



14. How do you appreciate the role of spinal cord in reflex actions?

Answer: Reflex actions are sudden responses or an involuntary action that do not involve thinking. For example, when we touch a hot object, we withdraw our hand immediately without thinking. In such actions, the spinal cord has a significant role to play. The reflex arc shows the pathway through which the reflex action occurs. In a reflex action, the spinal cord, along with the brain stem is responsible for the reflex movements. The sensory nerves that detect the heat are connected to the nerves that move the muscles of the hand. Such a connection of detecting the signal from the nerves (input) and responding to it quickly (output) is known as a reflex arc. Reflex arcs are formed in the spinal cord but the information is still sent to the brain. The brain does not have a significant response to it. Learn more about the role of the brain in reflex actions.

Section-III 4 X 4 = 16

Group A

15. What is the role of Epiglottis and Diaphragm in respiration?

Answer: Epiglottis is a flap-like muscular valve that controls the movement of food and air, towards their respective passages. From the nasal cavity, the air goes into the pharynx. From the pharynx there are two passages, beginning with the nearly same opening and ending into separate ones, one to the lungs and one to the stomach. Air must go into one and food into the other. It is also essential that food does not enter the tube through which air goes into the lungs. The traffic is kept properly channelled by a flap-like valve. This epiglottis protects the tube to the lungs, arresting entry of food. This valve is partly closed when we swallow food; it deflects food down to the stomach and keeps it out of the trachea or windpipe, which is the route to the lungs. The epiglottis opens more widely when we take a breath, and air enters the lungs. Nervous regulation is essential in guiding the function of epiglottis and passage of food and air. Meanwhile, another flexible flattened muscle called diaphragm also helps the lungs in moving air into and out of them. The diaphragm may be imagined as the 'floor' if you think of the chest cavity as a "room." When the diaphragm is relaxed when we breathe out, it is in the shape of a dome with the convex side of the dome extending into the chest cavity. When the diaphragm contracts during inhalation it flattens out a bit or the dome moves downward. As a result, the volume of the chest cavity is increased. When the diaphragm flattens, and the volume of the chest cavity is increased, its internal pressure decreases. Hence, the air from the outside also rushes into the lungs. This is an inspiration (inhalation). Then the reverse occurs. The chest wall is lowered and moves inward, and the diaphragm relaxes and assumes its dome shape. These changes increase the pressure on the lungs; thus, their elastic tissue contracts. It also squeezes the air out through the nose to the outer atmosphere. This process is expiration or exhalation.

16. What is root pressure? How is it useful to plants?

Answer: Root pressure is a force or the hydrostatic pressure generated in the roots. This pressure helps in driving the fluids and other ions from the soil in upwards directions into the plant's vascular tissue – Xylem**.** Root pressure, is one factor that contributes towards the movement of water in the xylem.

17. Write the experiment of a bell Jar and pudina plant, performed by Priestley to prove that air plays a crucial role in photosynthesis.

Answer: In 1770, after a series of experiments, Joseph Priestley concluded, the essentiality of air for photosynthesis and also for the growth of plants.

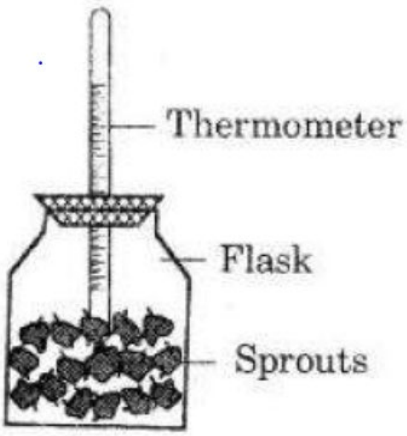
Materials required for the experiment: A bell jar, candle, rat, and a pudina plant.

Experiment:

1. Priestley kept a burning candle and a rat together in the single bell jar.
2. After some time, the candle extinguished, and the rat died.
3. For the second time, he kept a burning candle, rat, and a green plant together in the bell jar.
4. He observed that neither the candle got extinguished, nor did the rat die.

Conclusion: Based on his observations, Priestley concluded that in the first case, the air in the bell jar got polluted by the candle and rat. However, in the second case, the plant reinstated the air that was spoiled by the candle and the rat.

18.



a. **What is the aim of this experiment?**
b. **What change do you observe in the thermometer reading?**
c. **In your opinion, where did this heat come from?**
d. **What precaution should we take, while doing this experiment?**

Answer: (a) Aim of the experiment is to prove that heat is evolved during respiration
(b) The thermometer reading for moist seeds will go up as moist seeds respire and produce heat
(c) The heat is produced by the germinating seeds during the process of respiration
(d) During the experiment, make sure to remove the lid and prepare a cork (with thermocol, or rubber or any other material) through which you can bore a hole to insert a thermometer. Take care that the bulb of the thermometer is dipped in the sprouts. Also, close the flask with this tight-fitting cork.

