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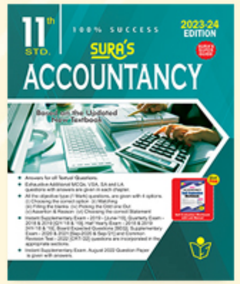

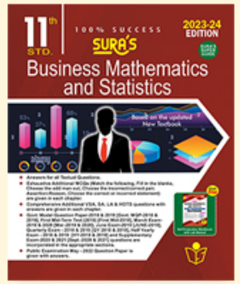

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- Instant Supplementary Exam August 2022 Bio - Zoology & Zoology Question Papers are given with answers.

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It gives me great pride and pleasure in bringing to you **Sura's Zoology Guide** for **11th Standard**. It is prepared as per the New Textbook. A deep understanding of the text and exercises is rudimentary to have an insight into the subject. The students have to carefully understand the topics and exercises.

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I pray the almighty to bless the students for consummate success in their examinations.

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UNIT - I

Chapter 1

THE LIVING WORLD

CHAPTER SNAPSHOT

1.1 Diversity in the Living World
1.2 Need for Classification
1.3 Taxonomy and Systematics
1.4 Three Domains of Life
1.5 Taxonomic Hierarchy
1.6 Nomenclature
1.7 Concept of Species
1.8 Tools for study of taxonomy

THE LIVING WORLD

Diversity in the Living world
- Living organisms
- Non-Living organisms

Three Domains
- **Archaea (Extremophiles)**: Eg: Methanogens
- **Bacteria**: Eg: Cyanobacteria
- **Eukarya (Eukaryotes)**: Eg: Protista

Nomenclature
The process of assigning scientific names to animals or taxonomic group is called Nomenclature.

Taxonomical tools
- Taxonomical keys
- Museum
- Zoological Parks
- Marine Parks
- Printed Taxonomical Tools

Taxonomic Hierarchy

Kingdom
All living animals belonging to various phyla.

Phylum
The group of classes with similar distinctive characteristics constitute a phylum.

Class
It includes one or more related orders with some common characters

Order
It is a group of closely related families which show few common features

Family
It inclues a group of related genera with less similarity as compared to genus and species

Genus
It is a group of closely related species which have evolved from a common ancestor

Species
It is a Basic unit of Classification

MUST KNOW DEFINITIONS

Bio-diversity	:	The presence of a large number of species in a particular ecosystem is called **'Biological diversity'** or in short Bio-diversity.
Taxonomy	:	Taxonomy is the science of arrangement of different organisms.
Systematics	:	The branch of science which deals with different features of species, their diversities, and relationships with other species is referred to as **Systematics**.
Species	:	Species is the basic unit of **Classification.**
Genus	:	It is a group of closely related species which have evolved from a common ancestor.
Monotypic genus	:	In some genus there is only one species which is called as **Monotypic genus.**
Polytypic genus	:	If there are more than one species in the genus it is known as **Polytypic genus.**
Family	:	It is a taxonomic category which includes a group of related genera with less similarity as compared to genus and species.
Order	:	One or more similar families are grouped together to form an order.
Class	:	This category includes one or more related orders with some common characters.
Phylum	:	The group of classes with similar distinctive characteristics constitute a Phylum.
Kingdom	:	All living animals belonging to various phyla are included in the Kingdom Animalia and it is the top most of the taxonomic hierarchy.
Nomenclature	:	The process of assigning scientific names to animals or taxonomic group is called **Nomenclature.**
ICZN	:	International Code of Zoological Nomenclature.
Tautonymy	:	The practice of naming the animals in which the generic name and speices name are the same is called **Tautonymy.** Eg: ***Naja naja*** (Indian Cobra).
Taxonomical keys	:	Keys are based on comparative analysis of the similarities and disimilarities of organisms.
DNA Barcoding	:	Short genetic marker in a organism's DNA which helps in identification.
DNA hybridization	:	Measures the degree of genetic similarity between pools of DNA sequences.
DNA finger printing	:	To identify an individual from a sample of DNA by looking at unique patterns in their DNA.
RFLP	:	Restriction Fragment Length Polymorphisms.
RFLP analysis	:	Difference in homologous DNA sequences that can be detected by the presence of fragments of different lengths after digestion of the DNA samples.
Polymerase chain Reaction (PCR) Sequencing	:	To amplify a specific gene, or portion of gene.
ALIS	:	Automated Leafhopper Indentification System.
DAISY	:	Digital Automated Identification System.

ABIS	:	Automatic Bee Identification System.
SPIDA	:	Species Identified Automatically. Eg: Spiders, Wasp and Bee wing Characters.
Draw wing	:	Honey bee wing identification.
INOTAXA	:	INtegrated Open TAXonomic Access.

EVALUATION

1. A living organism is differentiated from non-living structure based on
(a) Reproduction (b) Growth
(c) Metabolism (d) All the above
[Ans. (d) All the above]

2. A group of organisms having similar traits of a rank is
(a) Species (b) Taxon
(c) Genus (d) Family
[Ans. (a) Species]

3. Every unit of classification regardless of its rank is *[June-2019]*
(a) Taxon (b) Variety
(c) Species (d) Strain
[Ans. (a) Taxon]

4. Which of the following is not present in same rank? *[Mar-2019]*
(a) Primata (b) Orthoptera
(c) Diptera (d) Insecta
[Ans. (d) Insecta]

5. What taxonomic aid gives comprehensive information about a taxon? *[Mar-2020]*
(a) Taxonomic Key (b) Herbarium
(c) Flora (d) Monograph
[Ans. (d) Monograph]

6. Who coined the term biodiversity? *[May-'22]*
(a) Walter Rosen (b) AG Tansley
(c) Aristotle (d) AP de Candole
[Ans. (a) Walter Rosen]

7. Cladogram considers the following characters
(a) Physiological and Biochemical
(b) Evolutionary and Phylogenetic
(c) Taxonimic and systematic
(d) None of the above
[Ans. (b) Evolutionary and Phylogenetic]

8. Molecular taxonomic tool consists of
(a) DNA and RNA *[Govt.MQP-2018]*
(b) Mitochondria and Endoplasmic reticulum
(c) Cell wall and Membrane proteins
(d) All the above **[Ans. (a) DNA and RNA]**

9. Differentiate between probiotics and pathogenic bacteria. *[QY-2018; CRT-'22]*

Ans.

S.No.	Probiotic bacteria	Pathogenic bacteria
1.	Beneficial bacteria.	Disease Causing bacteria.
2.	Converts Milk into Curd	Causes Disease in plants & animals
3	**Eg:** Lactobacillus	**Eg:** Vibrio cholerae (cholera)

10. Why mule is sterile in nature?

Ans. Mules are produced by mating of male donkey and female horse. Mules are sterile animals because they cannot produce gametes due to problems in pairing up of chromosomes. They have odd number of chromosomes.

11. List any five salient features of the family *Felidae*.

Ans. **Salient features of the family *Felidae* :**

1. They are commonly called as wild cat family. They have adaptations to detect and hunt prey.
2. They are meat eaters (carnivores).
3. They have cutting teeth to shear meat. Canine teeth are large and sharp.
4. Their sizes vary from 2 kgs to 300 kgs.
5. They have acute senses - hearing, smell, vision and touch.
6. They have well padded toes with powerful and flexible bodies. **Eg: Lion, Tigers, Cats.**

12. What is the role of Charles Darwin in relation to concept of species? *[May-'22]*

Ans.

