JB ACADEMY, AYODHYA
ANNUAL EXAMINATION (2024 -25)
CLASS – XI, SUBJECT – BIOLOGY (044)

Time Allowed: 3 hours **Max. Marks: 70**

General Instructions:

1. **All questions are compulsory.**
2. **The question paper has five sections and 33 questions. All questions are compulsory.**
3. **Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.**
4. **There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.**
5. **Wherever necessary, neat and properly labelled diagrams should be drawn.**

SECTION - A

Q.1 What will be the PO_2 and PCO_2 in the atmospheric air compared to those in the alveolar air?

(a) PO_2 lesser, PCO_2 higher (b) PO_2 higher, PCO_2 lesser

(c) PO_2 higher, PCO_2 higher (d) PO_2 lesser, PCO_2 lesser

Q.2 Cardiac activity could be moderated by the autonomous neural system.

Tick the correct answer:

(a) The parasympathetic system stimulates heart rate and stroke volume
(b) The sympathetic system stimulates heart rate and stroke volume
(c) The parasympathetic system decreases the heart rate but increases stroke volume
(d) The sympathetic system decreases the heart rate but increases stroke volume

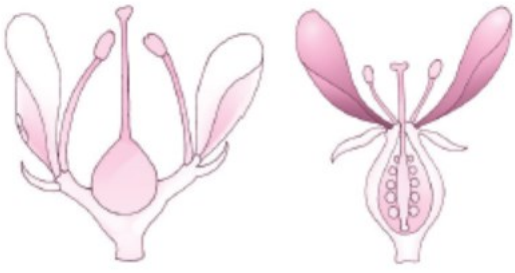
Q.3 The cardiac impulse is initiated and conducted further upto ventricle.

The correct sequence of conduction of impulse is
(a) S A Node → A V Node → Purkinje fibre → A V Bundle
(b) S A Node → Purkinje fibre → A V Node → A V Bundle
(c) S A Node → A V Node → A V Bundle → Purkinje fibre
(d) S A Node → Purkinje fibre → A V Bundle → A V Node

Q.4 A flower is zygomorphic, when

(a) it can be cut into two equal halves along only one vertical plane that passes through the centre.
(b) it can be cut into two equal halves along any radial plane that passes through the centre.
(c) it can not be cut into two equal halves along any vertical plane that passes through its centre.
(d) it can be cut into two equal halves along any vertical plane that passes through its centre.

Q.5 Identify the types of flowers A and B shown in the diagram and the nature of the ovary in each of them.



(A) (B)

(a) A - Hypogynous, superior
B - Epigynous, superior

(c) A - Perigynous, inferior
B - Perigynous, inferior

(b) A - Hypogynous, superior
B - Epigynous, inferior

(d) A - Perigynous, half-inferior
B - Epigynous, inferior

Q.6. Which of the following is a hormone secreted by adenohypophysis?

(a) Vasopressin (b) Prolactin (c) Secretin (d) Insulin

Q.7. Identify the hormone that is correctly matched with its source and function:

(a) Progesterone – Corpus luteum of ovary, regulates the growth and maintenance of secondary sex organs in females.
(b) Melatonin – pineal gland, regulates the normal sleep-wake cycle
(c) Oxytocin – pars nervosa, growth and maintenance of mammary glands
(d) Atrial natriuretic factor – wall of atria of heart, increases blood pressure.

Q.8. Lateral roots originate from

(a) epidermis (b) pericycle (c) endodermis (d) cortex

Q.9. Match Column I with Column II.

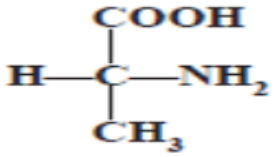
Column I	Column II
A. F. W Went	1. Ethylene
B. Skoog and Miller	2. Gibberellins
C. Cousins	3. Auxin
D. Kurosawa	4. Cytokinin

Q.10. Identify whether each of the following statements is true (T) or false (F) and select the correct option.

