CBSE SAMPLE PAPER – 07

Class-XI

BIOLOGY (THEORY)

Time: 3 Hrs **MM: 70**

General Instructions

1. The question paper comprises of five Sections A, B, C, D and E.
2. All questions are compulsory.
3. There is no overall choice however; internal choice has been provided in one question of 2 marks, one question of 3 marks and all the two questions of five marks category. Only one option in such question is to be attempted.
4. Questions1 to 5 in section A are very short questions of one mark each. These are to be answered in one word or one sentence each.
5. Questions 6 to 9 in section B are short questions of two marks each. These are to be answered in approximately 20-30 words each.
6. Questions 10 to 20 in section C are questions of three marks each. These are to be answered in approximately 30-50 words each. Question 21 is of 4 marks.
7. Questions 22 to 23 in section D are questions of five marks each. These are to be answered in approximately 80-120 words each.
8. Questions 24 to26 in section E is based on OTBA of 10 marks.

Section – A

1. What is corpora quadrigemina?
2. What is tetany?
3. What are hormones?
4. What is meant by equational division?
5. Define hydroponics.

Section – B

6. What are dianoflagellates with examples?
7. What are the criteria essentially of an element?

Or

What is the role of nitrogen and phosphorus in plants?

8. Differentiate karyokinesis and cytokinesis.

9. Mention four distinguishing features of phylum protozoa.

Section – C

10. What are the necessary conditions required by the plants for their growth?

Or

Compare fermentation and aerobic respiration.

11. Differentiate cerebrum and cerebellum.
12. Draw the structure showing axon terminal and synapse.
13. What are the criteria essentially of an element?
14. Define the following
    a) Functional residual capacity.
    b) Expiratory capacity
    c) Total lung capacity
15. What is activation energy? What effect does an enzyme have on activation energy?
16. Differentiate afferent neurons and efferent neurons.
17. Explain synovial joints with examples.
18. Give biological name, family, order, class and phylum of – man, housefly, mango and wheat.
19. What is night blindness? What lacks in the eye in this condition? Give one remedy.
20. Differentiate hyperglycemia and hypoglycemia.
21. **Anand a 14 years old boy thinks smoking makes him more energeticand feel like adult and thus more responsible citizen. He tries to smoke when he is with his peer group. His friend Rohit advised him the ill effect of smoking and later Anand quite the smoking.**
    a. **What values do you find in Rohit?**
    b. **What is the main cause of smoking addiction in young children?**
    c. **What are the ill effect of smoking?**

Section – D

22. Describe glycolysis.

Or

Schematically represent the inter-relationship among metabolic pathways showing respiration mediated breakdown of different organic molecules to carbon dioxide and water.

23. Draw a labelled diagram of digestive system of frog.

Or

Draw a labelled diagram of digestive system of an earthworm.

Section-E (OTBA) Questions

24. OTBA Question 2 mark

25. OTBA Question 3 mark

26. OTBA Question 5 mark

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ANSWERS

Section-A

1. The dorsal portion of the midbrain consists mainly of four round swellings (lobes) called corporaquadrigemina.
2. It is a rapid spasm (wild contractions) in muscles due to low Ca++ in body fluid.
3. Hormones are non-nutrient chemicals which act as intercellular messengers and are produced in trace amounts.
4. The M- phase is the most dramatic period of the cell cycle, involving a major reorganisation of virtually all components of the cell. Since the number of chromosomes in the parent and progeny cells is the same, it is also called as equational division.
5. The method of growing plants in a defined nutrient solution in complete absence of soil is called hydroponics.

Section-B

6. These organisms are mostly marine and photosynthetic. They appear yellow, green, brown, blue or red depending on the main pigments present in their cells. The cell wall has stiff cellulose plates on the outer surface. Most of them have two flagella; one lies longitudinally and the other transversely in a furrow between the wall plates. A red dianoflagellates – Gonyaulax undergo such rapid multiplication that they make the sea appear red (red tides). Toxins released by such large numbers may even kill other marine animals such as fishes.
7. (a) The element must be absolutely necessary for supporting normal growth and reproduction. In the absence of the element the plants do not complete their life cycle or set the seeds.

   (b) The requirement of the element must be specific and not replaceable by another element.

   (c) The element must be directly involved in the metabolism of the plant.