1. Charles Darwin visited the Galapagos Islands as a naturalist on a five year voyage around South America. He found 13 types of "Mocking birds" on the same island but in different habitats.
2. He brought back the different types and studied them. He found that only the beak pattern and usage was different in these different varieties.
3. This made him think that adaptation to suit a particular habitat (for food) had brought about such changes in these birds which lived in different habitats.
4. After some time they evolved into different species. The formation of new species or 'speciation' is brought about by Natural selection (Nature being the deciding factor).
5. Hence Darwin gets this credit of attempting to explain how species evolved and role of Natural selection. The birds are referred to as Darwin's finches. In 1859 Charles Darwin in his book **Origin of Species** explains the evolutionary connection of species by the process of natural selection.

13. Why elephants and other wild animals are entering into human living area?

Ans.

1. Man is destroying forests. Deforestation is increasing due to rapid urbanisation and increase in human population.
2. When habitats are destroyed, the animals living in that region could not find food and shelter.
3. They tend to wander outside of forest in search of food or shelter and enter into human living area.
4. Decrease in availability of clean water due to pollution.
5. The reality is that we have entered into the habitats of animals.

14. What is the difference between a Zoo and wild life sanctuary?

Ans.

Zoo:

1. A Zoo is a place where animals are held in capitivity and Public is allowed to visit and see the animals. It is a artificially created habitat.
2. A Zoo can sell, buy, breed or trade animals.

Wild life sanctuary:

1. A wild life sanctuary is a large area with natural surrounding where the animals are allowed to roam freely.
2. A boundary wall/barrier is in place to ensure that humans cannot enter the area. The animal gets the feel of a natural surrounding.
3. In many cases sanctuaries focus on maintaining and increasing the population of a particular species. Eg: **Kaziranga sanctuary in Assam focuses on Rhinoceros population.**

15. Can we use recent molecular tools to identify and classify organisms? [OR]
Name the molecular taxonomical tool and their application. *[QY-2018]*

Ans. Yes, we can.

Molecular taxonomical tools :

Technological advancement has helped to evolve molecular taxonomical tools from classical tools to molecular tools. The accuracy and authenticity is more significant in the molecular tools.

I. The following methods are being used for taxonomical classification.

a) **DNA barcoding -** Uses short genetic marker in an organism's DNA to identify it as belonging to a particular species.

b) **DNA hybridization -** measures the degree of genetic similarity between pools of DNA sequences.

c) **DNA fingerprinting** - to identify an individual from a sample of DNA by looking at unique patterns in their DNA.

d) **Restriction Fragment Length Polymorphisms (RFLP) analysis** - difference in homologous DNA sequences that can be detected by the presence of fragments of different lengths after digestion of the DNA samples.

e) **Polymerase Chain Reaction (PCR) -** sequencing to amplify a specific gene, or portion of gene.

16. Explain the role of Latin and Greek names in Biology.

Ans.

1. Knowledge of prefixes and suffixes in biology makes it easy to understand unfamiliar words. Biology involve lot of descriptive words and it is easy to adopt names from Greek and Latin.

Many words used in Biology are derived from Greek or Latin.

Eg: 'autos' is greek word which means self.

autophagy, autotroph > Biological terms having 'auto' as prefix

Autophagy means self destruction.

Autotroph means manufacture of own food.

'bis' is a latin word which means twice.

Binary fission, Bicuspid valve are Biological terms based on this.

Meaning:

Binary fission - Divide in two

Bicuspid - Two flaps.

2. Usage of Greek and Latin words also finds universal application.

HOTS (TEXTUAL)

1. What may be the reasons for the extinction of Dinosaurs? If you know the reasons for their extinction, why Sparrows are listed as endangered species?

Ans. A big meteorite crashed into Earth, changing the climatic conditions so dramatically that dinosaurs could not survive. Ash and gas spewing from volcanoes suffocated many of the dinosaurs. Diseases wiped out entire populations of dinosaurs. Food chain imbalances lead to the starvation of the dinosaurs. This may be behind the dinosaurs' demise. Common sparrows are going extinct because of mindless urbanisation. They are losing not just their natural habitats but also the essential human touch they need and thrive upon. The indifference caused by a lack of emotional connect has pushed these birds to the edge of extinction.

GOVERNMENT EXAM QUESTIONS

Bio-Zoology (Short version)

CHOOSE THE CORRECT ANSWERS 1 MARK

1. The seven kingdom system of classification was proposed by _____. *[First Mid-2018]*

(a) Coral Woese (b) R.H. Whittakar
(c) John ray (d) Cavalier Smith

[Ans. (d) Cavalier Smith]

2. The mind map Cladogram was introduced by *[QY-2018]*

(a) Aristotle (b) R.H. Whittaker
(c) Ernst Haeckal (d) Carlous Linnaeus

[Ans. (c) Ernst Haeckal]

3. The beneficial bacterias are known as *[HY-2018]*

(a) pathogens (b) probiotic
(c) cyanobacteria (d) plasmid

[Ans. (b) probiotic]

4. The cross between male lion and female tiger results in the production of *[QY-2019]*

(a) Hinny (b) Mule
(c) Tigon (d) Liger **[Ans.(d) Liger]**

5. Three domain classification was proposed by : *[Mar-2019]*

(a) Cavalier Smith (b) R.H. Whittaker
(c) Carolus Linnaeus (d) Carl Woese

[Ans. (d) Carl Woese]

6. The zoological name of National Bird is: *[June-2019]*

(a) *Pavo Cristatus* (b) *Zoothera Salimalii*
(c) *Columba livia* (d) *Chalcophaps indica*

[Ans. (a) *Pavo Cristatus*]

7. Match the following: *[Mar-2020]*

(1)	Parathyroid hormone	(i)	Addison's disease
(2)	Glucocorticoid hormone	(ii)	Endemic goitre
(3)	Thyroxine hormone	(iii)	Tetany
(4)	Growth hormone	(iv)	Acromegaly

(a) (1) - (iii), (2) - (i), (3) - (ii), (4) - (iv)
(b) (1) - (iii), (2) - (iv), (3) - (ii), (4) - (i)
(c) (1) - (iv), (2) - (i), (3) - (ii), (4) - (iii)
(d) (1) - (i), (2) - (iii), (3) - (iv), (4) - (ii)

[Ans. (a) (1) - (iii), (2) - (i), (3) - (ii), (4) - (iv)]

8. According to Aristotle, animal without red blood is called as : *[Sep-2020]*

(a) Enaima (b) Anaima
(c) Erythima (d) Polycythemia

[Ans. (b) *Anaima*]

9. Assertion (A) : Extremophiles are eukaryotes, capable of growing in extreme conditions like hot springs.
Reason (R) : They are able to get oxygen from hot water. *[CRT-'22]*

(a) Both (A) and (R) true, (R) explains (A).
(b) Both (A) and (R) true, but (R) does not explain (A).
(c) (A) is true but (R) are false.
(d) Both (A) and (R) are false.

