OSDAV Public School, Kaithal

Half yearly Exams (2024-25)

Class : XI

Subject : Biology

SET-A

Time: 3 Hrs .

M.M. : 70

General Instructions:-

(i)All questions are compulsory.

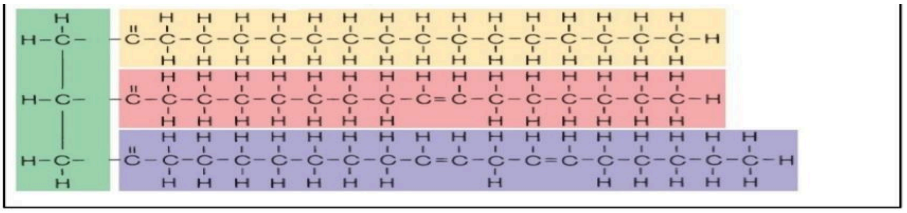
(ii)The question paper has five sections and 33 questions. All questions are compulsory.

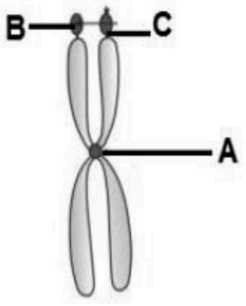
(iii)Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.

(iv)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.

(v)Wherever necessary, neat and properly labelled diagrams should be drawn.

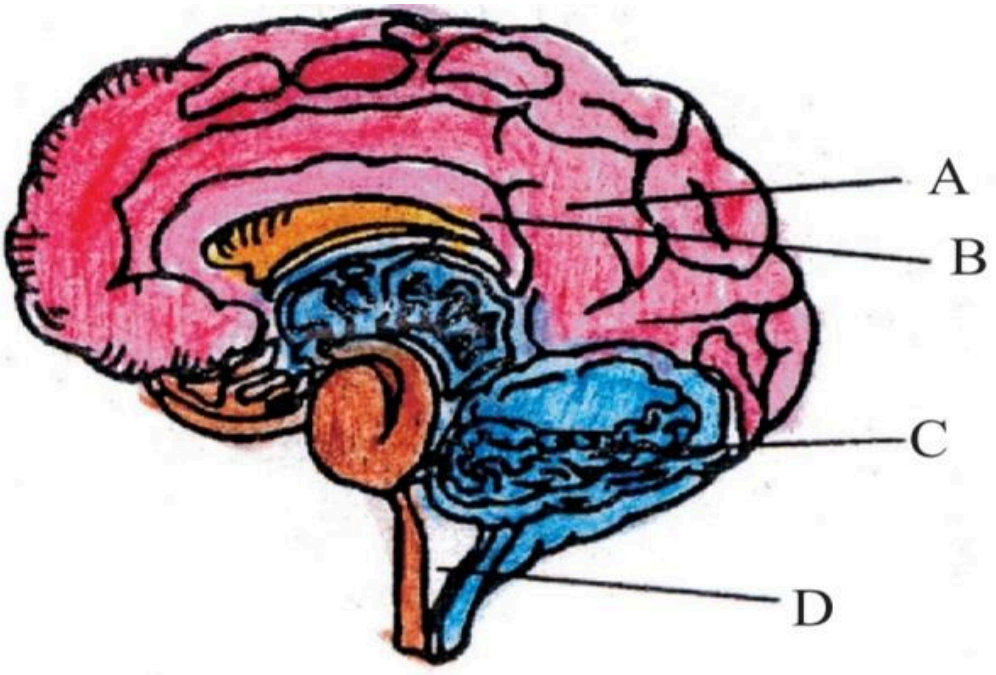
SECTION- A

Q 1	Given below are different sub-stages of prophase I. Match them with their correct feature. Column I — Column II I Zygotene — i Formation of bivalent II Pachytene — ii Terminalization of chiasmata III Diakinesis — iii Dissolution of synaptonemal complex IV Leptotene — iv Crossing over mediated by recombinase V Diplotene — v Chromosomes start condensing a) I-v, II-i, III-iv, IV-iii, V-ii b) I-i, II-iii, III-ii, IV-v, V-iv c) I-i, II-iv, III-ii, IV-v, V-iii d) I-v, II-iv, III-ii, IV-i, V-iii	**1**
Q .2	The most unique mammalian characteristic is: (a) presence of hair on the skin (b) two pairs of limbs (c) viviparous with internal fertilisation (d) presence of milk producing glands	**1**
Q.3	Adiantum differs from Funaria in the presence of: (a) independent gametophyte (b) multicellular sporophyte (c) flagellate antherozoids (d) dominant sporophyte	**1,**
Q.4	Correctly identify the organic compound (shown in the given diagrammatic representation) and its components.  (a) Triglyceride: - 1 Glycerol, 3 saturated fatty acids (b) Triglyceride: - 1 Glycerol, 2 unsaturated fatty acids, 1 saturated fatty acid (c) Triglyceride: - 1 Glycerol, 2 saturated fatty acids, 1 unsaturated fatty acid (d) Triglyceride: - 3 Glycerol, 2 unsaturated fatty acids, 1 saturated fatty acid	**1**
Q.5	Where is 70S ribosome found in the animal cell? a) Inside the nucleus b) Surface of rough endoplasmic reticulum c) Inside mitochondria d) In the cytoplasm	**1**

Q.6	Which among the following is incorrect about fructose and glucose? a) Fructose is also called as pyranose and it's a ketose sugar b) Glucose and fructose can be obtained by hydrolysis of sucrose c) Both fructose and glucose have the same molecular formula d) Both of them taste sweet	**1**
Q.7	What does A, B and C represent in the given figure?  A B C a.Centriole Telomere Primary constriction b.Centriole Satellite Secondary constriction c. Centromere Satellite Secondary constriction d. Centromere Telomere Primary constriction	**1**
Q.8	Which of the following is responsible for Peat formation; a)Marchantia b)Riccia c)Funaria d)Sphagnum	**1**
Q.9	A person living at sea level has around 5 million RBCs per cubic millimetre of blood, whereas one living at an altitude of 5400 metres has around 8 million. This is because at high altitude (a) atmospheric O2 level is less and hence more RBCs are needed to absorb the required amount of O2 to survive (b) there is more UV radiation which enhances RBC production (c) people eat more nutritive food, therefore more RBCs are formed (d) people get pollution – free air to breathe and more oxygen is available	1
Q.10	Match the Column-I with Column-II. **Column-I** **Column-II** (A) Fish (i) 3-chambered heart (B) Amphibia (ii) Incomplete double circulation (C) Birds (iii) 4-chambered heart (iv) Single circulation (v) 2-chambered heart (vi) Double circulation (a) A(i), (ii) B(iii), (vi) C(iv), (v) (b) A(i), (iv) B(v), (ii) C(iii), (vi) (c) A(v), (iv) B(i), (ii) C(iii), (vi) (d) A(iii), (ii) B(i), (iv) C(v), (vi)	**1**
Q 11	Excretory organ in prawn is (a) Green gland (b) Malpighian tubules (c) Kidney (d) Nephridia	**1**
Q.12	Low temperature preserves the enzyme ina ...'A'... state whereas high temperature destroys enzymatic activity because proteins are ...'B'... byheat.Choose the correct option:- (a) A = temporarily inactive, B = denatured (b) A = permanently inactive,B = temporarily inactive (c) A = permanently inactive, B = denatured (d) A = denatured, B = temporarily inactive	1

