

GOVERNMENT HIGHER SECONDARY PUBLIC EXAM – MAY-2022
TENTAIVE ANSWER KEY

STD: XI

SUB: ZOOLOGY

PART-I						15 x 1 = 15
Q. NO	A - TYPE	MARK	Q. NO	B - TYPE	MARK	
1	B) Myoglobin	1	1	A) 500 mL	1	
2	A) Urea	1	2	D) Pivot joint.	1	
3	D) Thyroid	1	3	D) Both b and c	1	
4	C) Agglutinogens	1	4	A) <i>Attacus ricini</i>	1	
5	B) Walter Rosen	1	5	C) Agglutinogens	1	
6	A) <i>Attacus ricini</i>	1	6	D) Thyroid	1	
7	A) 1 – iv, 2 – iii, 3 – ii, 4 - i	1	7	B) Walter Rosen	1	
8	D) Both b and c	1	8	B) Ultra sonogram	1	
9	A) 500 mL	1	9	C) Frogs evolved from gilled ancestors.	1	
10	C) Hypothalums	1	10	A) 1 – iv, 2 – iii, 3 – ii, 4 - i	1	
11	A) Arthropoda	1	11	C) Hypothalums	1	
12	B) Ultra sonogram	1	12	C) Fish	1	
13	C) Frogs evolved from gilled ancestors.	1	13	A) Urea	1	
14	D) Pivot joint.	1	14	B) Myoglobin	1	
15	C) Fish	1	15	A) Arthropoda	1	

PART – II

NOTE: Q.NO-24 IS COMPULSORY (2 Marks)