[Ans. (d) Both (A) and (R) are false**]**

UNIT - III

Chapter 5

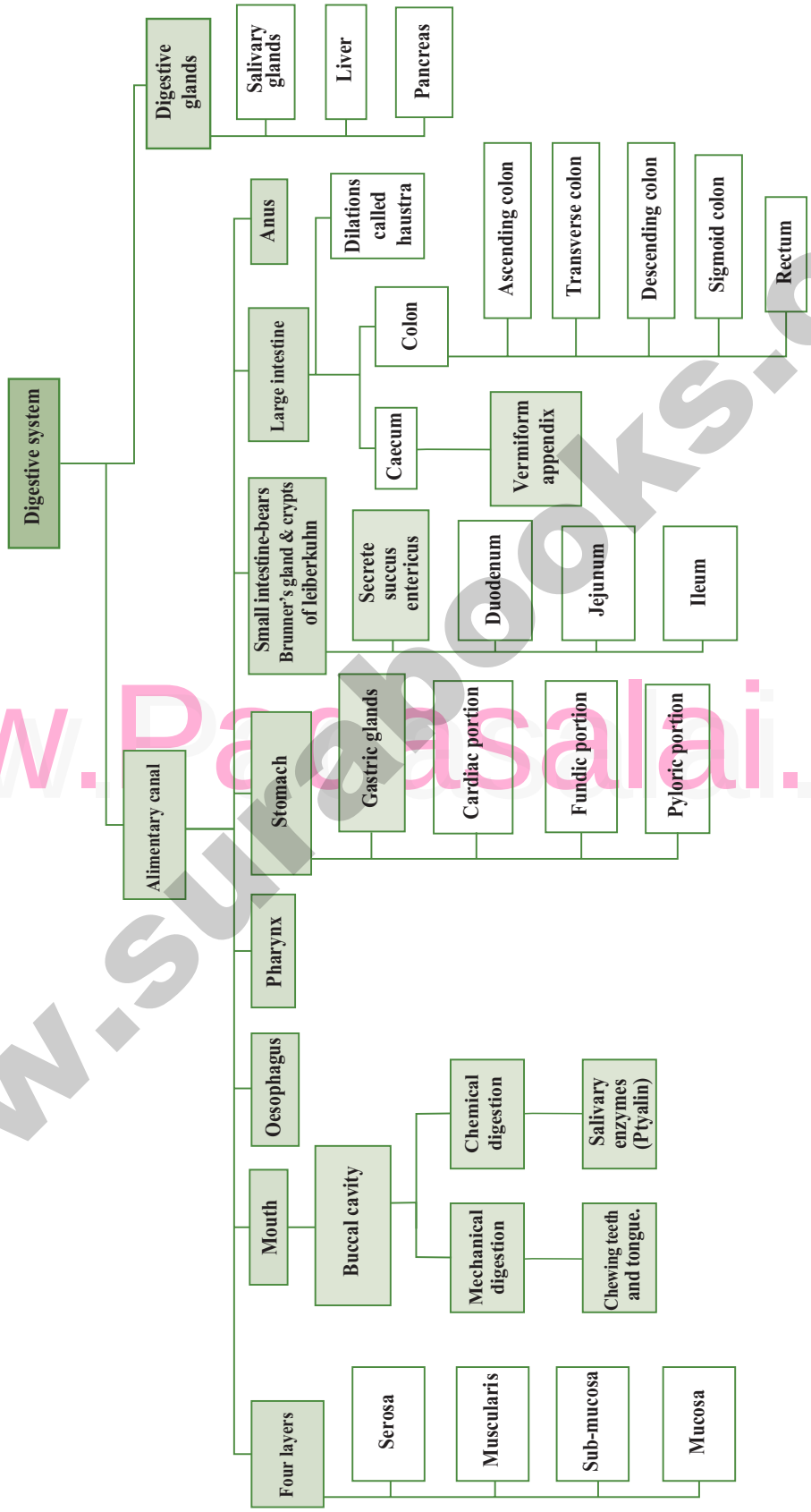
DIGESTION AND ABSORPTION

CHAPTER SNAPSHOT

5.1 Digestive System
- 5.1.1 Structure of the alimentary canal
- 5.1.2 Histology of the Gut
- 5.1.3 Digestive glands

5.2 Digestion of food and role of digestive enzymes
5.3 Absorption and assimilation of proteins, carbohydrates and fats.
5.4 Egestion
5.5 Nutrients, Vitamins and Minerals
5.6 Caloric value of carbohydrates, proteins and fats.
5.7 Nutritional and digestive disorders

CONCEPT MAP



MUST KNOW DEFINITIONS

Physiology	:	Study of functioning of organs and organ systems.
Gastric rugae	:	The inner wall of stomach has many folds called **Gastric rugae**.
Digestive glands	:	Digestive glands are exocrine glands which secrete biological catalysts called **enzymes**.
Gastric glands	:	The wall of the stomach is lined by gastric glands.
Balanced diet	:	A diet which can provide all the metabolic requirements of the body in a right proportion is called **balanced diet**.
PEM	:	Protein Energy Malnutrition
Appendicitis	:	It is the inflammation of the vermiform appendix.
Peptic ulcer	:	It refers to an eroded area of the tissue lining (mucosa) in the stomach or duodenum.
GERD	:	Gastero Oesophagus Reflex Disorder
Peyer's patches	:	Lymphoid tissue present in ileum.
Piles/Haemorrhoids	:	Enlargement of anal column.
Thecodont dentition	:	Each tooth is embedded in a socket.
Diphyodont	:	Two sets of teeth seen in human beings and mammals during their life time.
Heterodont dentition	:	The permanent teeth are of four different types.
Epiglottis	:	Cartilaginous flap which prevent entry of food into glottis.
Oxyntic cells	:	Cells in stomach wall which produce HCl.
Deglutition	:	The act of swallowing.
Chyme	:	Food mixed with gastric juices forming a creamy liquid called chyme.
Succus entericus	:	Intestinal juice which contains enzymes for digestion.
Absorption	:	Process by which end product of digestion passes into blood and lymph.
Egestion	:	Removal of digestive waste from the body.

EVALUATION

1. Choose the incorrect sentence from the following:

(a) Bile juice emulsifies the fat.

(b) Chyme is a digestive acidic food in stomach.

(c) Pancreatic juice converts lipid into fatty acid and glycerol.

(d) Enterokinase stimulates the secretion of pancreatic juice. **[Ans. (d) Enterokinase stimulates the secretion of pancreatic juice]**

2. What is chyme.....?

(a) The process of conversion of fat into small droplets.

(b) The process of conversion of micelles substances of glycerol into fatty droplet.

(c) The process of preparation of incompletely digested acidic food through gastric juice.

(d) The process of preparation of completely digested liquid food in midgut.

[Ans. (c) The process of preparation of incompletely digested acidic food through gastric juice]

3. Which of the following hormones stimulate the production of pancreatic juice and bicarbonate?

(a) Angiotensin and epinephrine

(b) Gastrin and insulin

(c) Cholecystokinin and secretin

(d) Insulin and glucagon

[Ans. (c) Cholecystokinin and secretin]

4. **The sphincter of Oddi guards** *[Aug-'22]*
(a) Hepatopancreatic duct
(b) Common bile duct
(c) Pancreatic duct
(d) Cystic duct
[Ans. (a) Hepatopancreatic duct]

5. **In small intestine, active absorption occurs in case of**
(a) Glucose (b) Amino acids
(c) Na^+ (d) All the above
[Ans. (d) All the above]

6. **Which one is incorrectly matched?** *[Sep-2021; CRT-'22]*
(a) Pepsin – stomach (b) Renin – liver
(c) Trypsin – intestine (d) Ptyalin – mouth
[Ans. (b) Renin – liver]

7. **Absorption of glycerol, fatty acids and monoglycerides takes place by**
(a) Lymph vessels within villi
(b) Walls of stomach
(c) Colon
(d) Capillaries within villi
[Ans. (a) Lymph vessels within villi]

8. **First step in digestion of fat is** *[May-'22]*
(a) Emulsification
(b) Enzyme action
(c) Absorption by lacteals
(d) Storage in adipose tissue
[Ans. (a) Emulsification]

