Grade 10 Biology Kerala 2021

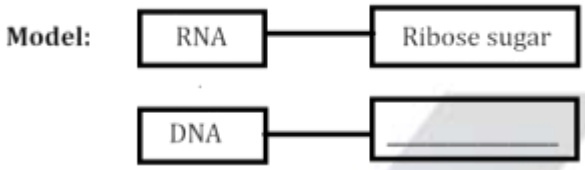
Time: $1^{1/2}$ Hours **Total Score: 40**

Instructions:

- 20 minutes is given as cool-off time.
- Use cool-off time to read the questions and plan your answers.
- Attempt the questions according to the instructions.
- Keep in mind, the score and time while answering the questions.
- The maximum score for questions from 1 to 36 will be 40.

1 score for each question from 1 to 10.

Q1. Complete the illustration according to the Model.



Solution:

DNA – Deoxyribose Sugar

Q2. The blood group without antibodies is:

(a) A (b) B (c) AB (d) O

Solution:

(c) AB

Q3. Identify the part of the brain which helps to maintain homeostasis.

(a) Cerebrum

(b) Thalamus

(c) Medulla oblongata

(d) Hypothalamus

Solution:

(d) Hypothalamus

Q4. Choose the correct pair.

(a) Prolactin : Production of milk

(b) Aldosterone : Promotes growth

(c) Cortisol : Salt-water balance

(d) Melatonin : Maintains blood pressure

Solution:

(a) Prolactin : Production of milk

Q5. The protein produced through genetic engineering which is used against viral diseases:

(a) Insulin (b) Interferons

(c) Endorphin (d) Somatotropin

Solution:

(b) Interferons

Q6. Identify the word pair relation and fill in the blank.

Genetic scissors : restriction endonuclease

Genetic glue :

Solution:

(b) DNA ligase

Q7. Which of the following statements is true about the yellow spot?

(a) There is no vision at this point.

(b) Photoreceptors are absent here.

(c) The optic nerve begins from this point.

(d) This is the point of maximum visual clarity.

Solution:

(d) This is the point of maximum visual clarity.

Q8. Which is known as youth hormone?

(a) Adrenaline (b) Thymosin

(c) Aldosterone (d) Testosterone

Solution:

(b) Thymosin

Q9. Identify the protozoal disease.

(a) Malaria (b) AIDS (c) Rat fever (d) Nipah

Solution:

(a) Malaria (caused by *Plasmodium*)

Q10. Which organism belongs to Cercopithecoidea?

(a) Gorilla (b) Gibbon (c) Monkey (d) Chimpanzee

Solution:

(c) Monkey

2 Scores for each question from 11 to 22.

Q11. Skin is considered as the safety shield of the body. Why?

Solution:

The outer epidermis of the skin contains keratin, a protein that blocks germ entry. Sebum, produced by sebaceous glands, makes the skin oily and waterproof, providing an additional barrier. Sweat, secreted by sweat glands, contains disinfectants that destroy germs. Additionally, the skin harbors useful bacteria that help prevent harmful pathogens from thriving, collectively protecting the body.

Q12. Correct mistakes if any in the underlined part of given statements.

(a) Substances responsible for taste should dissolve in <u>mucus</u> to stimulate the chemoreceptors.

(b) <u>Cochlea</u> contains specialised sensory hair cells concerned with hearing.

(c) Colour blindness is a condition due to the defect of the <u>cone cells</u>.

(d) The cluster of photoreceptors of a housefly is <u>eye spot</u>.

Solution:

(a) Substances responsible for taste should dissolve in **saliva** to stimulate the chemoreceptors.

(d) The cluster of photoreceptors of a housefly is **Ommatidia**.

Q13. What is the role of mRNA and tRNA in protein synthesis?

Solution:

- mRNA (messenger RNA) carries genetic information from the DNA in the nucleus to the cytoplasm.
- Once in the cytoplasm, mRNA reaches the ribosome, where it serves as a template for protein synthesis.
- tRNA (transfer RNA) brings specific amino acids to the ribosome based on the codons in the mRNA.
- Ribosomes link these amino acids in the correct sequence, forming protein molecules.

Q14. Complete the following table appropriately.

Symptoms	Causes	Disease
(i)	Production of dopamine in the brain gets reduced	(iii)
Loss of memory and inability to do routine works	(ii)	(iv)

Solution:

(i) Tremors and stiffness in muscle, difficulty with balance and coordination.