	Q.No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: **A. Both A and R are true and R is the correct explanation of A.** **B. Both A and R are true and R is not the correct explanation of A.** **C. A is true but R is false.** **D. A is False but R is true**	
Q.13	**Assertion** : Transmission of nerve impulse across a synapse is accomplished by neurotransmitters. **Reason** : Transmission across a chemical synapse usually requires neurotransmitters because there is a small space, synaptic cleft that separates one neuron from another.	**1**
Q.14	**Assertion** : Mitochondria and chloroplast are semi autonomous organelles. **Reason** : They are formed by the division of preexisting organelles as well as contain their own DNA but lack protein synthesizing machinery.	1
Q.15	**Assertion** : Symbiosis is furnished by mycorrhiza. **Reason** : In mycorrhiza, symbiosis is established between fungus and alga	**1**
Q.16	**Assertion** : Left atrium possess the thicket muscles. **Reason** : Left atrium receives blood from the lungs.	**1**

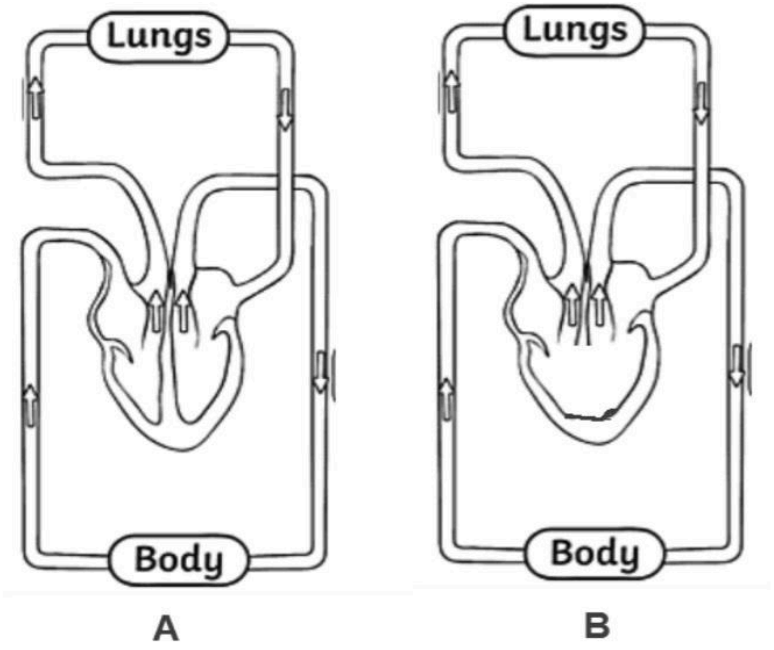
SECTION- B

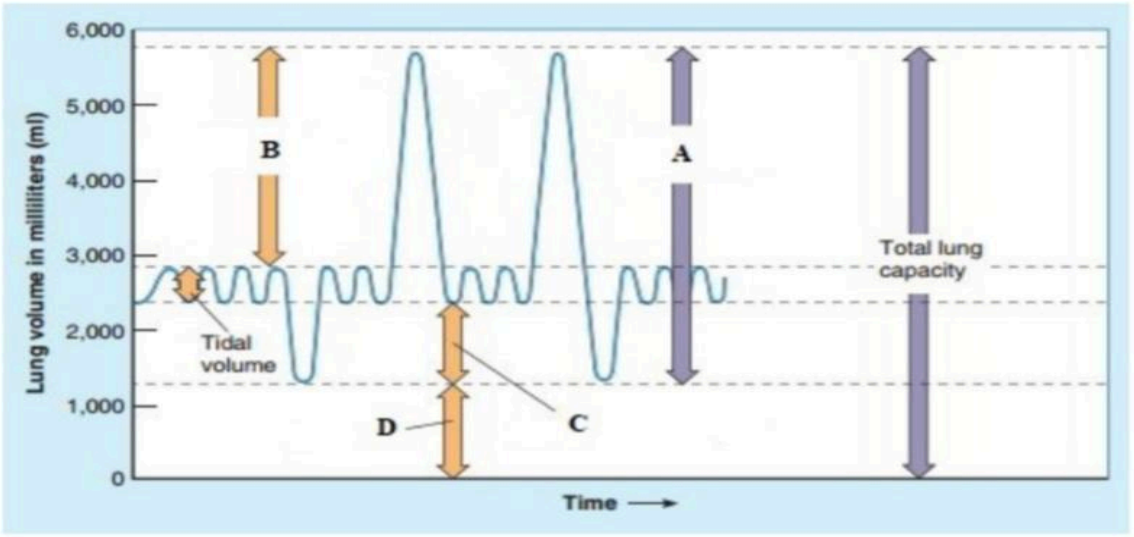
Q.17	Neena is having blood group A-ve while her husband's blood group is O +ve. Their first child is having blood gp. A +ve. Her second child was born with severe anemia and jaundice. What could be the reason ? How this situation could have been avoided ?	**2**
Q.18	Observe the diagram given below and answer the following questions : (i) Label the parts C & D. (ii) Give the function of C and D.  	**2**
Q.19	What are occupational respiratory disorders ? What are their harmful effects ? What precautions should a person take to prevent such disorders ?	**2**
Q 20	Draw a well labelled diagram of the powerhouse of the cell and explain the structure.	**2**
Q.21	Name the non-membrane bound organelle found in both prokaryotic and eukaryotic cells.Differentiate between the two.	**2**