9. **Enterokinase takes part in the conversion of**
(a) Pepsinogen into pepsin
(b) Trypsinogen into trypsin
(c) Protein into polypeptide
(d) Caseinogen into casein
[Ans. (b) Trypsinogen into trypsin]

10. **Which of the following combinations are not matched?**

	Column I		Column II
(a)	Bilirubin and biliverdin	i)	Intestinal juice
(b)	Hydrolysis of starch	ii)	Amylases
(c)	Digestion of fat	iii)	Lipases
(d)	Salivary gland	iv)	Parotid

[Ans. (a) Bilirubin and biliverdin-Intestinal juice]

11. **Match column I with column II and choose the correct option**

	Column I		Column II
(P)	Small intestine	i)	Largest factory
(Q)	Pancreas	ii)	Absorption of water
(R)	Liver	iii)	Carrying electrolytic solution
(S)	Colon	iv)	Digestion and absorption

(a) (P-iv) (Q -iii) (R- i) (S - ii)
(b) (P-iii) (Q -ii) (R- i) (S - iv)
(c) (P-iv) (Q -iii) (R- ii) (S - i)
(d) (P-ii) (Q -iv) (R- iii) (S - i)
[Ans. (a) (P-iv) (Q -iii) (R- i) (S - ii)]

12. **Match column I with column II and choose the correct option**

	Column I		Column II
(P)	Small intestine	i)	23 cm
(Q)	Large intestine	ii)	4 meter
(R)	Oesophagus	iii)	12.5 cm
(S)	Pharynx	iv)	1.5 meter

(a) (P-iv) (Q -ii) (R- i) (S - iii)
(b) (P-ii) (Q -iv) (R- i) (S - iii)
(c) (P-i) (Q -iii) (R- ii) (S - iv)
(d) (P-iii) (Q -i) (R- ii) (S - iv)
[Ans. (a) (P-iv) (Q -ii) (R- i) (S - iii)]

13. **Match column I with column II and choose the correct option** *[June-2019; CRT & May-'22]*

	Column I		Column II
(P)	Lipase	i)	Starch
(Q)	Pepsin	ii)	Cassein
(R)	Renin	iii)	Protein
(S)	Ptyalin	iv)	Lipid

(a) (P-iv) (Q -ii) (R- i) (S - iii)
(b) (P-iii) (Q -iv) (R- ii) (S - i)
(c) (P-iv) (Q -iii) (R- ii) (S - i)
(d) (P-iii) (Q -ii) (R- iv) (S - i)
[Ans. (c) (P-iv) (Q -iii) (R- ii) (S - i)]

14. **Which of the following is not the function of liver?** *[Sep-2021]*
(a) Production of insulin (b) Detoxification
(c) Storage of glycogen (d) Production of bile
[Ans. (a) Production of insulin]

15. Assertion (A): Large intestine also shows the presence of villi like small intestine.
Reason (B) : Absorption of water takes place in large intestine. *[Sep-2020 & Aug-'22]*
(a) Both A and B are true and B is the correct explanation of A
(b) Both A and B are true but B is not the correct explanation of A
(c) A is true but B is false
(d) A is false but B is true
[Ans. (d) A is false but B is true]

16. Which of the following is not true regarding intestinal villi?
(a) They possess microvilli.
(b) They increase the surface area.
(c) They are supplied with capillaries and the lacteal vessels.
(d) They only participate in digestion of fats.
[Ans. (d) They only participate in digestion of fats]

17. Why are villi present in the intestine and not in the stomach? *[Sep-2020; May-'22]*
Ans.
1. The villi are the units of absorption consisting of the lacteal duct in the middle surrounded by a fine network of blood capillaries.
2. Digestion is completed in the small intestine and maximum absorption takes place in the small intestine only.
3. Hence, the villi are found only in small intestine. A very small amount of substance is absorbed from the stomach.

18. Bile juice contains no digestive enzymes, yet it is important for digestion. Why? *[Sep-2020 &21; CRT-'22]*
Ans.
1. Bile is produced by the **Liver.** The Bile duct from the liver joins the pancreatic duct and pours its secretions into the duodenum.
2. The bile contains bile pigments **(bilirubin** and **biliverdin)** as the break down products of haemoglobin of dead RBCs, bile salts, cholesterol and phospholipids but has no enzymes.
3. Bile helps in emulsification of fats. Bile salts reduce the surface tension of fat droplets and break them into small globules. Bile also activates lipases to digest lipids.
4. Thus the bile is very important for digestion through it does not contain any enzyme.

19. List the chemical changes that starch molecule undergoes from the time it reaches the small intestine. *[Aug-'22]*
Ans.
1. When the food reaches the first part of the small intestine i.e. the duodenum, pancreatic juices and bile juice act on it.
2. Enzymes for starch digestion are present in the pancreatic juice. Pancreatic amylase converts glycogen and starch into maltose.
3. The enzymes in the intestinal juice (succus entericus) act further on the products of pancreatic digestion. *Maltase, Lactase, Sucrase* act on the sugars.
Maltose $\xrightarrow{Maltase}$ Glucose + Glucose
Sucrose $\xrightarrow{Sucrase}$ Glucose + Fructose
Lactose $\xrightarrow{Lactase}$ Glucose + Galactose
4. As a result of digestion, all macromolecules of food are converted into their corresponding monomeric units.
Carbohydrates $\longrightarrow$ Monosaccharides
(Glucose, Fructose, Galactose)
The simple substances thus formed are absorbed in the jejunum and ileum region of the small intestine.

20. How do proteins differ from fats in their energy value and their role in the body?
Ans.

S. No.	Proteins Energy value	Fats Energy value
1.	The caloric value and physiological fuel value of 1 gram of protein is 5.65 Kcal and 4 Kcal respectively.	Fat has a caloric value of 9.45 Kcal and a physiological fuel value of 9 Kcal per gradm.
	Role in the body	**Role in the body**
1.	Proteins are required for growth and repair of body cells.	Fats are their derivatives are the best reserve food stored in our body which is used for production of energy.
2.	They are stored in the body only to a certain extent. The body requires 65 - 75 gm of proteins per day.	The body requires 60 - 70 gm of fats per day.

21. Digestive secretions are secreted only when needed. Discuss.
Ans. The activities of the gastro-intestinal tract are carried out by the neural and hormonal control for proper coordination of different parts. Gastric and intestinal secretions are stimulated by neural signals. Hormonal control of the secretion of digestive juices is carried out by local hormones produced by the gastric and intestinal mucosa. Only presence of food in the alimentary canal triggers the corresponding neural and hormonal controls.

Zoology Long Version Questions
(for pure science Group)

Long Version Evaluation

Q.No. 1 to 9 Refer Evaluation.

10. Which of the following combinations are not matched?

(a) Vitamin D - Rickets
(b) Thiamine - Beriberi
(c) Vitamin K - Sterility
(d) Niacin - Pellagra

[Ans. (c) Vitamin K - Sterility]

11. Refer Evaluation Q.No.10
12. Refer Evaluation Q.No.11
13. Refer Evaluation Q.No.12
14. Refer Evaluation Q.No.13
15. Refer Evaluation Q.No.14
16. Refer Evaluation Q.No.15
17. Refer Evaluation Q.No.16
18. Refer Evaluation Q.No.17
19. Refer Evaluation Q.No.18
20. Refer Evaluation Q.No.19
21. Refer Evaluation Q.No.20
22. Refer Evaluation Q.No.21

Hots (Textual)

1. Though the bile juice of liver has no digestive enzyme but is very essential for proper digestion of food, especially of the fats. Discuss the following?
a) What is composition of bile?
b) How it helps in digestion of fats and other nutrients of food?
c) How it helps in absorption of fats?