A. Gas exchange continues uninterrupted even if you hold the breath for 30 seconds.[True/False]
B. A rise in PCO_2 increases the oxygen affinity of haemoglobin.[True/False]
C. Forceful expiration results from a forceful contraction of diaphragm.[True/False]
D. The volume of air left in the lungs after a forceful expiration, is called residual volume. [True/False]

(a) A – T, B – T, C – F, D – T
(b) A – T, B – T, C – F, D – F
(c) A – T, B – F, C – F, D – T
(d) A – F, B – T, C – T, D – F

Q.11. Identify the amino acid in the figure:



(a) alanine (b) valine (c) glycine (d) serine

Q.12. Some vascular bundles are described as ‘open’ because they

(a) are capable of producing secondary xylem and secondary phloem
(b) are surrounded by pericycle without endodermis
(c) possess conjuctive tissue between xylem and phloem
(d) are not surrounded by pericycle or endodermis

Q.13. Unidirectional transmission of a nerve impulse through nerve fibres is due to the fact that

(a) nerve fibre is insulated by myelin sheath.
(b) sodium pump starts operating only at the cyton and then continues into the nerve fibre.
(c) neurotransmitters are released by the axon endings and not by dendrites.
(d) neurotransmitters are released by dendrites and not by axons.

Q.14. Which of the following can prevent diuresis?

(a) Undersecretion of vasopressin and more reabsorption of water
(b) Reabsorption of Na+ and water from the renal tubule under the influence of aldosterone
(c) Secretion of ADH and decreased reabsorption of water
(d) Vasoconstriction caused due to ADH and ANF

OR

Q. The impulses from Central nervous system are relayed to the skeletal muscles through

(a) sympathetic nervous system
(b) parasympathetic nervous system
(c) somatic neural system
(d) autonomic nervous system

Q.15 **Assertion (A):** Receptors associated with the aortic arch and carotid artery also can recognize changes in CO_2 and H^+ concentration.
Reason (R): It sends necessary signals to the rhythm centre for remedial actions.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
c) Assertion is correct statement but reason is wrong statement.
d) Assertion is wrong statement but reason is correct statement.

Q.16 **Assertion (A):** In animal cells lipid-like steroidal hormones are synthesised in SER.
Reason (R): The smooth endoplasmic reticulum (SER) is the major site for synthesis of lipid.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.
b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.
c) Assertion is correct statement but reason is wrong statement.
d) Assertion is wrong statement but reason is correct statement.

SECTION - B

Q.17 Diffusion of gases occurs in the alveolar region only and not in the other parts of the respiratory system. Why?

Q.18. Plant growth regulators (PGRs) have innumerable practical applications. Name the PGR you should use to

(*a*) increase yield of sugarcane
(*b*) promote lateral shoot growth
(*c*) cause sprouting of potato tuber
(*d*) inhibit seed germination

OR

Q. What would be expected to happen if:

(*a*) GA_3 is applied to rice seedlings.
(*b*) dividing cells stop differentiating.
(*c*) a rotten fruit gets mixed with unripe fruits.
(*d*) you forget to add cytokinin to the culture medium?

Q.19 What is cranial meninges? Mention its layers and their functions.

Q.20 Name the stage of cell cycle at which each one of the following events occurs:

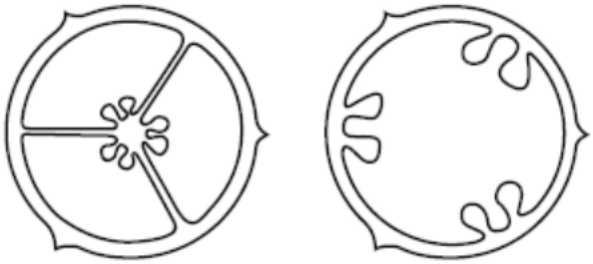
(a) Chromosomes are moved to spindle equator.

(b) Centromere splits and chromatids separate.

(c) Pairing between homologous chromosomes occurs.

(d) Crossing over between homologous chromosomes takes place.

Q.21 Name the type of placentation shown in the given figures (*i*) and (*ii*). Give one example of each type.



(*i*) (*ii*)

SECTION - C

Q.22. Describe: (I) synapsis (II) bivalent (III) Chiasmata. Draw a diagram to illustrate your anwer.

Q.23. With the help of neat labelled diagram explain female reproductive system, fertilization & development in Frog.

Q.24. On an educational trip to Uttranchal, Annu and her friends observed that many local people were having swollen necks. Please help Annu and her friends to find out the solutions to the following questions.

(*a*) Which probable disease are these people suffering from?

(*b*) How is it caused?

(*c*) What effect does this condition have on pregnancy?

Q.25. How is expiration carried out under normal physiological conditions?

Q.26. Answer the following with reference to the anatomy of dicot stem:

(*a*) Where exactly are the cambial cells located in the vascular bundle?