(ii) Continuous degeneration of neurons in the brain

(iii) Parkinson's disease

(iv) Alzheimer's disease

Q15. We withdraw our hand when accidentally touch on a sharp object.

(a) What kind of response is mentioned here?

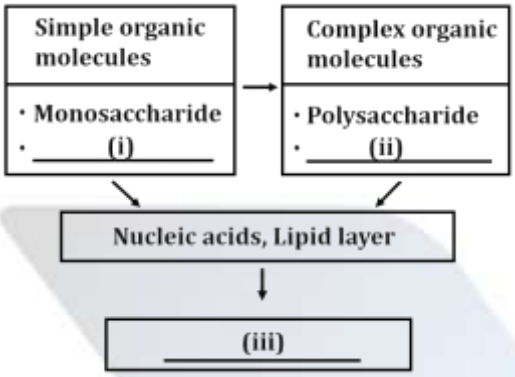
(b) Name two types of such responses.

Solution:

(a) The response is known as **reflex action.**

(b) The two types of reflexes are **cerebral** reflex and **spinal** reflex

Q16. An illustration related to chemical evolution is given below. Complete it appropriately.



Solution:

(i) Amino acids/ Fatty acids/ Nitrogenous bases

(ii) Proteins/ Lipids/ Nucleotides

(iii) Primitive cells (protocell)

Q17. Name the secretions which defend pathogens in the following body parts.

(a) Ear (b) Stomach (c) Trachea (d) Urinary tract

Solution:

(a) Ear: Ear Wax (Cerumen)

(b) Stomach: Gastric acid (Hydrochloric acid)

(c) Trachea: Mucus

(d) Urinary Tract: Urine (has antimicrobial properties)

Q18. Complete Column B of the given table using suitable functions given in the box.

A. Plant Hormones	B. Functions
(a) Gibberellin	(i)
(b) Auxin	(ii)
(c) Abscisic acid	(iii)
(d) Abscisic acid and Ethylene	(iv)

- Dropping of leaves and fruits
- Sprouting of leaves
- Fruit Formation
- Dormancy of Embryo

Solution:

(a) Gibberellin - Sprouting of leaves

(b) Auxin - Fruit Formation

(c) Abscisic acid - Dormancy of Embryo

(d) Abscisic acid and Ethylene - Dropping of leaves and fruits

Q19. Write any two uses of DNA fingerprinting technology.

Solution:

- **Forensic science**: Helps identify criminals by matching DNA samples from crime scenes with suspects.
- **Paternity testing**: To determine biological relationships, confirming paternity, etc.
- **Genetic disorders**: Helps to detect and identify specific gene markers of diseases.

Q20. Complete the table including the name of endocrine glands and their hormones responsible for the balance of Calcium level in blood.

Calcium level in blood	Hormone	Gland
(a) Increases	(i)	(ii)
(b) Decreases	(iii)	(iv)

Solution:

(i) Calcitonin

(ii) Thyroid gland

(ii) Parathormone (PTH)

(iv) Parathyroid gland

Q21. Observe the picture and answer the questions given below.

(a) Identify the photoreceptor.

(b) Name the pigment present in this receptor.

(c) Write the function of this pigment.

(d) Name the eye defect caused due to the deficiency of this pigment.

Solution:

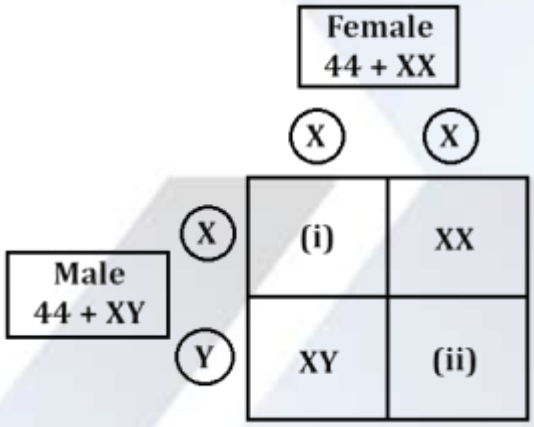
(a) The shown photoreceptor is a **rod cell**.

(b) The pigment present in a rod cell is **rhodopsin**.

(c) **Rhodopsin** helps in the process of vision in low light conditions by detecting light and converting it into nerve impulses that the brain can interpret.

(d) The deficiency of rhodopsin pigment causes **night blindness**.

Q22. Analyse the illustration and answer the questions.



(a) Fill up (i) and (ii).

(b) 'The chromosome of the father determines the sex of the child'. Explain.