Ans. The bile contains bile pigments (bilirubin and biliverdin) as the break down products of hemoglobin of dead RBCs, bile salts, cholesterol and phospholipids but has no enzymes. Bile helps in emulsification of fats. Bile salts reduce the surface tension of fat droplets and break them into small globules. Bile also activates lipases to digest lipids.

2. List the chemical preservatives, artificial enhancers found in the food items available in the market. How can you avoid such harmful substances in your food?

Ans. Artificial dyes, sweeteners and preservatives are added in the food in order to increase the flavor, texture and taste of food.

These substances are found in candies, fruit cake, chocolates, packed food and beverages.

Some of the them are harmful and are found and can be avoided by making these food materials at home and do not buy it from the market.

In this case we can avoid these preservatives because for a longer term the chemical substances are good for the health of the person.

3. What would happen if HCl is not secreted in the stomach?

Ans. The gastric juice contains HCl and pro enzymes. The pro enzyme pepsinogen, on exposure to HCl gets converted into the active enzyme pepsin which converts proteins into proteoses and peptones (peptides). The HCl provides an acidic medium (pH – 1.8) which is optimum for pepsin, kills bacteria and other harmful organisms and avoids putrifaction. So, if HCl is not secreted in stomatch, digestion of protein and destruction of harmful micro organisms will be affected.

GOVERNMENT EXAM QUESTIONS

Bio-Zoology (Short version)

Choose the Correct Answers 1 MARK

1. Goblet cells secrete *[QY-2018]*

(a) Simple protein (b) Structural protein
(c) Derived protein (d) Conjugated protein

[Ans. (c) Derived protein]

2. Match the following: *[HY-2018]*

A	B
1. Jaundice	(i) Cholesterol
2. Liver cirrhosis	(ii) Asprin
3. Gall stone	(iii) Alcoholism
4. Peptic ulcer	(iv) Viruses

	1	2	3	4
(a)	iii	iv	i	ii
(b)	iv	ii	iii	i
(c)	iv	iii	i	ii
(d)	i	ii	ii	iv

[Ans. (c) 1-iv, 2-iii, 3-i, 4-ii]

3. Which one of the following is incorrectly matched? *[Govt.MQP-2018]*

(a) Succus entericus - Intestine
(b) Renin - Kidney
(c) Rennin - Stomach
(d) Ptyalin - Mouth

[Ans. (c) Rennin – Stomach]

4. Assertion (A) : Maximum absorption takes place in the small inte. *[QY-2019]*

Reason (R) : Absorption of simple sugars, alcohol and medicine etc take place in small intestine

(a) Both (A) and (R) are true, (R) is the correct explanation of (A).
(b) Both (A) and (R) are true, (R) is the incorrect explanation of (A).
(c) (A) is a true statement buy (R) is false.
(d) (A) and (R) both are false.

[Ans. (c) (A) is a true statement buy (R) is false]

5. Which one of the following digested foods, is absorbed from the intestine by faciliated transport method?

(a) Fatty acids (b) Fructose *[CRT-'22]*
(c) Water (d) Vitamins

[Ans. (b) Fructose]

Very Short Answers 2 MARKS

1. What are the ducts present in the salivary glands?

Ans. 1. Stenson's duct, *[QY-2019]*
2. Wharton's duct and
3. Bartholin's duct or duct of Rivinis.

2. How does gall stones are formed? *[June-2019]*

Ans. **Gall Stones:**

1. Any alteration in the composition of the bile can cause the formation of stones in the gall bladder.
2. The stones are mostly formed of crystallized cholesterol in the bile.

3. In which part of the digestive system, absorption of following substances take place? *[Mar-2020]*

(i) Water, some minerals and certain drugs.
(ii) Simple sugar and alcohol.

Ans. **(i)** Large intestine, **(ii)** Stomach

4. What will happen when saliva pH ranges below 7? *[Sep-2020]*

Ans. **(i)** If the pH level of our saliva is less than 7, it indicates acidity.
(ii) Bicarbonates in the saliva make the pH 5.4 to 7.4.
(iii) If the bicarbonates level in saliva is reduced, the saliva becomes acidic and the tooth enamel may get dissolved.
(iv) This can lead to discomfort when consuming hot, cold, or sugary drinks.

5. Find out BMI for an adult, whose height is 173cm and his weight is 79kg. *[CRT-'22]*

$$\text{BMI} = \frac{\text{Body weight in kg}}{\text{Square of body height in meters}}$$

$$\text{BMI} = \frac{79}{173} = \frac{79}{1.73 \times 1.73} = \frac{79}{2.99} = 26.42$$

BMI = 26.42

Short Answers 3 MARKS

1. Write down the two actions of trypsin. *[QY-2018]*

Ans. 1. Trypsin activates the enzyme chymotrypsinogen in the pancreatic juice.
2. Trypsin hydrolyses proteins and polypeptides and peptones.
3. Trypsin digest protein.

2. Why, villi present in the intestine, are not present in the stomach? *[March-2019]*

Ans. 1. In the stomach there is no absorption of food. Absorption takes place only in the intestine through villi Absorption is a process by which the end product of digestion passes through the intestinal mucosa into the blood and lymph.
2. The villi in the lumen of ileum are the absorbing units, consisting of lacteal duct in the middle surrounded by fine network of blood capillaries. The process of absorption involves active, passive and facilitated transport.
3. Small amounts of glucose, amino acids and electrolytes like chloride ions are generally absorbed by simple diffusion. The passage of these substances into the blood depends upon concentration gradients.

Long Answers 5 MARKS

1. i. Write an account on protein energy malnutrition.
ii. Add a note on role of pancreatic enzymes in protein digestion. *[Govt.MQP-2018]*

Ans. **(i) Protein energy malnutrition(PEM) :**

1. Growing children require more amount of protein for their growth and development.
2. Protein deficient diet during early stage of children may lead to protein energy malnutrition such as **Marasmus** and **Kwashiorkor**.

3. Symptoms are dry skin, pot-belly, oedema in the legs and face, stunted growth, changes in hair colour, weakness and irritability.
4. Marasmus is an acute from of protein malnutrition. This condition is due to a diet with inadequate carbohydrate and protein.

(ii) Role of pancreatic enzymes in digestion :

1. Pancreatic juice contains enzymes such as trypsinogen, chymotrypsinogen, carboxypeptidases for protein digestion.
2. Trypsinogen is activated by an enzyme, enterokinase, secreted by the intestinal mucosa into active trypsin.
3. This in turn activates the enzyme chymotrypsinogen in the pancreatic juice.
4. The proteins and partially digested proteins in the chyme from the stomach are acted upon by the proteolytic enzymes of pancreatic juice in the small intestine.
5. $\text{Proteins} \xrightarrow[\text{(hydrolysis)}]{\text{Trypsin}} \text{Pelypeptides + peptones}$
6. Chymotrypsin hydrolyses peptide bonds associated with specific amino acids.

2. Explain the digestion and absorption of proteins in human intestine. *[HY-2018]*

Ans. **Digestion of proteins begin in the stomach**

1. The gastric juice contains HCl and proenzymes.
2. The proenzyme pepsinogen on exposure to HCl gets converted into the active enzyme pepsin which converts proteins into proteoses and peptones (peptides).
3. Rennin is a proteolytic enzyme found in the gastric juice of infants. It helps in digestion of milk protein caseinogen to casein in the presence of calcium ions.