(*b*) What is the name given to such a bundle?

(*c*) How are xylem vessels arranged?

(*d*) What type of cells constitute the pith?

Q.27. Fill in the blanks at (A), (B), (C), (D), (E) and (F) and complete the flow chart.

JG cells release (A), when there is fall in (B), or low availability of water in the body

↓

The released chemical converts (C) in the blood to Angiotensin I and then to Angiotensin II

↓

Angiotensin II increases the blood pressure by constriction of (D)

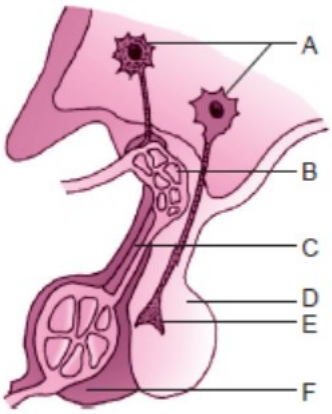
↓

Angiotensin II also activates adrenal cortex to release (E)

↓

It causes reabsorption of Na^+ and water, causing rise in (F)

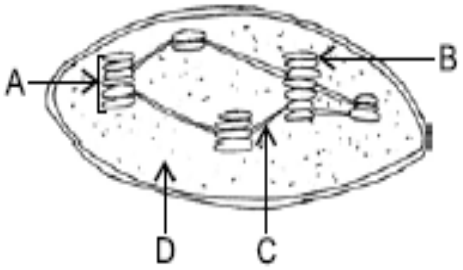
Q.28 The picture given below is the diagrammatic representation of pituitary and its relationship with the hypothalamus.



Answer the following questions.
(a) What does A represent? Name the two hormones secreted by A.
(b) What is the significance of B?
(c) Identify D. What is its role in the endocrine system?

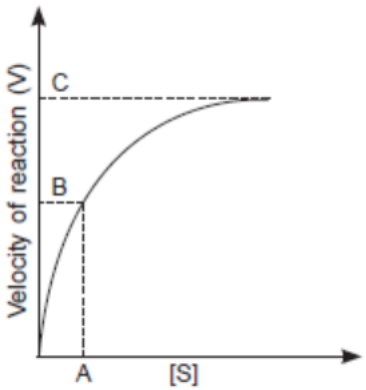
OR

Q. Fill in the blanks at (A), (B), (C) and (D) as shown in diagram. Name the chemical present in its (D) part which is also present in mitochondria.



SECTION - D

Q.29 Study the following graph showing the effect of substrate concentration on the rate of enzyme activity and answer the questions that follow:



(a) Define what is represented by A.
(b) What does C represent in the graph?

(c) Why is there no further increase in the velocity of enzyme action with addition of substrate?
(d) How can the catalytic efficiency of two enzymes be compared? Justify your answer.

Q.30 The improved model of the structure of cell membrane proposed by Singer and Nicolson (1972), is called fluid mosaic model. The fluid nature of the membrane is important from the point of view of certain functions. Detailed electron microscopic and other chemical investigations have shown that the cell membrane is composed of lipids, proteins and some carbohydrates.

(a) What percent of the membrane of human erythrocytes consists of lipids and proteins?
(b) How are the lipids arranged in the membranes?
(c) What is meant by fluidity of membrane?
(d) Mention the functions for which the fluid nature of the membrane is necessary.

SECTION - E

Q.31 Name the hormone that regulates each of the following and mention the source of it:

(*i*) Heart beat and blood pressure
(*ii*) Secretion of growth hormone
(*iii*) Maturation of Graafian follicles
(*iv*) Rise in calcium ion level in the blood
(*v*) Milk secretion

OR

Q. (*a*) Enlist the four steps involved in the catalytic action of an enzyme.
(*b*) Mention difference between coenzyme and prosthetic group with the examples.

Q.32 Name the three basic tissue systems in the flowering plants with diagram. Give the tissue names under each system.

OR

Q. (a) An Rh-negative woman is carrying an Rh-positive foetus for the second time. Describe the consequences of Rh incompatibility in this case? Why is it necessary to check the Rh-factor of the blood of a pregnant woman?

(b) Define cardiac cycle, cardiac output and stroke volume.

Q.33 Give a brief account of the counter-current mechanism and mention its role in urine formation.

OR

Q. (a) Explain the conduction of a nerve impulse along a nerve fibre.
(b) Explain the transmission of a nerve impulse across a chemical synapse.