Kerala Board Class 10 Biology 2015 Question Paper with Solutions

1. **Find out the relationship between the pair of words and fill up the blanks:**

a. **Rod cells: Rhodopsin**
Cone Cells: _____

b. **Cranial nerve: Communication from brain to organ**
_____ : Communication from spinal cord to organ

(c) Water vapour: Stomata
Water droplet: _____

Answer: (a) Photospins
(b) Spinal nerve
(c) Hydathodes

2. **Find the odd one out and identify the common features of the others:**
   1. **Dengue fever, swine flu, Ringworm, chikungunya**
   2. **Bt-Cotton, Superbug, Iguana, Bt-Brinjal**

Answer: (a) Ringworm. It is a fungal infection as the rest are all viral infection
(b) Iguana. Other three are all products of genetic engineering
Find the odd one out and identify the common features of the others:

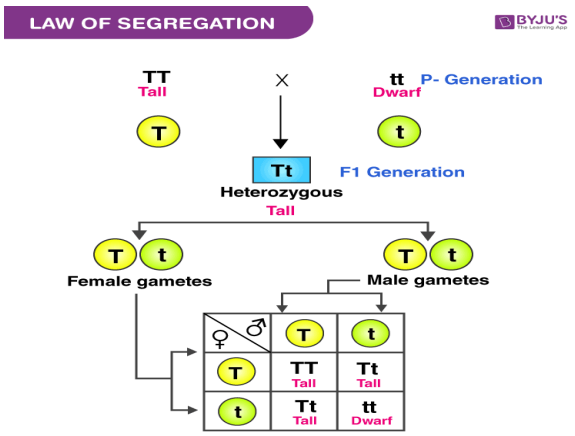
a. Dengue fever, swine flu, Ringworm, chikungunya
b. Bt-Cotton, Superbug, Iguana, Bt-Brinjal

3. "Germs, both alive and dead are used to get immunity". Substantiate the statement with vaccines used for rabies and tuberculosis.

Answer: In the rabies vaccines that fight against rabies, dead germs are used. Alternatively, in BCG, vaccines are used against tuberculosis, live, but inactive vaccines are used. So, this can substantiate the statement that "Germs, both alive and dead are used to get immunity."

4. Diagrammatically represent the symbols with the first generation of progenies of Tall and Dwarf pea plants when cross-pollinated as in Mendel's early stage of the experiment.

Answer:



5. "Receptors are modified neurons." Justify the statement with examples of receptors in different sense organs.

Answer: Receptors are modified neurons. Receptors found in the different sense organs include rods and cones in the eyes, taste receptors found in the tongue and auditory receptors in the ears.

6. Write your inference by analysing the following information in connection with evolution.

No of amino acids in β chain of man is - 146
The variation in the number of amino acids in the β chain:-
Chimpanzee - Nil
Gorilla - 1
Rhesus Monkey - 8
Dog - 16

1. **Substantiate the reason for the variation of amino acids of protein like haemoglobin in the above organisms.**
2. **Write the advantage of the micro-level knowledge of protein and genes of the related organism.**

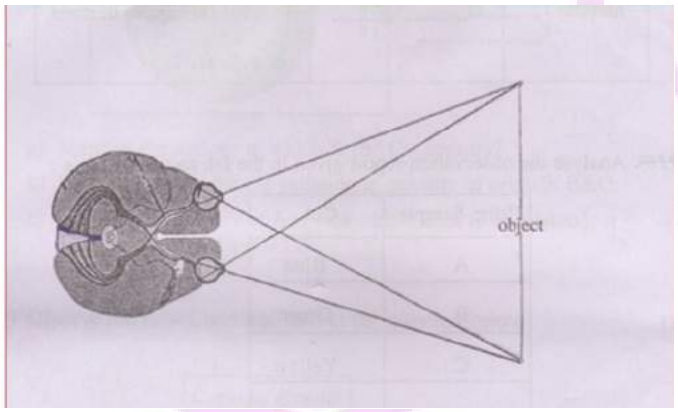
Answer: (a) Changes have occurred in the sequences of the amino acids in these organisms due to mutation and then natural selection. It is related to how closely these organisms are connected and their classification. Even though the sequence of amino acids in the haemoglobin molecule is different, the whole molecule will have the same basic structure, and its function of binding the oxygen molecules is also the same. Hence, this change in sequence will not affect the operation of the haemoglobin.