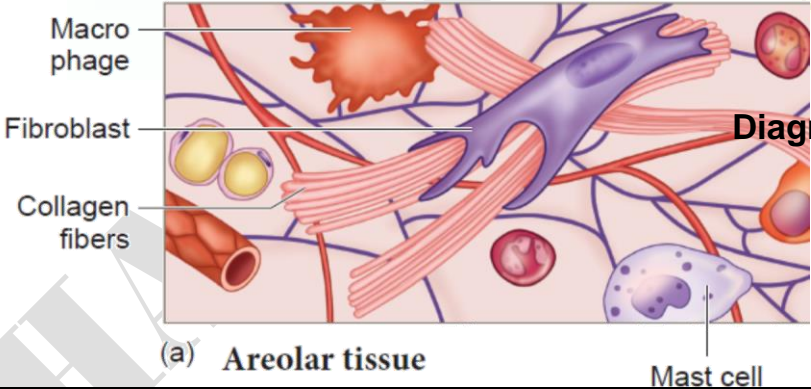
6 x 2 = 12

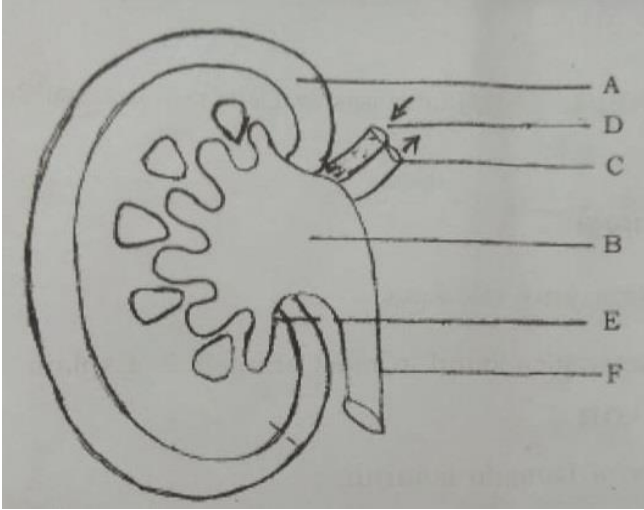
Q.NO	ANSWERS	MARKS
16	<p>'Brown fat' or Brown adipose tissue:</p> <ol style="list-style-type: none"> The adipose tissue which contains abundant mitochondria. Brown fat produces heat by non-shivering thermogenesis in neonates. White fat stores nutrients. <p>Brown fat:</p> <ol style="list-style-type: none"> It is used to heat the blood stream to warm the body. 	<p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>(Total-2)</p>
17	<ol style="list-style-type: none"> The male frog: A pair of vocal sacs and a copulatory or nuptial pad on the ventral side of the first digit of each forelimb. Female frogs: Vocal sacs and nuptial pads are absent. 	<p>1</p> <p>1</p> <p>(Total-2)</p>
18	<p>Why are villi present in small intestine:</p> <ol style="list-style-type: none"> Digestion is completed only in the small intestine and so maximum absorption takes place through villi in the small intestine. Hence, the villi are found only in small intestine. 	<p>2</p> <p>(Total-2)</p>
19	<p>Heart Beat:</p> <ol style="list-style-type: none"> Rhythmic contraction and expansion of heart. 	<p>2</p>
20	<p>Steps in Urine formation:</p> <ol style="list-style-type: none"> Glomerular filtration, Tubular reabsorption and Tubular secretion. 	<p>Any 1 = 1 mark</p> <p>Any 2 = 1 ½ mark</p> <p>All the three = 2 mark</p> <p>2</p> <p>(Total-2)</p>
21	<p>The walls of the ventricles are thicker than the auricles:</p> <ol style="list-style-type: none"> Because of to the presence of papillary muscles. 	<p>2</p>
22	<p>Hormones are chemical messengers:</p> <ol style="list-style-type: none"> Hormones are released into the blood and circulated as chemical signals. And acts specifically on certain organs or tissues called target organs or target tissues. 	<p>1</p> <p>1</p> <p>(Total-2)</p>
23	<ol style="list-style-type: none"> RBC diluting fluid - Hayem's WBC diluting fluid - Turk's solution 	<p>1</p> <p>1</p> <p>(Total-2)</p>
24	<p align="center">(Compulsory question)</p> <p>Gall stone:</p> <ol style="list-style-type: none"> Because of the gall stones are mostly formed of crystallized cholesterol in the bile. 	<p>2</p>

PART – III

NOTE: Q.NO-33 IS COMPULSORY (3 MARKS)

6 x 3 = 18

Q.NO	ANSWERS	MARKS
25	<p>Domain Archaea:</p> <ol style="list-style-type: none"> 1. It includes single celled organisms, the prokaryotes. 2. Have the ability to grow in extreme conditions like volcano vents, hot springs and polar ice caps, hence are also called extremophiles. 3. They are capable of synthesizing their food without sunlight and oxygen by utilizing hydrogen sulphide and other chemicals from the volcanic vents. 4. Methanogens - Some of the them produced methane 5. Halophiles - few live in salty environments 6. Thermoacidophiles - thrive in acidic environments and at high temperatures. 	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>(Total 3)</p>
26	<p>Schizocoelomates:</p> <ol style="list-style-type: none"> 1. Animals the body cavity is formed by splitting of mesoderm. 2. (e.g., annelids, arthropods, molluscs). <p>Enterocoelomate:</p> <ol style="list-style-type: none"> 1. Animals' body cavity is formed from the mesodermal pouches of archenteron. 2. (e.g., Echinoderms, hemichordates and chordates) 	<p>1</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>(Total 3)</p>
27	<p>Diagram showing Areolar tissue.</p>  <p>Diagram Parts (2)</p>	<p>2</p> <p>1</p> <p>(Total-3)</p>
28	<p>Nitrogen narcosis:</p> <ol style="list-style-type: none"> 1. When a person descends deep into the sea, the pressure in the surrounding water increases which causes the lungs to decrease in volume. 2. This decrease in volume increases the partial pressure of the gases within the lungs. 3. This effect can be beneficial, because it tends to drive additional oxygen into the circulation, but this benefit also has a risk, the increased pressure can also drive nitrogen gas into the circulation. 4. This increase in blood nitrogen content. (Nitrogen narcosis). 	<p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>(Total-3)</p>