Or

Nitrogen: This is the mineral element required by plants in the greatest amount. It is absorbed mainly as NO_3 – though some are also taken up as NO^{2-} or NH_4^+. Nitrogen is required by all parts of a plant, particularly the meristematic tissues and the metabolically active cells. Nitrogen is one of the major constituents of proteins, nucleic acids, vitamins and hormones.

8.

Karyokinesis	Cytokinesis
It is the process of division of nucleus.	It is the process of division of cytoplasm.
It corresponds to the separation of the daughter chromosomes into two daughter nuclei.	It corresponds to the separation of the two daughter nuclei into two daughter cells.

9. a) All organisms are unicellular, eukaryotic and holozoic.
   b) They have contractile vacuoles for excretion and Osmoregulation.
   c) Their locomotion is aided by cilia, flagella or pseudopodia.
   d) Asexual reproduce by binary fission and sexual reproduction by conjugation or gamete formation.

Section-C

10. Plants need water, oxygen and nutrients as very essential elements for growth. The plant cells grow in size by cell enlargement which in turn requires water. Turgidity of cells helps in extension growth. Thus, plant growth and further development is intimately linked to the water status of the plant. Water also provides the medium for enzymatic activities needed for growth. Oxygen helps in releasing metabolic energy essential for growth activities. Nutrients (macro and micro essential elements) are required by plants for the synthesis of protoplasm and act as source of energy.

    In addition, every plant organism has an optimum temperature range best suited for its growth. Any deviation from this range could be detrimental to its survival. Environmental signals such as light and gravity also affect certain phases/stages of growth.

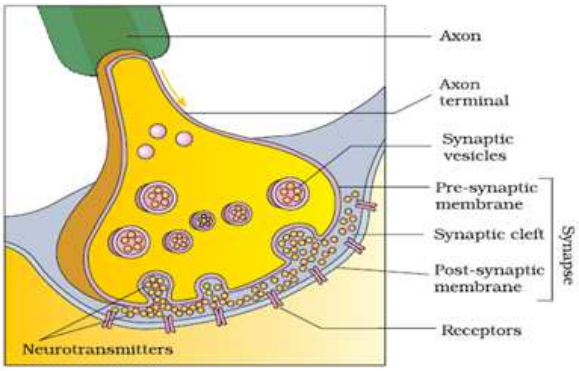
Or

- Fermentation accounts for only a partial breakdown of glucose whereas in aerobic respiration it is completely degraded to CO_2 and H_2O.
- In fermentation there is a net gain of only two molecules of ATP for each molecule of glucose degraded to pyruvic acid whereas many more molecules of ATP are generated under aerobic conditions.
- NADH is oxidised to NAD^+ rather slowly in fermentation, however the reaction is very vigorous in case of aerobic respiration.

11.

Cerebrum	Cerebellum
It is the largest part of the brain.	It is second largest part of the brain.
It is the part of the fore brain.	It is the part of hind brain.
It is made up of two cerebral hemispheres united by corpus callosum.	It is made up of two cerebral hemispheres.
It is the seat of mental abilities.	It helps to maintain of posture and equilibrium of the body and for muscle tone.

12.



13. The primary roots and its branches constitute the tap root system. Example – Mustard Plant. In monocot plants, the primary root is short lived and is replaced by a large number of roots. Example - Wheat plant.

14.

a) Functional residual Capacity – When a person inhales and exhales in a normal way, the volume of air that remains in the lungs is known as functional residual capacity.

b) Expiratory Capacity – The volume of air that can be breathed out forcefully, after a normal inspiration, is called expiratory capacity.

c) Total Lung Capacity – It refers to the volume of air accommodated in the lungs, at the end of a forceful inspiration; it is the sum of tidal volume, inspiratory reserve volume, expiratory reserve volume and residual volume.

15. For any chemical reaction to take place, a new bond must form. The energy needed to break the old bond is called the activation energy. Many reactants need a large amount of energy to push them to take part in a reaction. In the presence of enzymes, the activation energy is greatly lowered allowing the reaction to take place at low temperature. The half way point in a reaction is called the transition state. The transition state represents the stage when the new bonds are formed. Enzymes lower the activation energy by making it easier to achieve the transition state.

16.

Afferent neurons	Efferent neurons
a) These are sensory neurons.	a) These are motor neurons.
b) They convey impulses from sense organs and other receptors to the brain or spinal cord.	b) They convey impulses from the brain or spinal cord to muscles, glands and other effectors.
c) They do not form neuromuscular junction.	c) They form neuromuscular junction.