SECTION-C

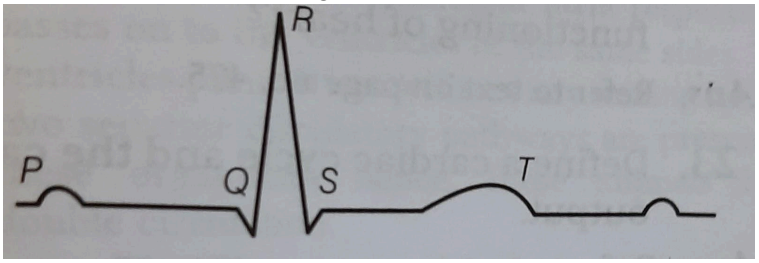
Q 22	Give reasons a. Scoliodon needs to swim constantly. b. Birds have pneumatic bones. c. Platypus, though oviparous, is a mammal.	**3**
Q.23	a)Categorise the following as homopolymers and heteropolymers: (i) Cellulose (ii) Collagen (iii) Inulin (iv) Chitin b)Why do starch give blue black colour with iodine ?	**3**
Q.24	Differentiate between- A)Viroids and Virus B)Pseudocoelomate and Coelomate Animals C) Rhodophyceae and Phaeophyceae	**3**
Q.25	Explain fluid mosaic model of plasma membrane with well labelled diagram.	**3**
Q.26	A)Amino acids exist as zwitterions. Give its structure. Why is it formed? B)Why does the shelf life of fruits and vegetables increase in a refrigerator?	**3**
Q.27	Explain the mechanism of breathing in humans.	**3**
Q.28	(a)GFR in a healthy individual is approximately 125 ml/min, but in Akshat, the GFR value has fallen down to 90 ml/min. How will his hypothalamus help him to cope up with this situation? (b) Name the cells forming the inner lining of Bowman's capsule.	**3**

SECTION- D

Q.29	**CASE STUDY BASED QUESTIONS** Observe the diagram and answer the questions that follow. a. Name the structure which is present in A but absent in B. b. Which group of organisms has type A and which group has type B type of circulation? c. What could be the possible disadvantage of type B circulation? d Prepare a flowchart representing the type of circulation shown in type A.  	**4**
Q.30	Analyse the given graph showing different respiratory volumes and capacities and answer the following questions: A)Define the pulmonary capacity depicted as A.	

	B)Differentiate between B and C in the given graph. C)What is Emphysema?  	4

SECTION-E

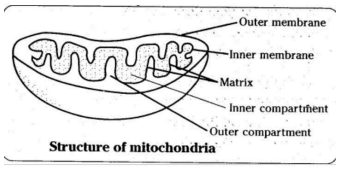
Q.31	A)Given below is the diagrammatic representation of a standard ECG  What does P ,Q ,R ,S ,T wave represent? B) Name two heart sounds. How are they produced?	**5**
Q.32	(a) Give two points of difference between Anaphase I and AnaphaseII of meiosis. (b) Where does meiosis occur in the human body ? (c) What is the significance of meiosis in living organisms ?	**5**
Q.33	A)What is the total member of bones present in the left pectoral girdle and the left arm respectively in a normal human? B)What is the role of the sarcoplasmic reticulum, myosin head and F-actin during contraction in striated muscles? C)What is Myasthenia gravis?	**5**

BIOLOGY-- XI (Set A)
SEPTEMBER EXAMINATION(2024)
ANSWER KEY AND MARKING SCHEME
SECTION A

Q 1	C	**1**
Q 2	D	**1**
Q 3	D	**1**
Q 4	B	**1**
Q.5	C	**1**
Q 6	A	**1**
Q 7	C	**1**
Q 8	D	**1**
Q.9	A	**1**
Q.10	C	**1**
Q.11	A	**1**
Q.12	A	**1**
Q 13	A	**1**
Q.14	C	**1**
Q.15	C	**1**
Q.16	D	**1**

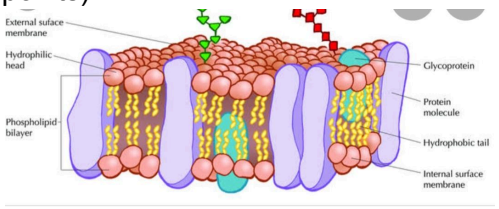
SECTION B

Q.17	During her first pregnancy after exposure with blood of her first Rh +ve child, her body prepared antibodies against Rh antigen in her blood. In the second pregnancy these Rh antibodies from the mother leaked into the blood of the foetus (Rh +ve) and destroyed the foetus RBCs. It could cause severe anaemia and Jaundice could be foetal to the foetus. This situation could have been avoided if she had got herself administered anti Rh antibodies, immediately after first delivery to kill Rh antibodies entered in mother's blood from foetus	1/2×4 =2
Q.18	(i) C:Cerebellum D : Medulla oblongata (ii)C : Balancing of body and maintain posture D : Vomiting , coughing, breathing, salivation or any other correct answer	**1** **1**
Q.19	Occupational respiratory disease is any lung condition you get at work. It occurs because of repeated exposure to certain toxins. You can even get a disease long after being exposed to those toxins. Certain workplaces lend themselves to disease. Particles in the air from many sources cause these lung problems. These sources include factories, smokestacks, exhaust, fires, mining, construction, and agriculture.	½

	Asbestosis. This is caused when a person breathes in tiny asbestos fibers. Over time, this leads to lung scarring and stiffening of the lungs. Coal worker's pneumoconiosis or black lung disease. This is caused by breathing coal dust. It causes lung inflammation and scarring. It's important to use protective equipment when working with materials that can cause lung disease. This can include wearing facemasks or respirators. In addition, always follow workplace safety steps. It's also important not to smoke. And to follow advice for lung testing (such as spirometry) to measure your lung function.	½ **1**
Q.20	 **Structure of mitochondria** OR Mitochondria are called the "powerhouse of cell" as they are involved in the formation of ATP during the aerobic cellular respiration. Their structure shows the following details: They are surrounded by double membranes, as an outer membrane and an inner membrane. The space between the two membranes is called peri-mitochondrial space. The inner membrane shows the infoldings called cristae that bear the ATP synthases complex. It has enzymes for the electron transport chain. Interior to the inner membrane, the matrix is present that contains the ribosomes, DNA and enzymes. The ribosomes are of 70S types and DNA is circular	**½+½+ ½+½**
Q.21	Ribosome In prokaryotes 70S In eukaryotes 80S	**1** **1**