29	 <p>A Cortex D Renal artery C Renal vein B Renal pelvis E Major calyx F Ureter</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ (Total-3)								
30	<p>Name of the hormone: Atrial natriuretic factor</p> <ol style="list-style-type: none"> Excessive stretch of cardiac atrial cells cause an increase in blood flow to the atria of the heart and release Atrial Natriuretic Peptide or factor (ANF). It travels to the kidney where it increases Na^+ excretion and increases the blood flow to the glomerulus, And acting on the afferent glomerular arterioles as a vasodilator or on efferent arterioles as a vasoconstrictor. It decreases aldosterone release from the adrenal cortex and also decreases release of renin, thereby decreasing angiotensin II. ANF acts antagonistically to the renin- angiotensin system, aldosterone and vasopressin. 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ (Total-3)								
31	<p>Difference between the rod and cone cells:</p> <table border="1" data-bbox="212 1323 1262 1648"> <thead> <tr> <th>Rod cells</th> <th>Cone cells</th> </tr> </thead> <tbody> <tr> <td>Responsible for vision in dim light</td> <td>Responsible for colour vision and works best in the bright light.</td> </tr> <tr> <td>The pigment - Rhodopsin, predominant in the extra fovea region</td> <td>The pigment - photopsin, concentrated in the fovea region</td> </tr> <tr> <td>120 millions</td> <td>6-7 millions</td> </tr> </tbody> </table> <p style="text-align: right;">Any three</p>	Rod cells	Cone cells	Responsible for vision in dim light	Responsible for colour vision and works best in the bright light.	The pigment - Rhodopsin, predominant in the extra fovea region	The pigment - photopsin, concentrated in the fovea region	120 millions	6-7 millions	1 1 1 1 (Total-3)
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120 millions	6-7 millions									
32	<p>3 F hormone:</p> <ol style="list-style-type: none"> Adrenalin and noradrenalin and are referred as "3F hormone" Fight, flight and fright hormone. 	$1 \frac{1}{2}$ $1 \frac{1}{2}$ (Total-3)								

33	(Compulsory question)	
	ADH: - Positive feedback mechanism:	
	1. Excessive loss of fluid from the body or there is an increase in the blood pressure,	1/2
	2. The osmoreceptors of the hypothalamus respond by stimulating the neurohypophysis.	1/2
	3. To secrete the antidiuretic hormone (ADH) or vasopressin	1/2
	Negative feedback mechanism:	
1. When you drink excess amounts of your favourite juice,	1/2	
2. The osmoreceptors of the hypothalamus is no longer stimulated.	1/2	
3. The release of ADH is suppressed from the neurohypophysis.	1/2	
	(Total-3)	