Digestion in small intestine :

1. The bile, pancreatic juice and intestinal juice are the secretions released into the small intestine.
2. The pancreatic juice contains enzymes such as trypsinogen, chymotrypsinogen and carboxy peptidases for digestion of proteins. Bile plays no role in protein digestion.

$$\text{Trypsinogen (Inactive)} \xrightarrow[\text{(Intestinal mucosa)}]{\textit{Enterokinase}} \text{Trypsin (Active)}$$

$$\text{Chymotrypsinogen (Inactive)} \xrightarrow{\text{Trypsin}} \text{Chymotrypsin (Active)}$$

Proteins and partially digested proteins in the chyme are acted upon by proteolytic enzymes of pancreatic juice.

Trypsin hydrolyses proteins into polypeptides and peptones.

Chymotrypsin hydrolyses peptide bonds associated with specific aminoacids.

The enzymes in the intestinal juice (succus entericus) such as *dipeptidases* act on the end products of pancreatic digestion of proteins.

$$\text{Dipeptides, Tripeptides} \xrightarrow{\textit{Peptidase}} \text{Aminoacids}$$

As a result of digestion, proteins are converted into their respective monomeric units.

$$\text{Proteins} \longrightarrow \text{Amino acids}$$

The simple substances thus formed are absorbed in the jejunum and ileum region of the small intestine.

Absorption :

1. The villi in the lumen of ileum are the absorbing units which are supplied with blood capillaries.
2. Small amounts, of amino acids are generally absorbed by simple diffusion.
3. Nutrients like amino acids are absorbed into the blood against the concentration gradient by active transport.
4. Absorbed substances are transported through blood and lyumph to the liver through the hepatic portal system.
5. From the liver, nutrients are transported to all other regions of the body for utilization.
6. All the body tissues utilize the absorbed substance for their activities and incorporate into their protoplasm. This process is called **assimilation**.

3. Explain the digestion in the small intestine. *[QY-2019]*

Ans.

1. The bile, pancreatic juice and intestinal juice are the secretions released into the small intestine.
2. The pancreatic juice contains enzymes such as typsinogen, chymotrypsinogen, carboxypeptidases, pancreatic amalyses, pancreatic lipases and nucleases.
3. Trypsinogen is activated by an enzyme, enterokinase, secreted by the intestinal mucosa into active typsin, which in turn activates the enzyme cymotrypsinogen in the pancretic juice.
4. Bile helps in emulsification of fats.
5. Bile salts reduce the surface tension of fat droplets and break them into small globules.

UNIT - III

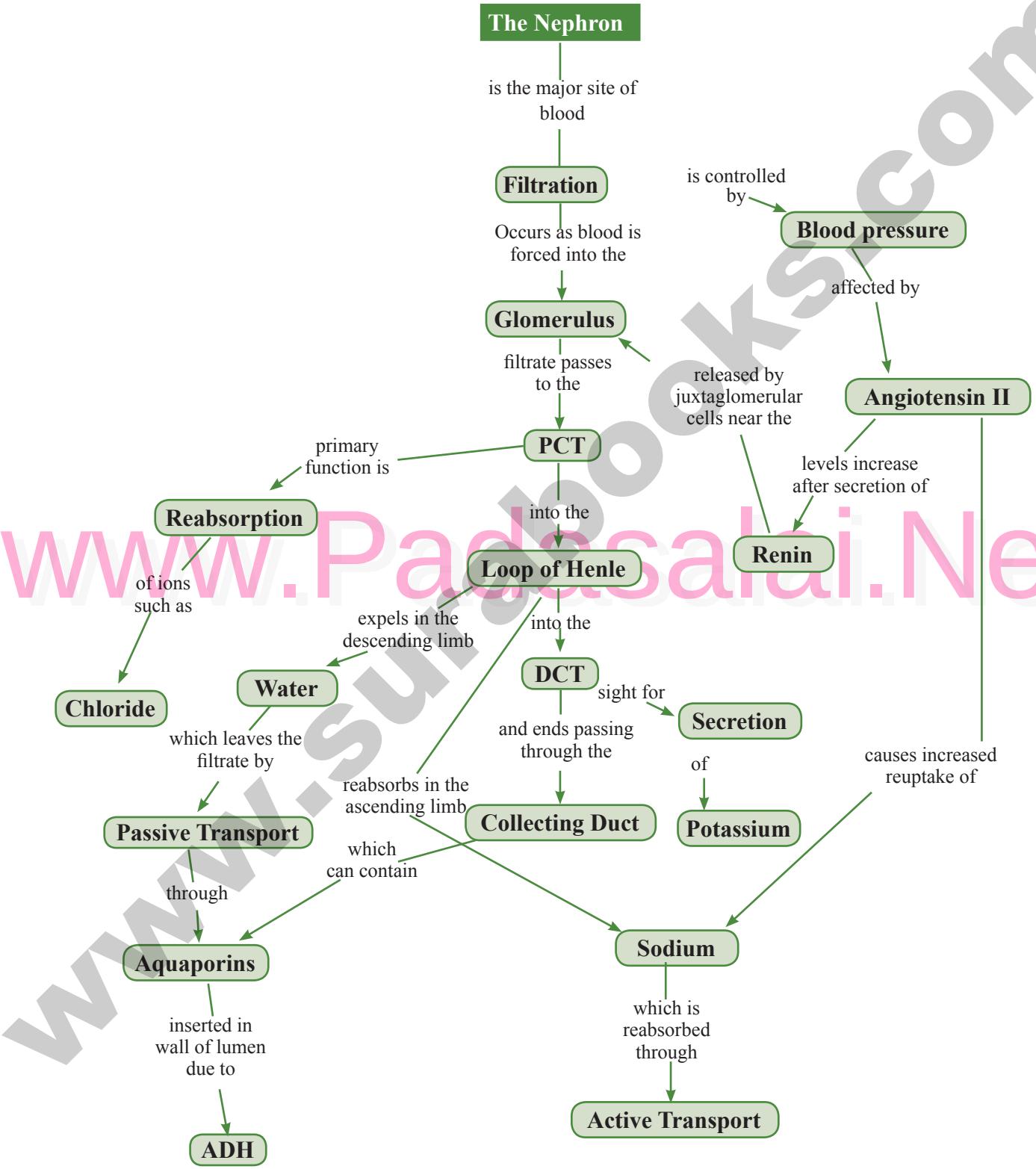
Chapter 8

EXCRETION

CHAPTER SNAPSHOT

8.1 Modes of Excretion
8.2 Human excretory system
8.2.1 Structure of kidney
8.2.2 Structure of a nephron
8.3 Mechanism of urine formation in human
8.4 Regulation of kidney function
8.5 Micturition
8.6 Role of other organs in excretion
8.7 Disorders related to the excretory system
8.8 Haemodialysis
✶ Kidney Transplantation

CONCEPT MAP



MUST KNOW DEFINITIONS

Excretion	:	The process by which the body gets rid of the nitrogenous waste products of protein metabolism is called excretion.
Ammonoteles	:	Organisms which excrete waste in the form of Ammonia.
Uricotelic	:	Organisms which excrete waste in the form of uric acid..
Ureoteles	:	Organisms which excrete waste in the form of urea.
Protonephridia & Metanephrida	:	Primitive kidneys.
Malpighian Tubules	:	Excretory organs in insects.
Nephron	:	structural and functional unit of kidneys.
Renal pyramids	:	conical tissue masses found in medulla of kidney.
Ornithine cycle	:	process by which nitrogenous waste is converted to urea in the liver.
Aquaporins	:	water permeable channels found in collecting duct of Nephron.
ADH	:	Anti diuretic hormone
afferent arteriole	:	branch of renal artery entering each Nephron.
efferent arteriole	:	The arteriole which leaves the Bowman's capsule of the Nephrons.
Micturition	:	process of release of urine from the bladder.
Renal failure	:	failure of the kidney to excrete wastes.
Renal calculi	:	stones formed in the Renal tubule of Renal pelvis..
Artificial kidney	:	Dialyzing machine which removes toxic urea from the blood in case of kidney failure.
Kidney transplantation	:	Transfer of healthy kidney from one person to another person with kidney failure.
Glomerulus	:	The ball of capillaries which lie in the Bowman's capsule of Nephron.