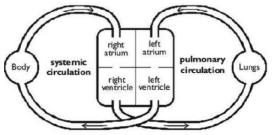
SECTION C

Q.22	a) Scoliodon lacks air bladder and has to swim constantly to avoid sinking. b) Birds have pneumatic bones that have air cavities to aid in flying c) Platypus, though oviparous, it has mammary glands.	1 1 1
Q 23	a)ii- Heteropolymer i, iii, iv- Homopolymer b)Starch forms a helical secondary structure which can hold I2.	**2** **1**
Q.24	A)Viroids are free RNA molecules of low molecular weight without any protein coat while viruses can have either RNA or DNA molecules encapsulated in a protein coat. B)Coelomate animals have a coelom, this is a body cavity that has a mesodermal lining. Pseudocoelomate animals have a body cavity but it is not lined with mesodermal cells.Mesoderm is present as scattered pouches in between	**1** **1**

	ectoderm and endoderm. C)Chlorophyceae has the green pigments, and Rhodophyceae has the red pigments, and the Phaeophyceae do have the brown pigments. ... Rhodophyceae has the phycocyanin and phycoerythrin and the other one Phaeophyceae do have the flavoxanthin and the fucoxanthin. **Or** any other relevant point	**1**
Q.25	The plasma membrane is composed of lipids that are arranged in a bilayer and within the membrane with the polar head towards the outer sides and the hydrophilic tails towards the inner part. Because of this the nonpolar tail of saturated hydrocarbons is protected from the aqueous environment. The plasma membrane consists of 52% protein and 40% lipids. Peripheral proteins lie on the surface of the membrane while the integral proteins are partially or totally buried in the membrane.(any two points)  Diagram 4 labelling	**1** **1** **1**
Q.26	A)  IAt different pH, the structures of amino acids change because of the ionisable nature of −NH2 and −COOH groups. B)At low-temperature enzymes are inactivated, low temperatures restrict the growth of food-ruining microorganisms and also suppress the function of enzymes in food.	**1** **1** **1**
Q.27	The process of breathing, or respiration, is divided into two distinct phases. The first phase is called inspiration, or inhaling. When the lungs inhale, the diaphragm contracts and pulls downward. At the same time, the muscles between the ribs contract and pull upward. This increases the size of the thoracic cavity and decreases the pressure inside. As a result, air rushes in and fills the lungs. The second phase is called expiration, or exhaling. When the lungs exhale, the diaphragm relaxes, and the volume of the thoracic cavity decreases, while the pressure within it increases. As a result, the lungs contract and air is forced out.	½+½ +½ ½+½+ ½
Q.28	A)Hypothalamus stimulated by activated osmoreceptors; -ADH/ vasopressin released from neurohypophysis; -Water reabsorption from latter parts of tubule; -Increase in body fluid volume/blood pressure leading B)Podocytes	**2** **1**

SECTION-D

Q.29	a. interventricular septum b. aves/mammals // amphibians/reptiles c. mixing of oxygenated and deoxygenated blood. Less efficient	**½** **½+½** **½+½**

	d. 	**1.5**
Q.30	A)vital capacity;maximum volume of air a person can breathe in after a forced expiration/ maximum volume of air a person can breathe out after a forced inspiration. b) B- Inspiratory reserve volume-the additional volume of air that can be inspired after a forcible inspiration. C – Expiratory reserve volume- the additional amount of air that can be expired by a forcible expiration. C) emphysema generally occurs in smokers in which alveolar walls get brakes and reduce the exchange of gases.	**1** **1** **1** **1**

SECTION E

Q.31	A)P wave represent depolarisation of SA node PQwave in an ECG complex indicates atrial depolarization. The QRS is responsible for depolarization of AV node and atrial repolarization ST depolarisation of ventricles T wave is ventricular repolarization. TP represent joint diastole B)The two distinct sounds are heard, a low, slightly prolonged “lub” (first sound) occurring at the beginning of ventricular contraction or systolic caused by closing of bicuspid and tricuspid valves higher-pitched “dup” (second sound), caused by the closure of aortic and pulmonary valves at the end of systole or starting of joint diastolic.	**1/2×6 =3** **1+1**
Q.32	A) **Anaphase I** / **Anaphase II** 1. Anaphase I takes place during Meiosis I / 1. Anaphase II takes place during Meiosis II. 2. No splitting up of centromere. / 2. Centromere of chromosome splits into two. 3. Chromosome of homologous pair separate and move towards poles. / 3. Chromatids of a chromosome separate and move towards poles. B)Meiosis is a process that occurs in sex cells, such as sperm and egg cells in the human body, to make more of them. In the primordial germ cells of males and females, meiosis takes place in the testes and ovaries, respectively. C)Meiosis is a type of cell division that reduces the number of chromosomes in the parent cell by half and produces four gamete cells.The significance of meiosis is in- **Formation of gametes** – Meiosis form gametes that are essential for sexual reproduction. **Genetic information** – Meiosis switches on the genetic information for the development of gametes. **Crossing over** – It introduces new combination of traits or variations. **Mutation** – Mutations take place due to irregularities of meiotic division.(Any two)	**2** **1** **2**

Q.33	A) The total number of bones present in the left pectoral girdle is 2 (the clavicle and scapula). Left-arm possesses 30 bones in a normal human.	1
	B)**Sarcoplasmic Reticulum:** It releases calcium ions into the sarcoplasm that bind with a subunit of troponin on actin and brings about conformational changes. So, they remove the masking of the active binding sites for myosin on the actin filaments.	1
	Myosin Head: It is an active ATPase enzyme. It provides specific binding sites for ATP and active sites for F-actin to form cross-bridges.	1
	F-Actin: The active binding sites on F-actin are specific to the myosin head and are required for cross-bridge formation.	1
	C)This is a type of autoimmune disease. A breakdown in communication between nerves and muscles causes this condition. It affects the neuromuscular junction that causes progressive weakening and paralysis of skeletal muscles. Symptoms are double vision, weakness in the arm and leg muscles, and difficulties with speech and chewing.	1