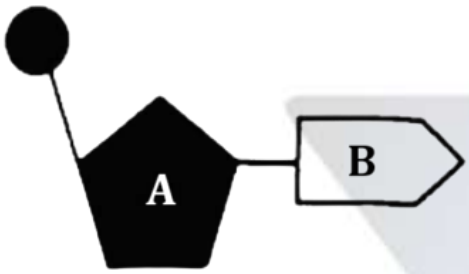
Solution:

(a) (i) XX; (ii) XY

(b) The father can contribute either an **X** or a **Y chromosome**, where, **XX** results in a female, and **XY** results in a male. Thus, the father's chromosome determines the child's sex.

3 scores for each question from 23 to 32.

Q23. Observe the illustration and answer the questions.



(a) Identify the illustration.

(b) What do A and B indicate?

(c) Name the type of 'B' found only in DNA molecule.

Solution:

(a) It is a **nucleotide**.

(b) A- **Sugar Molecule**, B- **Nitrogen Base**

(c) The nitrogenous base found only in DNA is **thymine (T)**.

Q24. Read the statement and answer the questions.

'Cancer is caused by the uncontrolled division of cells'.

(a) What is the reason for uncontrolled division of cells?

(b) Write any two factors causing cancer.

(c) Suggest any two measures that reduce the chance for cancer.

Solution:

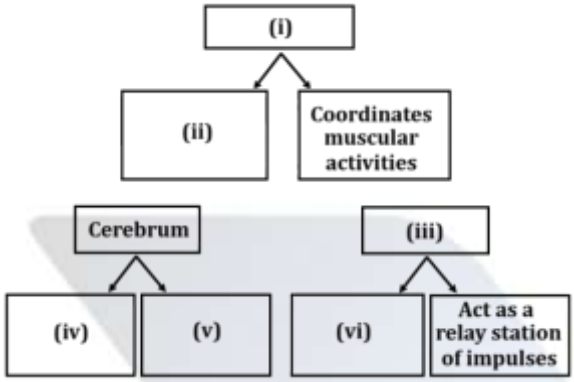
(a) Failure of cell division mechanism leads to abnormal growth and division of cells.

(b) Smoking, exposure to radiation (like UV rays or X-rays), viruses, hereditary factors and environmental factors.

(c) Some measures that reduce the chance of cancer are:

- Avoid smoking and limit exposure to tobacco products.
- Maintain a healthy diet and exercise regularly.

Q25. Complete the following illustration using appropriate statements given in the box.



- Maintain equilibrium of the body
- Cerebellum
- Evoke sensation
- Centre of thought, intelligence, memory and imagination
- Thalamus
- Analyses impulses from various parts of the body and sends to the cerebrum

Solution:

(i) Cerebellum

(ii) Maintain the equilibrium of the body

(iii) Thalamus

(iv) Centre of thought, intelligence, memory and imagination

(v) Evoke sensation

(vi) Analyses impulses from various parts of the body and sends to the cerebrum

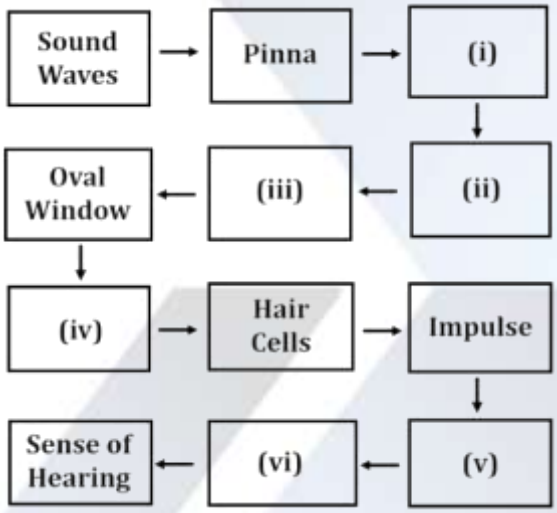
Q26. Analyse the given table and arrange Column B and C according to Column A.

A	B	C
Acromegaly	Increased production of somatotropin during growth phase	Overgrowth on the neck
Cretinism	Excessive production of somatotropin after growth phase	Excessive growth of the body
Gigantism	Decreased production of thyroxine during infancy	Overgrowth of bones on the face, jaws and fingers
	Excessive production of thyroxine	Physical and mental growth retardation in children

Solution:

A	B	C
Acromegaly	Excessive production of somatotropin after growth phase	Overgrowth of bones on the face, jaws and fingers
Cretinism	Decreased production of thyroxine during infancy	Physical and mental growth retardation in children
Gigantism	Increased production of somatotropin during growth phase	Excessive growth of the body

Q27. Complete the flowchart related to hearing by adding missing terms.