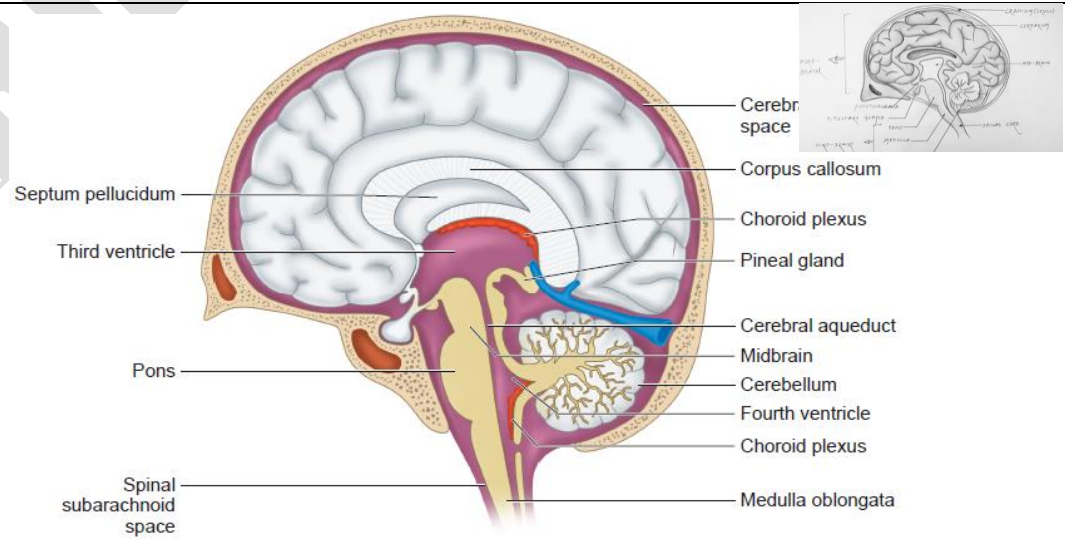
PART – IV (5 MARKS)**5 x 5 = 25**

Q.NO	ANSWERS	MARKS
34. (a)	The common fundamental features of animals:	
	I. Arrangement of cell layers,	1
	II. Cellular level of organization:	1
	III. Nature of coelom,	1
	IV. Presence or absence of segmentation,	1
	V. Notochord and	1
	I. Arrangement of cell layers.	1
	Diploblastic animals:	
	1. Animals in which the cells are arranged in two embryonic layers, the external ectoderm, and internal endoderm.	(Total-5)
	Triploblastic animals:	
	2. Animals in which the developing embryo has three germinal layers are called	
II. Levels of organisation,		
Cellular level of organization:		
1. The cells are arranged as loose aggregates and do not form tissues.		
2. Ex: Sponges.		
Tissue level of organization:		
3. Cells that perform similar functions are aggregated to form tissues.		
4. Ex: (<i>Hydra</i> - Coelenterata).		
Organ level of organization:		
5. Different kinds of tissues aggregate to form an organ to perform a specific function		
6. Ex: Phylum Platyhelminthes.		

	<p>Organ system level of organization</p> <ol style="list-style-type: none"> The tissues are organised to form organs and organ systems. Each system is associated with a specific function and show organ system level of organisation. Ex: flatworms, nematodes, annelids, arthropods, molluscs, echinoderms and chordates <p>III. Nature of coelom:</p> <p>Acoelomates:</p> <ol style="list-style-type: none"> Animals which do not possess a body cavity. e.g., Flatworms <p>Pseudocoel:</p> <ol style="list-style-type: none"> In some animals, the body cavity is not fully lined by the mesodermal epithelium. <p>Eucoelom or true coelom:</p> <ol style="list-style-type: none"> It is a fluid-filled cavity that develops within the mesoderm and is lined by mesodermal epithelium. e.g., annelids, arthropods, molluscs, Echinoderms, hemichordates and chordates <p>IV. Presence or absence of segmentation:</p> <ol style="list-style-type: none"> In some animals, the body is externally and internally divided into a series of repeated units called segments with a serial repetition of some organs (Metamerism). <p>V. Notochord:</p> <ol style="list-style-type: none"> Animals which possess notochord at any stage of their development are called chordates. 	
34. (b)	<p>Morphological features of Lampito marutii.</p> <ol style="list-style-type: none"> Body: long and cylindrical narrow body which is bilaterally symmetrical. Size: 80 to 210 mm in length - diameter of 3.5 – 5 mm, Colour: light brown in colour, with purplish tinge at the anterior end (Porphyrin pigment). Segments: metameres (165 – 190 segments). Dorsal surface: Marked by a dark mid dorsal line (dorsal blood vessel) along the longitudinal axis of the body. Ventral surface: Presence of genital openings. Peristomium: First segment of the body. Prostomium: A small flap structure Overhanging the mouth. Pygidium: The last segment (anus) <p>Clitellum.</p> <ol style="list-style-type: none"> In mature worms, segments 14 to 17 may be found swollen with a glandular thickening of the skin. Pre clitellar region (1st – 13th segments), Clitellar region (14th – 17th segments) Post – clitellar region (after the 17th segment). 	<p>Any 5 (Total-5)</p>

35. (a)	<p>Digestion in the stomach.</p> <ol style="list-style-type: none"> 1. Food remains in the stomach for 4 to 5 hours, the rhythmic peristaltic movement churns and mixes the food with gastric juice and make it into a creamy liquid called chyme. 2. The gastric secretion is partly controlled by autonomic reflexes. 3. The secretion of gastric juice begins when the food is in the mouth. 4. The gastric juice contains HCl and proenzymes. <p>Role of HCl:</p> <ol style="list-style-type: none"> 5. HCl converts the proenzyme pepsinogen into the active enzyme pepsin. 6. The HCl provides an acidic medium (pH1.8) which is optimum for pepsin, 7. Kills bacteria and other harmful organisms and avoids putrefaction. <p>Role of pepsin: (Pepsinogen)</p> <ol style="list-style-type: none"> 8. It converts proteins into proteoses and peptones (peptides). <p>Role of mucus and bicarbonates:</p> <ol style="list-style-type: none"> 9. Lubrication and protection of the mucosal epithelium from the eroding nature of the highly acidic HCl. <p>Role of rennin:</p> <ol style="list-style-type: none"> 10. It helps in the digestion of milk protein, caseinogen to casein in the presence of calcium ions. 11. This enzyme secretion gradually reduces with aging. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>(Total-5)</p>
35. (b)	<p>Transport of CO₂ in the respiratory system:</p> <ol style="list-style-type: none"> 1. Blood transports CO₂ from the tissue cells to the lungs in three ways: <p>As carbonic acid:</p> <ol style="list-style-type: none"> 2. About 7% of CO₂ is carried in a dissolved state (as carbonic acid) through plasma. <p>As carbamino - haemoglobin:</p> <ol style="list-style-type: none"> 3. About 20-25% of CO₂ is transported by Hb as carbamino-haemoglobin. $CO_2 + Hb \rightleftharpoons Hb CO_2$ <p>As bicarbonate:</p> <ol style="list-style-type: none"> 4. About 70% of CO₂. 5. RBCs contain a high concentration of the enzyme, carbonic anhydrase, whereas a small amount of carbonic anhydrase is present in the plasma. 6. At the tissues the pCO₂ is high due to catabolism and diffuses into the blood to form HCO₃ and H⁺ ions. 7. When CO₂ diffuses into the RBCs, it combines with water forming carbonic acid (H₂CO₃) catalyzed by carbonic anhydrase. 	<p>½</p> <p>1</p> <p>1</p> <p>2</p>