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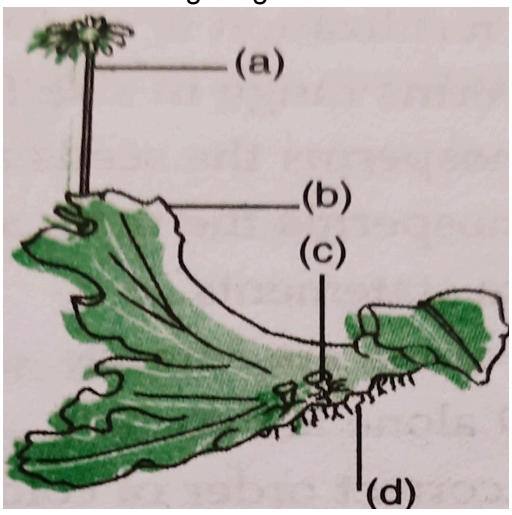
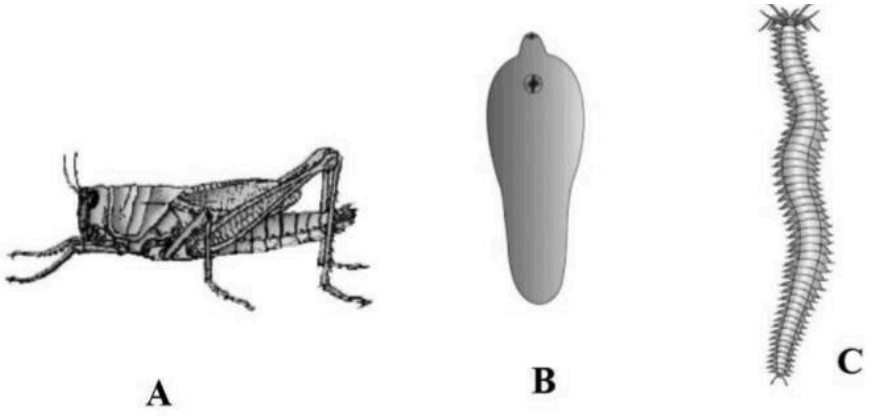
(v)Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION- A

Q 1	One of the following is not a characteristic feature of sponges: A) cellular level of organisation B) presence of ostia C) intracellular digestion D) body supported by Chitin	**1**
Q 2	Which is correct for Mammalia (a) A = macropus = kangaroo, B = camelus = cameleon (b) A = canis = dog, B = felis = cat (c) A = equus = rat, B = leo = lion (d) A = camelus = cameleon, B = canis = cat	**1**
Q.3	Examine the figure given below and select the right option:  A) a-seta,b-sporophyte,c-protonema,d-rhizoids B) a- antheridiophore,b-male thallus,c-globule,d-root C) a- archegoniophore,b- female thallus,c-gemma cup,d-rhizoids D) a- archegoniophore, b female thallus, c-bud,d-foot	**1**
Q.4	Which one of the following pairs of nitrogenous bases of nucleic acids is wrongly matched with the category mentioned against it? A) Adenine, Thymine – Purines B) Uracil, Cytosine – Pyrimidines C) Guanine, Adenine – Purines D) Thymine, Uracil– Pyrimidines	**1**
Q.5	Glycocalyx is associated with; A) nucleolus B) plasma membrane C) centriole D) ribosomes	**1**

Q.6	What is the incorrect pair out of the following**?** (a) Hinge joint – between the humerus and pectoral girdle (b) Pivot joint – between atlas, axis and occipital condyle (c) Gliding joint – between the carpals (d) Saddle joint – between the carpal and metacarpals of the thumb	1
Q.7	Which of the following are not membrane bound? A) vacuole B) ribosomes C) lysosomes D) plastids	1
Q.8	In a healthy human being glomerular filtration rate per day is a)120 litre / day b)125 ml/ day c)180 litre/day d)220 litre/ day	**1**
Q.9	A person living at sea level has around 5 million RBCs per cubic millimetre of blood, whereas one living at an altitude of 5400 metres has around 8 million. This is because at high altitude (a) atmospheric O2 level is less and hence more RBCs are needed to absorb the required amount of O2 to survive (b) there is more UV radiation which enhances RBC production (c) people eat more nutritive food, therefore more RBCs are formed (d) people get pollution – free air to breathe and more oxygen is available	1
Q.10	Which component in the blood acts as an anticoagulant? a) Fibrinogen b) Thrombin c) Globin d) Heparin	**1**
Q 11	Given below are the figures of a few organisms. Find the correct option with respect to their excretory organs. a. A- Malpighian tubules, B- flame cells, C- nephridia b. A – green gland, B - nephron, C- nephridia c. A – Malpighian tubules, B- nephridia, C- flame cells d. A – flame cells, B – nephridia, C – nephron  A B C	**1**
Q.12	In the systemic circulation, blood vessel that carries blood from the intestine to liver is named (A) Hepatic portal arch B) Hepatic portal artery (C) Hepatic portal vein D) None	1
	Q.No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: **A. Both A and R are true and R is the correct explanation of A.** **B. Both A and R are true and R is not the correct explanation of A.** **C. A is true but R is false.** **D. A is False but R is true**	

Q.13	**Assertion:** Ammonia should be removed from the body as rapidly as it is formed. **Reason:** In water, ammonia is soluble.	**1**
Q.14	**Assertion**: The lungs are situated in a thoracic chamber which is anatomically an air-tight chamber. **Reason**: Such an arrangement is essential to avoid any change in pulmonary volume.	1
Q.15	**Assertion** : Symbiosis is furnished by mycorrhiza. **Reason** : In mycorrhiza, symbiosis is established between fungus and alga	**1**
Q.16	**Assertion**: In amphibians and reptiles, double circulation is incomplete. **Reason:** Unlike in birds and mammals, in amphibians and reptiles, the left atrium receives oxygenated blood and the right atrium receives deoxygenated blood.	**1**

SECTION- B

Q.17	A)Where is the SA node situated?What is its function? B)What is the function of GLUT--4?	**2**
Q.18	List the following steps in a sequential manner for the completion of the respiration process. a) Diffusion of oxygen and CO2 across the alveolar membrane b) Transportation of gases by blood c) Utilisation of oxygen for catabolic reactions by the cells and hence the resultant release of CO2 d) Pulmonary ventilation through which atmospheric air is drawn in and carbon dioxide-rich alveolar air is given out e) Diffusion of oxygen and carbon dioxide between tissues and blood	**2**
Q.19	Explain Rh-incompatibility in humans.	**2**
Q 20	Draw a well labelled diagram of the kitchen of the cell and explain the structure.	**2**
Q.21	What are 9 + 2 and 9 + 0 arrangements.Explain these with the help of examples.	**2**