Using this information from the sequences of amino acids in haemoglobin, the evolutionary relationships between the species in terms of the evolution of humans is evident. Chimpanzees, gorillas, rhesus monkeys and humans are more closely related and have a more recent common ancestor. The kangaroo and horse would also have a common ancestor with chimpanzees, gorillas, rhesus monkeys and humans, but further back in time than the common primate ancestor.

The dog (*Canis familiaris* considered a distinct species or *Canis lupus familiaris* is a subspecies of the wolf) and is a domesticated carnivore of the family Canidae. At the same time, the rhesus macaque (*Macaca mulatta*) is a species of Old World monkey. Gorillas are ground-dwelling, predominantly herbivorous apes that inhabit the forest of central Sub-Saharan Africa. Also, The chimpanzee (*Pan troglodytes*), also known as the common chimpanzee, robust chimpanzee, or simply chimp, is a species of great ape native to the forest and savannah of tropical Africa. Meanwhile, it is seen that anatomically and physiologically, Rhesus monkeys are related to human beings. Also, the closest relatives of gorillas are the other two Homininae genera, chimpanzees and humans, all of them having diverged from a common ancestor about 7 million years ago. Human gene sequences differ only 1.6% on average from the sequences of corresponding gorilla genes, but there is a further difference in how many copies each gene has.

(b) Advantage of the micro-level knowledge of protein and genes of the related organism also indicates the close relationship between the organisms and their classification, and it also helps in assigning the similarities and differences between two individuals.

7. Name the process represented in the following illustration. Write the peculiarity of the image formed in the labelled sense organ.



Answer: This image represents the path of impulses from both the retinas/eye to the brain. When an image from two sides of the same object are formed in the right and the left eye, they are combined in the visual area of the cerebrum in the brain to create a three-dimensional image of the object. This is Binocular vision. Usually, inverted images are formed at the back of our eye, but here that is not the case.

8. "Some specific process during Meiosis helps to create variation in character among organisms."
a. Analyse this statement and explain the process.
b. What happens if sudden changes occur in chromosome number and structure? Cite examples.

Answer: (a) Meiosis is a cell division process, which takes place in two phases resulting in the creation of 4 haploid gametes. This two-step procedure will reduce the number of chromosomes into half, thus resulting in the formation of egg and sperm cells. The

chromosome count goes from 46 to 23. This is one of the reasons why human embryo has 46 chromosomes from birth.
(b) Any change, addition or deletion of the chromosomal part causes alteration of number, position or sequence of genes in the chromosome. This alteration of the structure is referred to as chromosomal aberrations or chromosomal mutations. Students can know more about chromosomal disorder in humans from here.

9. Match the item in column B and C with systems of treatment given in column A.

A	B	C
a)_____	Sages and Maharishis	Lifestyle maintain the body fit
Homeopathy	Samuel Haniman	b) _____
Allopathy	c)_____	Importance to diagnosis treatment and medicine

Answer: (a) Ayurvedic medicine
(b) Used to restore the health of the sick
(c) Samuel Hahnemann

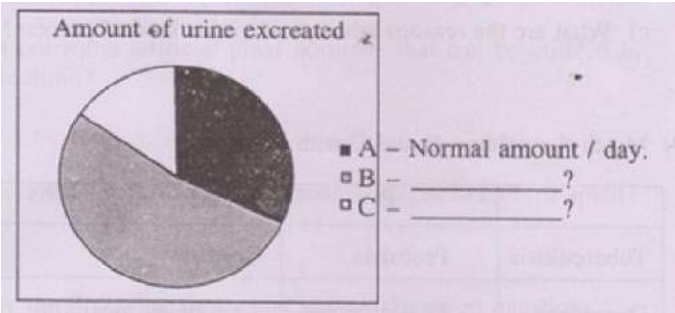
10. Analyse the observation report given in the lab record of Laya.