Group -B

19. What is mastication? Explain about the teeth used in mastication.

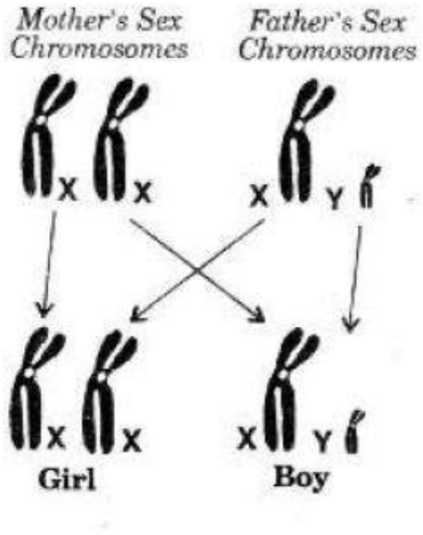
Answer: During mastication food size becomes convenient to swallow. Food is cut and crushed by our teeth in the mouth and mixed with saliva to make it wet and slippery (also called mastication). The circular muscles of the mouth enable the food to be pushed into the oral cavity and to be moved around. As the food cannot be swallowed directly, the teeth grind, chew and shred it. This process is called mastication. For this purpose the surface muscles of the jaw help in biting and chewing actions, and move the jaw up, down, forward and backward during food mastication. Your lower jaw moves up and down as you chew food. The teeth help in cutting and grinding while tongue movements evenly spread out the food and help in mixing it with saliva. To learn more about the types of teeth and its functions, check her.

20. Write about the 4 R's needed for the protection and conservation of the environment?

Answer: There are essentially 3 R's in the process of creating and maintaining a comprehensive recycling program. Learn more about the 3 R's here.

Reduce: Repair leaky taps and avoid a shower or switch off unnecessary lights and fans. Think of other things that you could reduce usage of.
Reuse: things that you often tend to throw away, like paper and wrapping papers. This would save plants and minimise pollution.
Recycle: may not always be a very good option as recycling plastic is a tricky process and can cause havoc. The chief problem lies in plastics' complexity. There are as many types of plastic as their uses. Since each type can only be recycled with its own kind, plastics need to be carefully sorted before they can be processed.
Now, adding to this is the 4th R of environment conservation. This fourth R that is an important part of environment conservation is Recover. It stands for recovering valuable commodities.

21.



a. If a sperm with a "x" chromosome fertilises with an ovum with "x" chromosome, what will be the gender of the baby?
b. Who determines the sex/gender of the baby, mother or father?
c. Is it correct to blame the mother for giving birth to a baby girl?
d. Do all our characters resemble that of our parents?

Answer: (a) If a sperm with "x" chromosome fertilises with an ovum with "x" chromosome, then the gender of the baby will be a girl
(b) Father determines the sex/ gender of a baby
(c) No, it is not correct to blame the mother for giving birth to a baby girl.
All the gametes (ova) produced by a woman have only X chromosomes. The gametes (sperm) produced by a man are of two types, one with X chromosome and other Y chromosome. If the sperm carrying Y chromosome fertilises the ovum (X chromosome). Then the baby will have XY condition. So the baby will be a boy. Or if a sperm with X chromosome fertilises an ovum with x chromosome, then the baby will be a girl.

(d) Characters as we know are governed by genes. Thus, there is change in the frequency of genes in small populations. This is known as “Genetic drift’, which provides diversity in the population. Character can be acquired, which an offspring has acquired during their lifetime or it can be hereditary, passed on to its offspring i.e. to the next generation. Each character or trait is expressed due to a pair of factors or ‘alleles’ (contrasting expressions of the same trait). Gene is a segment of a nucleic acid called ‘DNA’ which is present in the nucleus of every cell. It controls the expression of a trait or character. Traits are determined by the chemical nature of DNA and a slight change in it leads to variations. Colour of the hair, the skin etc. are examples of traits. Slight inheritable changes in the chemical structure of DNA may lead to change in the characteristic or trait of offspring of an organism, which leads to ‘Variations’.

22. What steps would you like to follow on your part to conserve bio-diversity?

Answer: Biodiversity conservation refers to the protection, upliftment, and management of biodiversity in order to derive sustainable benefits for present and future generations. Some steps to adopt are given below:

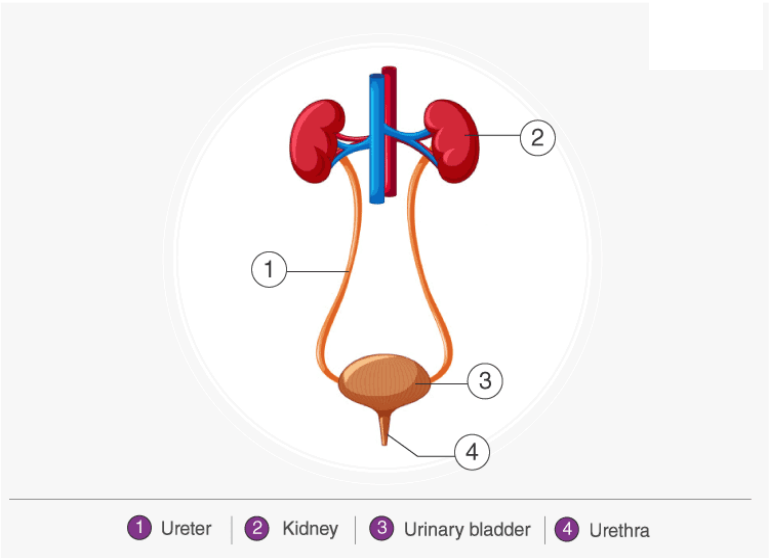
- Stop wastage
- Reduce the use of fossil fuel consumption
- Restore damaged habitats
- Reduce the level of pollutants in the environment and so on.

Meanwhile, Learn more about the steps to follow to conserve biodiversity.

Section-IV **5 X 1 = 5**

23. Draw a neat labelled diagram of excretory system in human beings

Answer:



24. Draw the diagram of human sperm and label its parts. Write a few lines about it.

Answer: Learn more about the structure of sperm from here.