SECTION-C

Q 22	Give one example of each of the following : (a) An egg-laying mammal (b) A fish having poisonous sting (c) A walnut-shaped marine organism that shows bioluminescence (d) A cnidarian showing metagenesis (e) An arthropod which is a gregarious pest (f) A reptile having four-chambered heart	**3**
Q.23	Explain the Primary and secondary structure of proteins with diagrams.	**3**
Q.24	Differentiate between- A)Viroids and Virus B)Pseudocoelomate and Coelomate Animals C) Rhodophyceae and Phaeophyceae	**3**
Q.25	Explain fluid mosaic model of plasma membrane with well labelled diagram.	**3**
Q.26	A)Amino acids exist as zwitterions. Give its structure. Why is it formed? B)Why does the shelf life of fruits and vegetables increase in a refrigerator?	**3**
Q.27	The graph given here shows the oxygen dissociation curve during the transport of oxygen by haemoglobin in our body. a) Name the parameters 'a' and 'b' plotted on the X and Y axis respectively. (b) Haemoglobin binds and dissociates with oxygen in our body at two different sites. Explain these processes.	**3**

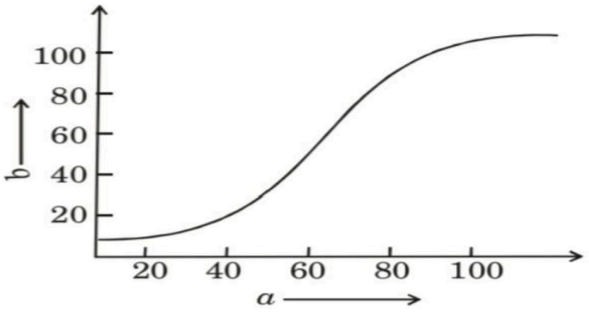


Fig. Oxygen dissociation curve

Q.28 Study the following diagram :
(a) Label the parts a, b and c in the above diagram of a nephron.
(b) Name the cells forming the inner lining of Bowman's capsule.
(c) What is the value of Glomerular filtration rate?

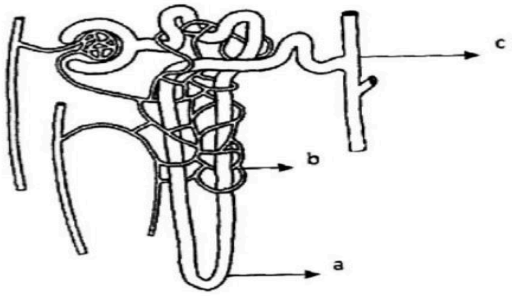


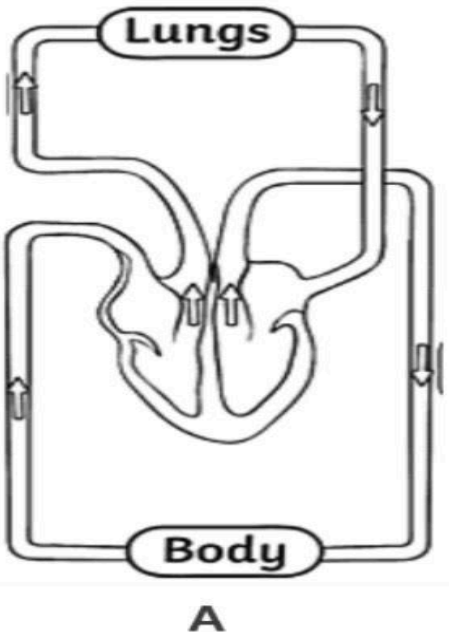
Fig. Nephron

3

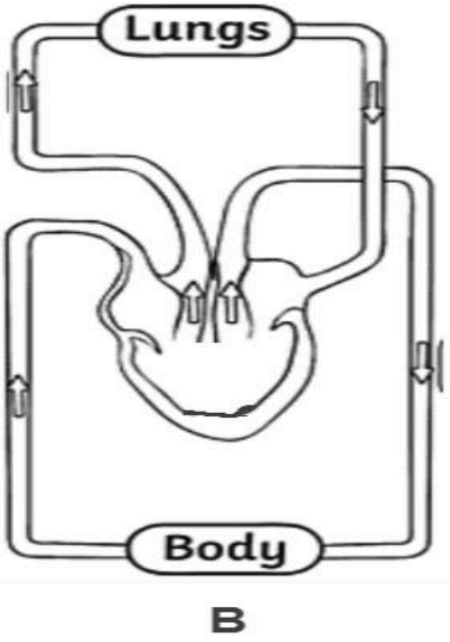
SECTION- D

CASE STUDY BASED QUESTIONS

Q.29 Observe the diagram and answer the questions that follow.



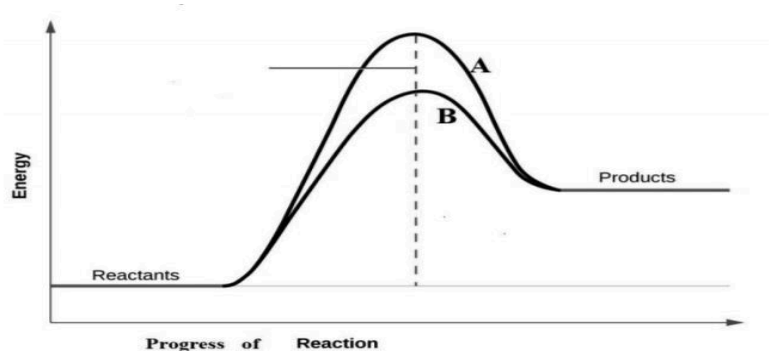
A



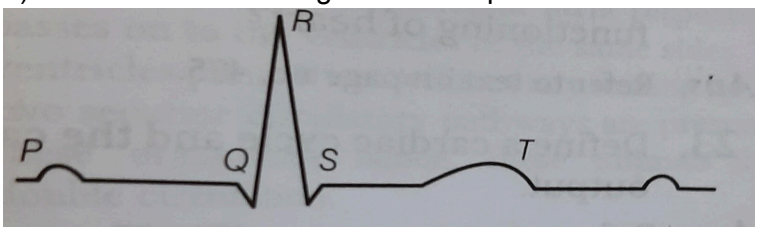
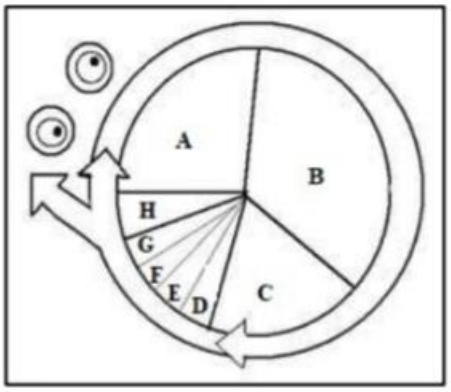
B

4

a. Name the structure which is present in A but absent in B.
b. Which group of organisms has type A and which group has type B type of circulation?
c. What could be the possible disadvantage of type B circulation?
d Prepare a flowchart representing the type of circulation shown in type A.