17. Synovial joints are characterized by the presence of a fluid filled synovial cavity between the articulating surfaces of the two bones. Such an arrangement allows considerable movement. These joints help in locomotion and many other movements. Ball and socket joint (between humerus and pectoral girdle), Hinge joint (knee joint), Pivot joint (between atlas and axis), Gliding joint (between the carpals) and Saddle joint (between carpal and metacarpal of thumb) are some examples.

18.

Common Name	Biological Name	Family	Order	Class	Phylum/ Division
Man	*Homo sapiens*	Hominidae	Primata	Mammalia	Chordata
Housefly	*Musca domestica*	Muscidae	Diptera	Insecta	Arthropoda
Mango	*Mangifera indica*	Anacardiaceae	Sapindales	Dicotyledonae	Angiospermae
Wheat	*Triticum aestivum*	Poaceae	Poales	Monocotyledonae	Angiospermae

19. Night blindness is a vitamin A deficiency characterized by poor vision in dim light. It occurs due to lack of rhodopsin in the rod cells of the retina. It can be remedied by having food materials rich in vitamin A like carrot, papaya etc.

20.

Hyperglycemia	Hypoglycemia
It results from hyposecretion of insulin.	It results from hypersecretion of insulin.
Its symptoms show high blood glucose level, breakdown of muscle tissue, loss of weight and tiredness.	It symptoms show low blood glucose level, hunger, sweating, irritability and double vision.

21. a) Rohit shows the true friendship sprit and advised his friend correct path.

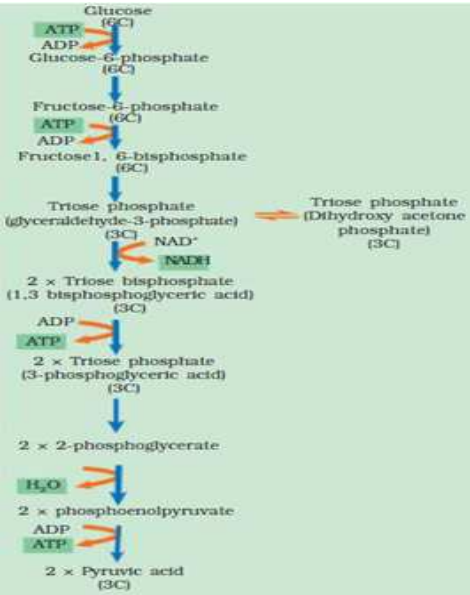
b) The most common reason for smoking addiction in young children is films, and advertisement.

c) Smoking may leads to a number of respiratory disease like tuberculosis, lung cancer etc.

Section-D

22. The term glycolysis has originated from the Greek words, glycos for sugar and lysis for splitting. The scheme of glycolysis was given by Gustav Embden, Otto Meyerhof, and J. Parnas, and is often referred to as the EMP pathway. In anaerobic organisms, it is the only process in respiration. Glycolysis occurs in the cytoplasm of the cell and is present in all living organisms. In this process, glucose undergoes partial oxidation to form two molecules of pyruvic acid. In plants, this glucose is derived from sucrose, which is the end product of photosynthesis, or from storage carbohydrates. Sucrose is converted into glucose and fructose by the enzyme, invertase, and these two monosaccharides readily enter the glycolytic pathway. Glucose and fructose are phosphorylated to give rise to

glucose-6-phosphate by the activity of the enzyme hexokinase. This phosphorylated form of glucose then isomerises to produce fructose-6-phosphate. Subsequent steps of metabolism of glucose and fructose are same. In glycolysis, a chain of ten reactions, under the control of different enzymes takes place to produce pyruvate from glucose.

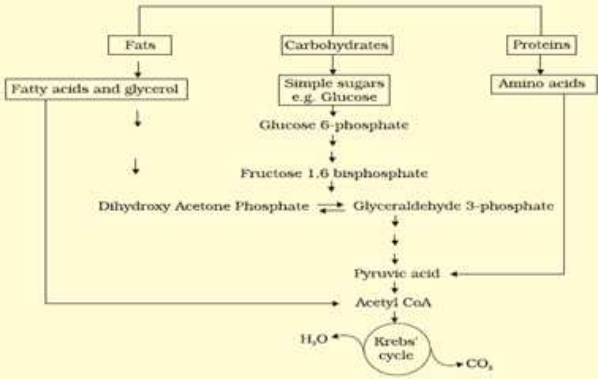


ATP is utilised at two steps: first in the conversion of glucose into glucose 6-phosphate and second in the conversion of fructose 6-phosphate to fructose 1, 6-diphosphate. The fructose 1, 6-diphosphate is split into dihydroxyacetone phosphate and 3-phosphoglyceraldehyde (PGAL). There is one step where NADH + H+ is formed from NAD+ when 3-phosphoglyceraldehyde (PGAL) is converted to 1, 3-bisphosphoglycerate (DPGA). Two redox-equivalents are removed (in the form of two hydrogen atoms) from PGAL and transferred to a molecule of NAD+. PGAL is oxidised and with inorganic phosphate to get converted into DPGA.