Urine Sample	Colour
A	Blue
B	Green
C	Yellow
D	Orange
E	Red

a. Mention the name of the reagent used to test in these sample solutions.
b. Which among the samples contain the highest concentration of glucose?
c. What might be the endocrine malfunction that leads to this condition?

Answer: (a)The presence of glucose in the urine can be a sign of diabetes and testing a urine sample with Benedict's reagent is a simple way of checking for the existence of glucose in people. This is a solution of copper sulfate, sodium carbonate and sodium citrate in water.
(b) The E sample with Red urine contains the highest concentration of glucose
(c) Failure of the pituitary gland leads to this condition

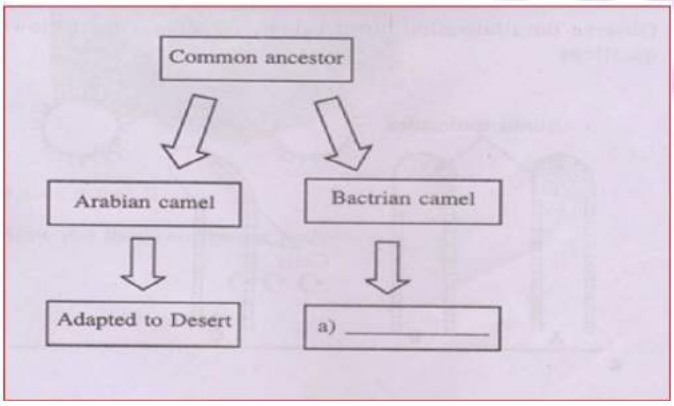
11. Observe the graphical representation of the amount of urine excreted from a person in different season and answer the question given below:



a. Mention the seasons at which B and C- appears.
b. Elucidate the reason for variation in the quantity of urine and B and C.
c. Name the deficiency of the hormone, which leads to excessive loss of water through urine.

Answer: a) The season at which B appears is Cold climate, monsoon or winter while C appears in hot weather or summer
b) Reason for variation in the quantity of urine and B and C is the variation of water lost as sweat or variation of water is reabsorbed
c) The deficiency of hormone that leads to excessive loss of water through urine is anti-diuretic hormone is ADH.

12. Observe the flow chart and answer the question below:



a. Complete the flow chart.
b. Name the process by which these two camels were evolved.
c. What are the reasons which led to this kind of process?

Answer: a) adapted to cool and cold desert environment
b) The process by which the two camels are evolved is the divergent evolution
c) Accumulation of favourable variations that are inherited through generations are the reasons that lead to this kind of process

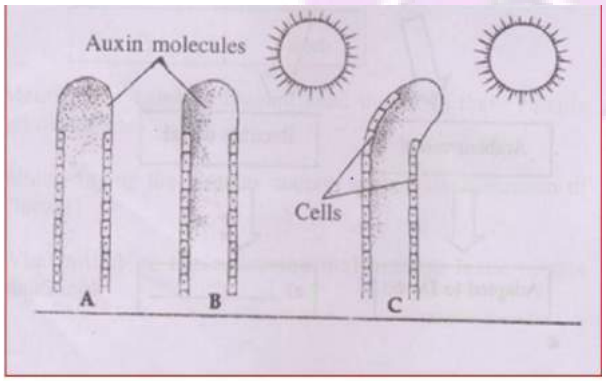
13. Match column B and C with column A.

A	B	C
Tuberculosis	**Protozoa**	**Contact**
Dysentry	**Filarial Larvae**	**Anopheles Mosquito**
Malaria	**Bacteria**	**Food/ Water**
Ringworm	**Plasmodium**	**Culex mosquito**
	Fungus	**Air**

Answer:

A	B	C
Tuberculosis	Bacteria	Air
Dysentry	Protozoa	Food/ Water
Malaria	Plasmodium	Anopheles Mosquito
Ringworm	Fungus	Contact