Solution:

(i) Auditory Canal

(ii) Eardrum

(iii) Ear ossicles

(iv) Cochlea

(v) Auditory nerve

(vi) Cerebrum

Q28. AIDS is a dreadful disease caused by HIV.

(a) Which cells in the human body are affected by HIV?

(b) Write any two ways by which HIV is transmitted

Solution:

(a) HIV affects **lymphocytes,** primarily the $CD4^+$ **T cells**.

(b) HIV is transmitted in the following ways:

- Through body fluids.
- By sharing needles and syringes
- Through unprotected sexual contact.
- From HIV-infected mother to her foetus

Q29. Processes in the sense of sight are given below. Arrange them in sequential order.

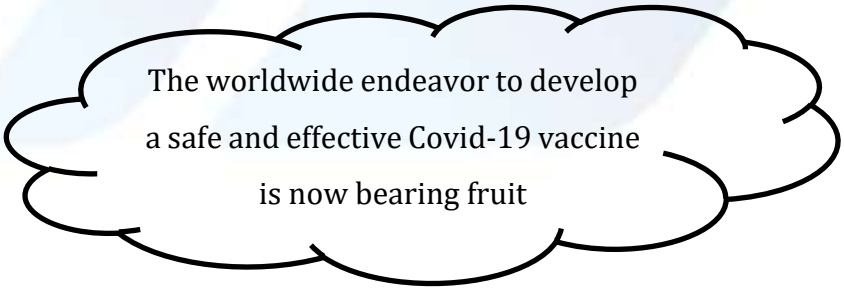
- Sense of sight
- Lens focus the light rays into the retina.
- Cornea refracts light into the eye.
- Impulse transmits through the optic nerve to the cerebrum.
- Photosensory cells on the retina are stimulated.
- Light entering through the pupil falls on the lens.

Solution:

The correct sequential order is:

- Cornea refracts light into the eye.
- Light entering through the pupil falls on the lens.
- Lens focus the light rays into the retina.
- Photosensory cells on the retina are stimulated.
- Impulse transmits through the optic nerve to the cerebrum.
- Sense of sight

Q30. Observe the News given below and answer the questions.



(a) What are vaccines?

(b) Write any two components used in vaccines.

(c) Name any two vaccines.

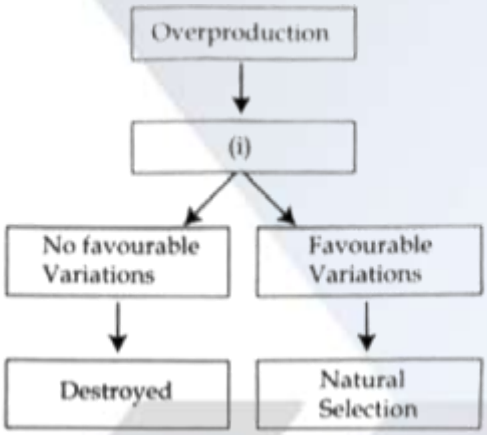
Solution:

(a) Vaccines are biological substances that stimulate the immune system to produce an immune response against specific pathogens, helping the body fight infections. These are given in advance to prevent certain diseases.

(b) Dead, inactivated, alive but neutralized germs or toxins are used as vaccines.

(c) BCG, OPV, Pentavalent, MMR, TT

Q31. Analyse the illustration and answer the questions.



(a) Fill up (i).

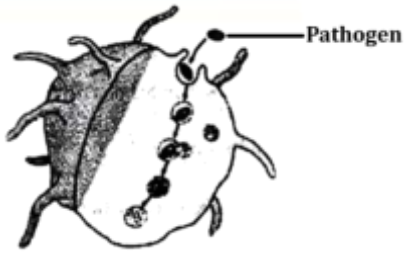
(b) How Natural Selection leads into the origin of new species?

Solution:

(a) (i) - Struggle for existence

(b) When organisms overproduce, they compete for limited resources. Only those with favourable traits survive, and over time, these traits accumulate, leading to the formation of new species through natural selection. The isolated populations with advantageous variations diverge and, through speciation, become distinct species.

Q32. Analyse the illustration and answer the questions given below:



(a) Identify the process illustrated here.

(b) Name two white blood cells performing this function.

(c) What is the importance of this process?