Q.30	Observe the given graph showing a chemical reaction taking place in the presence and absence of an enzyme. a) Based on energy level difference between substrate/reactant and product, identify the type of reaction. b) Which of the two curves depicts the reaction catalysed by enzymes? Give a reason. c) If a chemical closely resembling the substrate is added to the reaction, Which of the curves in the graph will be affected and why?  	**4**

SECTION-E

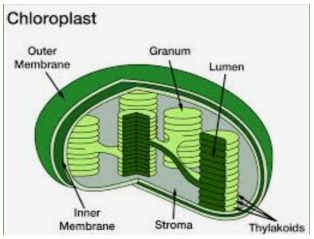
Q.31	A)Given below is the diagrammatic representation of a standard ECG  What does P ,Q ,R ,S ,T wave represent? B) Name two heart sounds. How are they produced?	**5**
Q.32	A diploid cell with DNA content 2C and 24 chromosomes goes through the different stages of cell cycle.  (a) In which of the phases A to H, the DNA content is increased to 4C? What will be the number of chromosomes in this phase? (b) In which of the phases A to H, is chromosome morphology most easily observed? How are the chromosomes arranged in this phase? (c) Adult heart cells, although metabolically active, do not divide until required. Which phase of the cell cycle do they exhibit? What is the other term used for this phase? (d) State two significance of mitosis in animals.	**5**
Q.33	Explain mechanism of muscle contraction with well labelled diagram.	**5**

BIOLOGY-- XI (Set B)
SEPTEMBER EXAMINATION(2024)
ANSWER KEY AND MARKING SCHEME
SECTION A

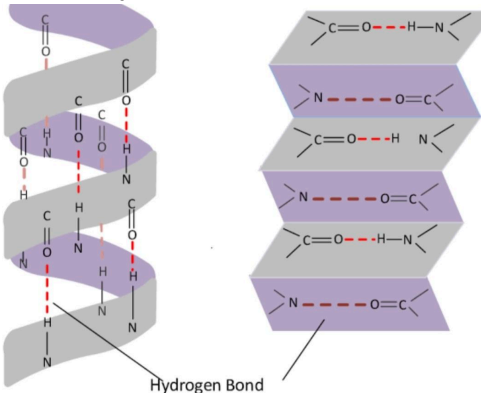
Q 1	D	**1**
Q 2	B	**1**
Q 3	C	**1**
Q 4	A	**1**
Q.5	B	**1**
Q 6	A	**1**
Q 7	B	**1**
Q 8	C	**1**
Q.9	A	**1**
Q.10	D	**1**
Q.11	A	**1**
Q.12	C	**1**
Q 13	B	**1**
Q.14	C	**1**
Q.15	C	**1**
Q.16	C	**1**

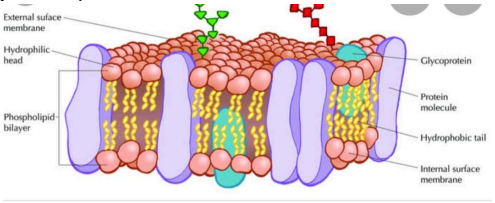
SECTION B

Q.17	A)sinoatrial node is an oval-shaped region of special cardiac muscle in the upper corner of the right atrium.These cells have the ability to spontaneously generate an electrical impulse. B)enables glucose transport into cells	**½+½** **1**
Q.18	d,a,b,e,c	**2**
Q.19	A special case of Rh Incompatibility exists between Rh negative mother and Rh positive foetus. During the first pregnancy the Rh antigens of the foetus do not get exposed to the Rh negative blood of the mother because placenta ensures complete separation of blood flowing in the mother and the foetus. But the possibility of exposure of mother's blood to Rh antigens from foetus can be there. If that happens. the mother	**2**

	starts preparing antibodies against Rh antigens. In case of subsequent pregnancies, Rh antibodies from the mother can leak into the Rh positive foetus. This can be fatal to the foetus. This can also cause severe anaemia and jaundice to the baby. This condition is called erythroblastosis fetalis	
Q.20	 OR The chloroplast is a structure which is surrounded by two unit membranes separated from one another by a space called periplastidal space. The heterogeneous nature of chloroplast is due to the presence of disc-like structures i.e., grana, in a colourless matrix called stroma. Grana are the sites for the light reaction and stroma is the site for the dark reaction of photosynthesis. Each granum is made up of a stock of closed compartments called thylakoids. In stroma, there are many membranes running parallel to each other throughout the length of chloroplast which is called lamellae. (any two points)	**½+½+ ½+½**
Q.21	Flagella and cilia have 9 pairs of microtubules situated on the outside that are bound together and 2 microtubules in the middle or centre. Centriole is composed of 9 sets of radially arranged microtubules triplets that run parallel to the axis of the centriole.	**1** **1**

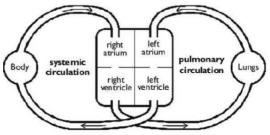
SECTION C

Q.22	a Platypus or Spiny anteater b.Trygon c.Ctenoplana d. Obelia e. Locust f. Crocodile	3
Q 23	The primary structure consists of a linear chain of amino acids. The secondary structure contains regions of amino acid chains that are stabilized by hydrogen bonds from the polypeptide backbone. These hydrogen bonds create alpha-helix and beta-pleated sheets of the secondary structure.(3 points) 	½ **½+½+ ½** **1**

Q.24	A)Viroids are free RNA molecules of low molecular weight without any protein coat while viruses can have either RNA or DNA molecules encapsulated in a protein coat. B)Coelomate animals have a coelom, this is a body cavity that has a mesodermal lining. Pseudocoelomate animals have a body cavity but it is not lined with mesodermal cells.Mesoderm is present as scattered pouches in between ectoderm and endoderm. C)Chlorophyceae has the green pigments, and Rhodophyceae has the red pigments, and the Phaeophyceae do have the brown pigments. ... Rhodophyceae has the phycocyanin and phycoerythrin and the other one Phaeophyceae do have the flavoxanthin and the fucoxanthin. **Or** any other relevant point	**1** **1** **1**
Q.25	The plasma membrane is composed of lipids that are arranged in a bilayer and within the membrane with the polar head towards the outer sides and the hydrophilic tails towards the inner part. Because of this the nonpolar tail of saturated hydrocarbons is protected from the aqueous environment. The plasma membrane consists of 52% protein and 40% lipids. Peripheral proteins lie on the surface of the membrane while the integral proteins are partially or totally buried in the membrane.(any two points)  Diagram 4 labelling	**1** **1** **1**
Q.26	 A) IAt different pH, the structures of amino acids change because of the ionisable nature of −NH2 and −COOH groups. B)At low-temperature enzymes are inactivated, low temperatures restrict the growth of food-ruining microorganisms and also suppress the function of enzymes in food.	**1** **1** **1**
Q.27	A)X Partial pressure of O2, y % saturation of haemoglobin B)In the lungs, the partial pressure of oxygen is high. Hence, haemoglobin binds to oxygen and forms oxyhaemoglobin. Tissues have a low oxygen concentration. Therefore, at the tissues, oxyhaemoglobin releases oxygen to form haemoglobin. The sigmoid shape of the dissociation curve is because of the binding of oxygen to haemoglobin. As the first oxygen molecule binds to haemoglobin, it increases the	**1** **2**