	<p>8. Carbonic acid is unstable and dissociates into hydrogen and bicarbonate ions.</p> <p>9. Carbonic anhydrase facilitates the reaction in both directions.</p> $\text{CO}_2 + \text{H}_2\text{O} \xrightleftharpoons{\text{carbonic anhydrase}} \text{H}_2\text{CO}_3$ $\xrightleftharpoons{\text{carbonic anhydrase}} \text{HCO}_3^- + \text{H}^+$	1/2
36. (a)	<p>Cardiac cycle:</p> <p>1. The events that occur at the beginning of the heartbeat and last until the beginning of next beat is called cardiac cycle. It lasts for 0.8 seconds. The series of events that takes place in a cardiac cycle.</p> <p>PHASE 1:</p> <p>2. Ventricular diastole: The pressure in the auricles increases than that of the ventricular pressure. AV valves are open while the semilunar valves are closed. Blood flows from the auricles into the ventricles passively.</p> <p>PHASE 2:</p> <p>3. Atrial systole: The atria contract while the ventricles are still relaxed. The contraction of the auricles pushes the maximum volume of blood to the ventricles until they reach the end-diastolic volume (EDV). EDV is related to the length of the cardiac muscle fibre. The more the muscle is stretched, the greater the EDV and the stroke volume.</p> <p>PHASE 3:</p> <p>4. Ventricular systole (isovolumetric contraction): The ventricular contraction forces the AV valves to close and increases the pressure inside the ventricles. The blood is then pumped from the ventricles into the aorta without change in the size of the muscle fibre length and ventricular chamber volume (isovolumetric contraction).</p> <p>PHASE 4:</p> <p>5. Ventricular systole (ventricular ejection): Increased ventricular pressure forces the semilunar valves to open and blood is ejected out of the ventricles without backflow of blood. This point is the end of the systolic volume (ESV).</p> <p>PHASE 5:</p> <p>6. (Ventricular diastole): The ventricles begin to relax, pressure in the arteries exceeds ventricular pressure, resulting in the closure of the semilunar valves. The heart returns to phase 1 of the cardiac cycle.</p>	<p>1/2</p> <p>1/2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>(Total-5)</p>

<p>36.(b)</p>	<p>Bone is a cellular, living tissue capable of growth, self-repair and remodeling in response to physical stresses.</p> <p>Formation of haematoma:</p> <ol style="list-style-type: none"> 1. When a bone breaks the blood vessels in the bone and surrounding tissues are torn and results in haemorrhage. Due to this a haematoma, a mass of clotted blood forms at the fracture site. 2. The tissues at the site becomes swollen, painful and inflammed. The death of bone cells, occur due to lack of nutrition. <p>Formation of fibrocartilaginous callus:</p> <ol style="list-style-type: none"> 3. Within a few days several events lead to the formation of soft granulation tissue called callus. 4. Phagocytic cells invade the area and begin to clean up the debris. 5. The fibroblasts and osteoblasts invade from the nearby periosteum and endosteum and begin reconstructing of the bone. <p>Formation of Bony callus:</p> <ol style="list-style-type: none"> 6. New bone trabeculae begin to appear in the fibro cartilaginous callus. Gradually that is converted into a bony (hard) callus of spongy bone. 7. Bony callus formation continues until a firm union is formed about two months later to an year for complete woven bone formation. <p>Remodeling of Bone:</p> <ol style="list-style-type: none"> 8. Bony callus formation will be continued for several months. After that the bony callus is remodelled. 9. The excess material on the diaphysis exterior and within the medullary cavity is removed and the compact bone is laid down to reconstruct the shaft walls. 10. The final structure of the remodelled area resembles like the unbroken bony region. 	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>(Total-5)</p>
		<p>Diagram 3</p> <p>Parts any four 2</p> <p>(Total-5)</p>