The conversion of DPGA to 3-phosphoglyceric acid (PGA), is also an energy yielding process; this energy is trapped by the formation of ATP. Another ATP is synthesized during the conversion of PEP to pyruvic acid. Pyruvic acid is then the key product of glycolysis. The metabolic fate of pyruvate depends on the cellular need. There are three major ways in which different cells handle pyruvic acid produced by glycolysis. These are lactic acid fermentation, alcoholic fermentation and aerobic respiration. Fermentation takes place under anaerobic conditions in many prokaryotes and unicellular eukaryotes. For the complete oxidation of glucose to CO2 and H2O, however,

organisms adopt Krebs' cycle which is also called as aerobic respiration. This requires O2 supply.

Or

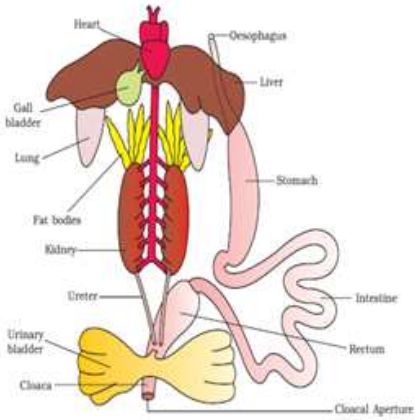


Glucose is the favoured substrate for respiration. All carbohydrates are usually first converted into glucose before they are used for respiration. Other substrates can also be respired, as has been mentioned earlier, but then they do not enter the respiratory pathway at the first step. Fats would need to be broken down into glycerol and fatty acids first. If fatty acids were to be respired they would first be degraded to acetyl CoA and enter the pathway. Glycerol would enter the pathway after being converted to PGAL. The proteins would be degraded by proteases and the individual amino acids (after deamination) depending on their structure would enter the pathway at some stage within the Krebs' cycle or even as pyruvate or acetyl CoA.

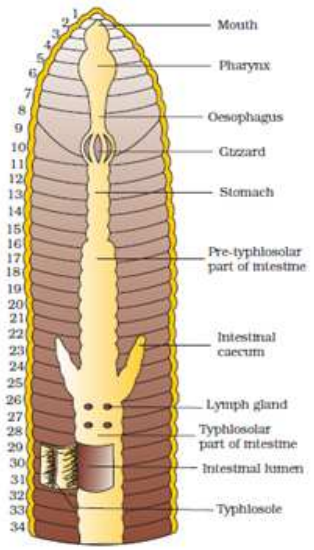
Since respiration involves breakdown of substrates, the respiratory process has traditionally been considered a catabolic process and the respiratory pathway as a catabolic pathway. These compounds would be withdrawn from the respiratory pathway for the synthesis of the said substrates. Hence, fatty acids would be broken down to acetyl CoA before entering the respiratory pathway when it is used as a substrate.

But when the organism needs to synthesise fatty acids, acetyl CoA would be withdrawn from the respiratory pathway for it. Hence, the respiratory pathway comes into the picture both during breakdown and synthesis of fatty acids. Similarly, during breakdown and synthesis of protein too, respiratory intermediates form the link. Breaking down processes within the living organism is catabolism, and synthesis is anabolism. Because the respiratory pathway is involved in both anabolism and catabolism, it would hence be better to consider the respiratory pathway as an amphibolic pathway.

23.


Heart
Oesophagus
Liver
Gall bladder
Lung
Stomach
Fat bodies
Kidney
Ureter
Intestine
Urinary bladder
Rectum
Cloaca
Cloacal Aperture

Or


Mouth
Pharynx
Oesophagus
Gizzard
Stomach
Pre-typhlosolar part of intestine
Intestinal caecum
Lymph gland
Typhlosolar part of intestine
Intestinal lumen
Typhlosole