	affinity for the second molecule of oxygen to bind. Subsequently, haemoglobin	
Q.28	a) a loop of Henle b) Vasa recta/ blood capillaries c) Collecting duct B)squamous epithelium C) 125 ml/ min or 180 litre/ day	½+½+ ½ 1 ½

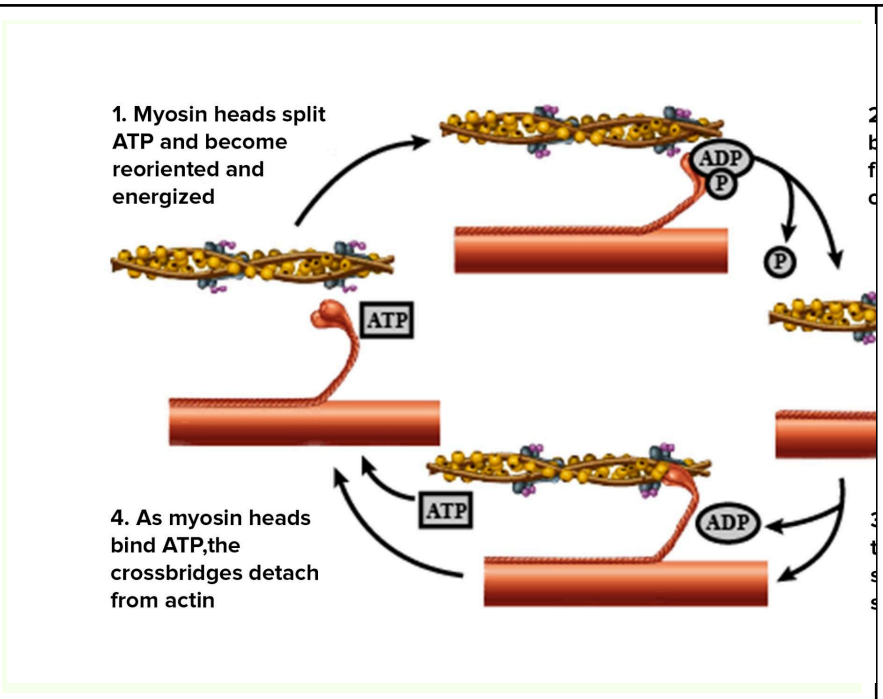
SECTION-D

Q.29	a. interventricular septum b. aves/mammals // amphibians/reptiles c. mixing of oxygenated and deoxygenated blood. Less efficient d. 	½ ½+½ ½+½ **1.5**
Q.30	a) Endothermic reaction, as energy level of Product is higher than substrate/ reactant. b) Curve B represents enzyme catalysed reaction/ Since difference in average energy content of reactant from that transition state (Activation energy) is lower than in curve A. c) Curve B Chemical will act as competitive inhibitor/will bind to active site of enzyme/will affect conversion of substrate to product	**1** ½ **1** ½ **1**

SECTION E

Q.31	A)P wave represent depolarisation of SA node PQwave in an ECG complex indicates atrial depolarization. The QRS is responsible for depolarization of AV node and atrial repolarization ST depolarisation of ventricles T wave is ventricular repolarization. TP represent joint diastole B)The two distinct sounds are heard, a low, slightly prolonged “lub” (first sound) occurring at the beginning of ventricular contraction or systolic caused by closing of bicuspid and tricuspid valves higher-pitched “dup” (second sound), caused by the closure of aortic and pulmonary valves at the end of systole or starting of joint diastolic.	**1/2×6 =3** **1+1**
Q.32	(a) B Synthesis phase or S phase No of chromosomes 2n= 24 (no of chromosomes remains same) (b) E Metaphase Chromosomes are arranged along the equator/ equatorial plate or metaphase plate	 **1.5** **1.5**

	(c) G0 phase Quiescent phase (d) Growth/ cell repair/ restoring nucleo-cytoplasmic ratio	 **1** **1**
Q.33	**Mechanism of muscle contraction:** 1. The sliding filament concept is the most widely time-venerated motive for muscle contraction. 2. Muscle contractions, in keeping with this viewpoint, are part of a chemical interest cycle. **Sliding filament concept:** 1. Actin is a highly abundant intracellular protein found in all eukaryotic cells that play an important role in muscle contraction and cell movement. 2. Actin is also required for the maintenance and control of cell shape and architecture. 3. Myosin is a prototypical molecular motor—a protein that converts chemical energy in the form of ATP into mechanical energy, resulting in force and movement. 4. Cross-bridges extending from myosin filaments carry out the operation. 5. Sarcomeres are contractile muscle units. 6. A sarcomere is a striated muscular functional unit. 7. This indicates that it is the most fundamental unit of our skeletal muscle. 8. Actin filaments connect with the Z disc at the sarcomere's terminal. 9. Sarcomeres shorten and muscular tissues agree at the same time as the sliding filament pulls the Z disc deeper. 10. A sarcomere is made from numerous parallel filaments referred to as actin filaments (skinny filaments) and myosin filaments (thick filaments). 11. The sliding filament concept explains how muscle tissue agrees for the duration of the body. 12. Tiny actin filaments are constantly pulled throughout large myosin filaments to provide anxiety in a muscle. 13. When an impulse reaches the neuromuscular junction, the sarcoplasmic reticulum is activated, inflicting calcium ions to be released. 14. These calcium ions then bind to troponin, displacing tropomyosin from the actin's myosin binding site.	4 1


1. Myosin heads split ATP and become reoriented and energized
ADP
P
P
ATP
ATP
ADP
4. As myosin heads bind ATP,the crossbridges detach from actin