EVALUATION

1. Concentration of urine depends upon which part of the nephron *[Aug-'22]*
(a) Bowman's capsule
(b) length of Henle's loop
(c) P.C.T.
(d) Network of capillaries arising from glomerulus
[Ans. (b) length of Henle's loop]

2. If Henle's loop were absent from mammalian nephron, which one of the following is to be expected? *[March-2019 ; Sep-2020]*
(a) There will be no urine formation
(b) There will be hardly any change in the quality and quantity of urine formed
(c) The urine will be more concentrated
(d) The urine will be more dilute
[Ans. (d) The urine will be more dilute]

3. What will happen if the stretch receptors of the urinary bladder wall are totally removed?
(a) Micturition will continue
(b) Urine will be continue to collect normally in the bladder
(c) There will be micturition
(d) Urine will not collect in the bladder
[Ans. (c) There will be micturition]

4. The end product of Ornithine cycle is *[Sep-2020; May-'22]*
(a) carbon dioxide (b) uric acid
(c) urea (d) ammonia
[Ans. (c) urea]

5. Identify the wrong match *[HY-2019]*
(a) Bowman's capsule - Glomerular filteration
(b) DCT - Absorption of glucose
(c) Henle's loop - Concentration of urine
(d) PCT - Absorption of Na^+ and K^+ ions
[Ans. (b)DCT - Absorption of glucose]

6. Podocytes are the cells present on the *[Aug-'22]*
(a) Outer wall of Bowman's capsule
(b) Inner wall of Bowman's capsule
(c) Neck of nephron
(d) Wall glomerular capillaries
[Ans. (b) Inner wall of Bowman's capsule]

7. Glomerular filtrate contains
(a) Blood without blood cells and proteins
(b) Plasma without sugar
(c) Blood with proteins but without cells
(d) Blood without urea **[Ans. (a) Blood without blood cells and proteins]**

8. Kidney stones are produced due to deposition of uric acid and
(a) silicates (b) minerals
(c) calcium carbonate (d) calcium oxalate
[Ans. (d) calcium oxalate]

9. Animal requiring minimum amount of water to produce urine are *[Mar-2020]*
(a) ureotelic (b) ammonotelic
(c) uricotelic (d) chemotelic
[Ans. (c) uricotelic]

10. Aldosterone acts at the distal convoluted tubule and collecting duct resulting in the absorption of water through
(a) Aquaphorins (b) spectrins
(c) GLUT (d) Chloride channels
[Ans. (a) Aquaporins]

11. The hormone which helps in the reabsorption of water in kidney tubules is *[Aug-'22]*
(a) cholecystokinin (b) angiotensin II
(c) antidiuretic hormone
(d) pancreozymin **[Ans. (c) antidiuretic hormone]**

12. Malpighian tubules remove excretory products from
(a) mouth (b) oesophagus
(c) haemolymph (d) alimentary canal.
[Ans. (d) alimentary canal.]

13. Arrange the following structures in the order that a drop of water entering the nephron would encounter them.
(a) Afferent arteriole
(b) Bowman's capsule
(c) Collecting duct
(d) Distal tubule
(e) Glomerulus
(f) Loop of Henle
(g) Proximal tubule
(h) Renal pelvis

Ans. **(a)** Afferent arteriole
(e) Glomerulus
(b) Bowman's capsule
(g) Proximal tubule
(f) Loop of Henle
(d) Distal tubule
(c) Collecting duct
(h) Renal pelvis

14. Name the three filtration barriers that solutes must come across as they move from plasma to the lumen of Bowman's capsule. What components of the blood are usually excluded by these layers?

Ans. (a) Glomerular capillary endothelium - Prevents blood cells and negatively charged plasma proteins.

(b) Basal lamina - ECM of glycoproteins, plasma proteins.

(c) Epithelium of Bowman's capsule.

15. What forces promote glomerular filtration? What forces opposes them? What is meant by net filtration pressure?

Ans. 1. Glomerular pressure is the chief force that promotes Glomerular filtration.

2. The two opposing forces are the plasma proteins in the capillaries contributed by the colloidal osmotic pressure and the capsular hydrostatic pressure due to the fluids in the glomerular capsule.

Net filtration pressure

= Glomerular hydrostatic pressure – (Colloidal osmotic pressure + capsular hydrostatic pressure)

= 55 m Hg – (30mm Hg + 15mm Hg)

= 10 mm Hg

The net filtration pressure of 10mm Hg is responsible for renal filtration.

16. Identify the following structures and explain their significance in renal physiology?

(a) Juxtaglomerular apparatus

(b) Podocytes

(c) Sphincters in the bladder

Ans. (a) **Juxtaglomerular apparatus :**

1. Juxta glomerular apparatus (JGA) is a specialized tissue in the afferent arteriole of the nephron that consists of macula densa and granular cells.
2. The macula densa cells sense distal tubular flow and affect afferent arteriole diameter, whereas the granular cells secrete an enzyme called renin.
3. A fall in glomerular blood flow, glomerular blood pressure and glomerular filtration rate, can activate JG cells to release renin which converts a plasma protein, angiotensinogen (synthesized in the liver) to angiotensin I.
4. This starts off a series of events known as Renin - Angiotensin - Aldosterone system which finally increases the **glomerular blood pressure** and **glomerular filtration rate**.

(b) **Podocytes:**

1. In a nephron, the external parietal layer of the glomerulus is made up of simple squamous epithelium and the visceral layer is made of epithelial cells called **Podocytes**.
2. The podocytes end in foot processes which cling to the basement membrane of the glomerulus. The openings between the foot processes are called filtration slits. This acts as a filter to retain blood cells and large protein in plasma while permitting the passage of fluids.

(c) **Sphincters in the bladder:**

1. The external and internal sphincters are muscles guarding the opening of the urinary bladder at the urethra.
2. When the urinary bladder gets filled with urine, the urinary bladder stimulates the central nervous system via sensory neurons and brings about contraction of the bladder. Simultaneously somatic motor neurons induce the sphincters to close.
3. Smooth muscles contract resulting in the opening of the internal sphincter passively and relaxing the external sphincter. When the stimulatory and inhibitory controls exceed the threshold, the sphincter opens and urine is expelled out.
4. Thus the sphincter muscles keep the urethra closed except during expulsion of urine.

17. In which segment of the nephron most of the re-absorption of substances takes place?

Ans. About 70% of the reabsorption takes place in the proximal convoluted tubules of the nephron.

18. When a molecule or ion is reabsorbed from the lumen of the nephron, where does it go? If a solute is filtered and not reabsorbed from the tubule, where does it go?

Ans. (a) When a molecular or ion is reabsorbed from the lumen of the nephron it goes out of the lumen through the blood in the efferent arteriole.

It is reabsorbed into the efferent arteriole which leaves the Nephron, and enters the peritubular capillaries.