37. (b)	<p>Functions of thyroxine or tetra-iodothyronine (T4):</p> <ol style="list-style-type: none"> 1. Thyroxine regulates the basal metabolic rate (BMR) and body heat production. 2. It stimulates protein synthesis and promotes growth. 3. It is essential for the development of skeletal and nervous system. 4. Thyroxine plays an important role in maintaining blood pressure. 5. It reduces serum cholesterol levels, Optimum levels of thyroxine in blood is necessary for gonadial functions. <p>Functions of thyrocalcitonin (TCT):</p> <ol style="list-style-type: none"> 1. TCT is a polypeptide hormone, which regulates the blood calcium and phosphate levels. 2. It reduces the blood calcium level and opposes the effects of parathyroid hormone. 	<p>Hormone s name</p> <p>$\frac{1}{2} + \frac{1}{2} = 1$</p> <p>Any four functions</p> <p>$4 \times 1 = 4$</p> <p>(Total-5)</p>
38. (a)	<p>X-rays</p> <ol style="list-style-type: none"> 1. Radiography is the use of X-rays to visualize the internal structures of a patient. X-Rays are a form of electromagnetic radiation, produced by an X-ray tube. <p>Clinical significance: any four 4 x 1 = 4</p> <ol style="list-style-type: none"> 1. Used for diagnosing the disease of the heart, lungs and fractures of bones and joints. 2. Used to visualise hollow organs and blood vessels by filling them with certain chemical formulations containing barium and iodine. 3. Dental radiography is used in diagnosis of oral problems. 4. Mammography is a special type of X-ray imaging to create detail images of the breast tissues. 5. Fluoroscopy for real time images. 6. X-rays are used in radiation therapy to shrink cancerous tumours. 	<p>1</p> <p>4</p> <p>(Total-5)</p>
38. (b)	<p style="text-align: center;">Diagram -</p> <p style="text-align: center;">Figure 13. 3 Life cycle of <i>Bombyx mori</i></p>	<p>1</p>

	<p>Life cycle of <i>Bombyx mori</i></p> <ol style="list-style-type: none"> 1. Male moth copulates with female for about 2-3 hours and if not separated, they may die after few hours of copulating with female. 2. Just after copulation, female starts egg laying which is completed in 1-24 hours. 3. A single female moth lays 400 to 500 eggs depending upon the climatic conditions. <p>Two types of eggs:</p> <ol style="list-style-type: none"> 1. The diapause and non-diapause: 2. The diapause type is laid by silkworms inhabiting the temperate regions, whereas silkworms belonging to subtropical regions like India lay non-diapause type of eggs. <p>Caterpillar development:</p> <ol style="list-style-type: none"> 1. The eggs after ten days of incubation hatch into larva called as caterpillar. 2. The newly hatched caterpillar is about 3 mm in length and is pale, yellowish-white in colour. 3. The caterpillars are provided with well-developed mandibulate type of mouth-parts adapted to feed easily on the mulberry leaves. 4. After 1st, 2nd, 3rd and 4th moultings caterpillars get transformed into 2nd, 3rd, 4th and 5th instars respectively 5. It takes about 21 to 25 days after hatching. The fully grown caterpillar is 7.5 cm in length. <p>Formation of cocoon:</p> <ol style="list-style-type: none"> 1. Caterpillar develops salivary glands, stops feeding and undergoes pupation. 2. The caterpillars stop feeding and move towards the corner among the leaves and secrete a sticky fluid through their silk gland. 3. The secreted fluid comes out through spinneret (a narrow pore situated on the hypopharynx) and takes the form of long fine thread of silk which hardens on exposure to air and is wrapped around the body of caterpillar in the forms of a covering called as cocoon. <p>Adult moth:</p> <ol style="list-style-type: none"> 1. The pupal period lasts for 10 to 12 days and the pupae cut through the cocoon and emerge into adult moth. 	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>(Total-5)</p>
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