Solution:

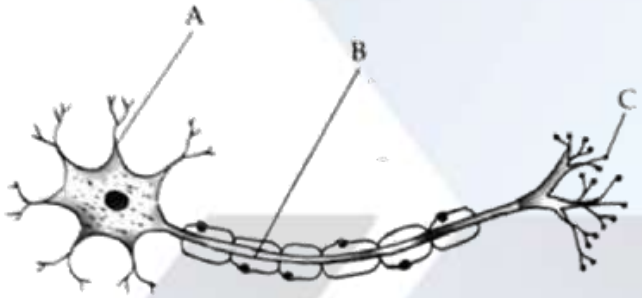
(a) The process illustrated is **phagocytosis.**

(b) Monocytes and neutrophils are two white blood cells performing this function.

(c) Phagocytosis helps the immune system by engulfing and destroying harmful pathogens, such as bacteria, viruses, and fungi.

4 Scores for each question from 33 to 36.

Q33. Observe the figure and answer the questions.



(a) Identify the cell.

(b) Name the parts labelled A and B.

(c) Write down the function of C.

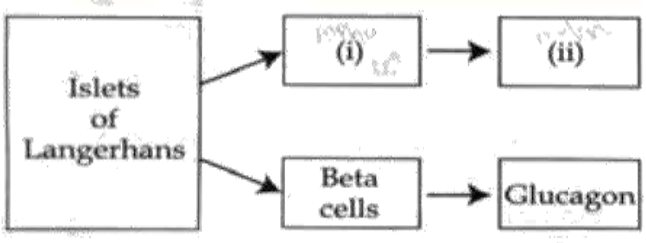
Solution:

(a) The shown cell is a **neuron** or nerve cell.

(b) A: Dendron, B: Axon

(c) C: Synaptic knob which is responsible for secreting neurotransmitters.

Q34. Observe the illustration and answer the questions.



(a) Identify (i) and (ii).

(b) Write two functions of (ii).

(c) Name the condition resulting from the deficiency of (ii).

Solution:

(a) (i) **Beta cells** and (ii) **Insulin**

(b) Two functions of insulin:

- Regulates blood sugar levels by promoting the absorption of glucose by cells.
- Stimulates the liver to store glucose in the form of glycogen.

(c) Condition resulting from the deficiency of insulin: **Diabetes mellitus**

Q35. BCG is the vaccine used against this disease'.

(a) Which disease is mentioned here?

(b) How is this disease transmitted from one person to another?

(c) Name the bacteria causing this disease.

(d) Write any two organs affected by this disease.

Solution:

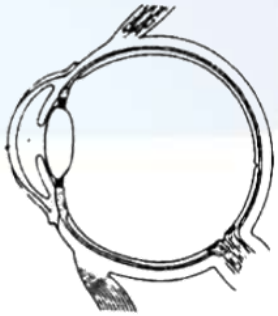
(a) Tuberculosis (TB)

(b) Tuberculosis is an air-borne disease transmitted through airborne droplets when an infected person coughs, sneezes, or talks.

(c) The bacteria causing Tuberculosis is *Mycobacterium tuberculosis*

(d) Organs affected by this disease include: Lungs, Kidneys, Brain, Bones and Joints.

Q36. Redraw the figure. Identify, name and label the following parts.



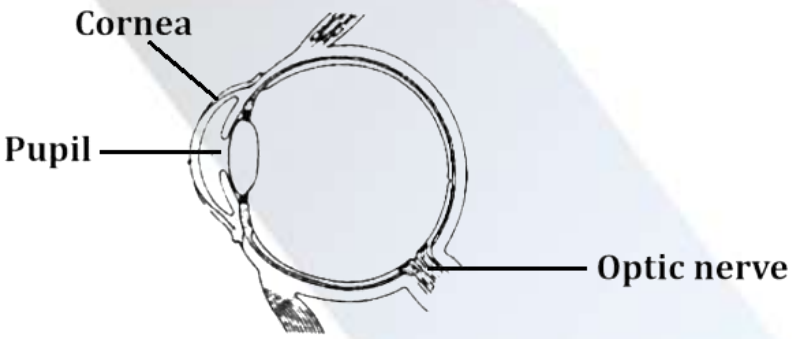
- Redrawing diagram

(a) The projected transparent anterior part of sclera.

(b) The aperture seen at the centre of the iris.

(c) The nerve that transmit impulse to the brain.

Solution:



(a) The projected transparent anterior part of the sclera: **Cornea**

(b) The aperture seen at the centre of the iris: **Pupil**

(c) The nerve that transmits impulses to the brain: **Optic nerve**