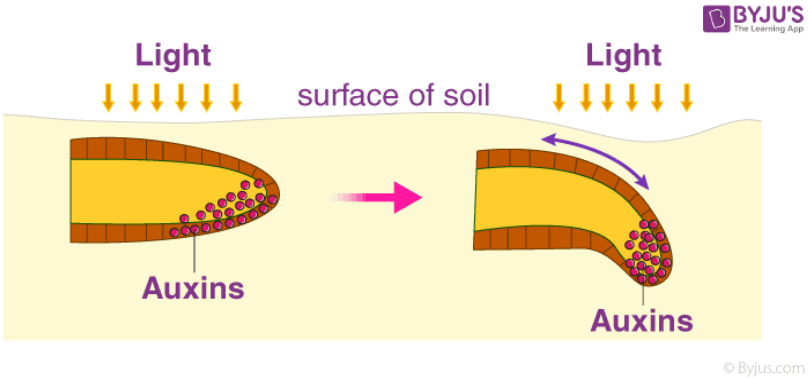
14. Observe the illustration given below and answer the three questions.



a. What kind of hormone action is represented in the illustration?
b. Draw the opposite action of these hormones in the plant root.
c. List out some artificial plant hormones that can be utilised in agriculture.

Answer: (a) Auxins, a plant hormone found in the stem tip of a plant moves to the darker side of the plant. Auxin is also the hormone that controls the growth of the plant cells. In

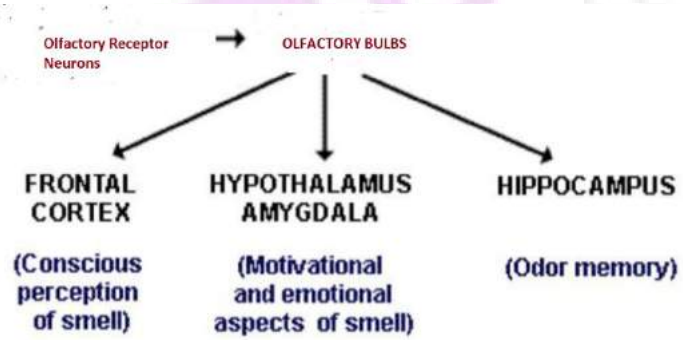
the shoots, the shaded side contains more auxin and grows longer, thus causing the shoot to bend towards the light.
(b) While the auxins, stimulates in the shoots, it restricts in the roots. Now, if the root of a plant is placed horizontally, the bottom contains more auxin than the top side, thus making the bottom side of the root grow less than the top side resulting in the root to bend in the direction of gravity. This is the opposite of auxin in the shoot.



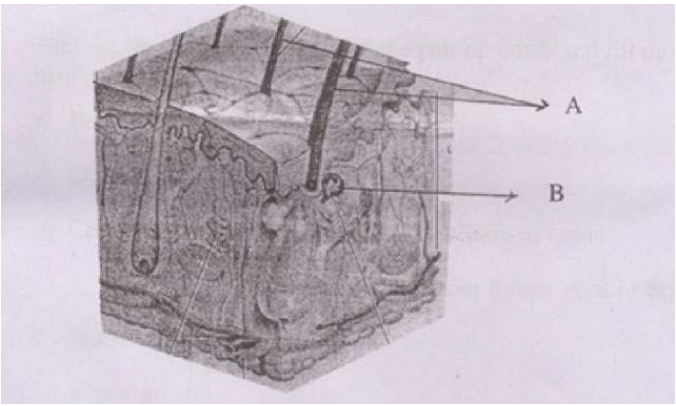
(c) Phytohormones are used in successful cultivation to obtain greater yield. The high percentage of germination of sown seeds in the field has a bearing on the output. Pretreatment of seeds with IAA, NAA, GA, etc. is very effective, not only producing an increased percentage of germination but also helping in the total yield of the crop plants.

15. Make a flow chart showing the sequential stages to feel the smell.

Answer:



16. Observe the following figure and answer the given questions.



a. Label A and B.
b. How do they protect your body?

Answer: a) In this image of the structure of the skin, part A is labelled as Hair, and part B is the oil or sebaceous glands

b) Sebum, which is essential for supple skin, also secretes levels of lipids that properly balance to prevent skin irritation. It also provides anti-bacterial and anti-fungal protection. It protects the skin against sunburn, damage caused by UV rays and more.