(b) If a solute is filtered and not reabsorbed from the tubule it will finally reach the distal convoluted tubule of the nephron and enter the collecting duct to be sent out as waste in the form of urine.

19. Which segment is the site of secretion and regulated reabsorption of ions and pH homeostasis?

Ans. The distal convoluted tubule of the nephron is the site of secretion and regulated reabsorption of ions and pH homeostasis.

20. What solute is normally present in the body to estimate GFR in humans?

Ans. **Creatinine.** Some of it is secreted but the quantity present is very low and its clearance is a measure of estimating glomerular filtration rate (efficiency of the kidney).

21. Which part of the autonomic nervous system is involved in micturition process?

Ans. When the urinary bladder gets filled with urine, the stretch receptors in the urinary bladder are stimulated.

Stretching of the urinary bladder stimulates the central nervous system via the sensory neurons of the parasympathetic nervous system and brings about contraction of the bladder.

Simultaneously somatic motor neurons induce the sphincters to close. Smooth muscles contract and opening of the internal sphincters occurs passively and external sphincter relaxes.

When the stimulatory and inhibitory controls exceed the threshold, the sphincter opens and urine is expelled out.

22. If the afferent arteriole of the nephron constricts, what happens to the GFR in that nephron? If the efferent arteriole constricts what happens to the GFR in that nephron? Assume that no auto regulation takes place.

Ans. Constriction of the afferent arteriole of the nephron causes decrease in Glomerular filtration rate (GFR). since the quantity of blood flow through the arteriole decreases.

Constriction of the efferent arteriole of the nephron causes increase in Glomerular Filtration rate.

23. Identify the biological term.

Excretion, glomerulus, urinary bladder, glomerular filtrate, ureters, urine, Bowman's capsule, urinary system, reabsorption, micturition, osmosis, proteins homeostasis.

(a) A liquid which gathers in the bladder.

(b) Produced when blood is filtered in a Bowman's capsule.

(c) Temporary storage of urine. *[Mar-2020]*

(d) A ball of inter twined capillaries.

(e) Removal of unwanted substances from the body. *[Mar-2020]*

(f) Each contains a glomerulus.

(g) Carry urine from the kidneys to the bladder.

(h) Scientific term for urination. *[Mar-2020]*

(i) Regulation of water and dissolved substances in blood and tissue fluid.

(j) Consists of the kidneys, ureters and bladder.

(k) Removal of useful substances from glomerular filtrate.

(l) What solute the blood contains that are not present in the glomerular filtrate?

Ans. **(a)** Urine

(b) No suitable option (correct Ans. : Glomerular filtrate)

(c) No proper option
(Correct answer : Urinary bladder)

(d) Glomerulus

(e) Excretion

(f) Bowman's capsule

(g) Ureters

(h) Micturition

(i) Homeostasis

(j) Urinary system

(k) Reabsorption

(l) Proteins.

24. With regards to toxicity and the need for dilution in water, how different are ureotelic and uricotelic excretions? Give examples of animals that use these types of excretion.

Ans. **Ureotelism :**

1. The process of excreting urea is called **uricotelism.**
2. Animals which are found in places where water availability is not abundant have this mode of excretion.
3. They convert Ammonia produced in the body into urea in the liver and release it to the blood. This is filtered and excreted by the kidneys, Eg: Mammals, many terrestrial amphibians and marine fishes.
4. In terms of toxicity urea is more toxic than uric acid but it is soluble in water and is thus excreted as urine.

Uricotelism :

1. The process of excreting uric acid is called **uricotelism**.
2. Uric acid can be removed from the body with a minimal loss of water and the excreta is in the form of pellet or paste (semisolid).
3. **Eg. :** Many desert animals, Reptiles, Birds, Insects.
4. In terms of toxicity, uric acid is the least toxic nitrogenous waste. It is also insoluble in water.

25. Differentiate protonephridia from metanephridia.

Ans.

	Protonephridia	Metanephridia
1.	It consists of tubular excretory structures which end in specialised cells such as flame cells inside the body and open out by means of excretory pores.	They are excretory glands with a ciliated funnel like opening into the body cavity and connected to a duct which opens outside the body.
2.	It mainly helps in osmoregulation.	It helps in excretion and osmoregulation
3.	It is found in acoelomates and coelomates. Eg: Flat worms	It is found in coelomates only Eg: Annelids, Arthropods.
4.	They are primitive in nature.	They are advanced than protonephridia.

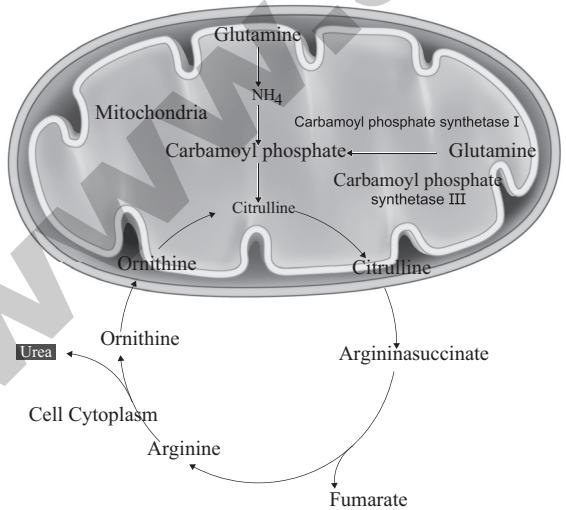
26. What is the nitrogenous waste produced by amphibian larvae and by the adult animal?

Ans. Nitrogenous waste produced by amphibian larvae is Ammonia. Since they are aquatic, ammonia diffuses into the water.

Nitrogenous waste produced by adult amphibian is urea since they are terrestrial. Further production of urea as excretory waste requires less water.

27. How is urea formed in the human body? (OR)
We are not consuming urea. But in our body urea is produced. Why? *[March-2019; Aug-'22]*

Ans. The nitrogenous waste formed as a result of breakdown of amino acids is converted to urea in the liver by the **Ornithine cycle** or **urea cycle**.



Ornithine cycle

28. Differentiate cortical from medullary nephrons. *[Mar-2020]*

Ans. **Cortical Nephrons :**

In majority of the nephrons, the loop of Henle is too short and extends very little into the medulla i.e, they lie in the renal cortex. These are called **cortical nephrons** and form about 80% of total nephrons in the kidney.

Medullary Nephrons :

In some nephrons, the loop of Henle is very long and run deep into the medulla. They are called **Medullary nephrons**.

29. What vessels carry blood to the kidneys? Is this blood arterial or venous?

Ans. Renal artery branches out from the dorsal aorta and supplies the kidney with arterial blood.

It breaks into small arterioles and an afferent arteriole enters into each nephron.

30. Which vessels drain filtered blood from the kidneys?

Ans. The efferent arteriole drains the filtered blood from the nephron. All the efferent arterioles from the nephrons join to form the renal vein. This carries venous blood and leaves the kidney to join the inferior vena cava.

31. What is tubular secretion? Name the substances secreted through the renal tubules.

Ans.

1. Tubular secretion is the passage of waste material from the blood to the filtrate in the Nephron. It is the last stage of Excretory process taking place in the Nephron.
2. Substances such as H^+, K^+, NH_4^+, creatinine and organic acids move into the filtrate from the peritubular capillaries into the tubular fluid.
3. Most of the water is absorbed in the proximal convoluted tubule and Na^+ is exchanged for water in the loop of Henle. Hypotonic fluid enters the distal convoluted tubule and substances such as urea and salts pass from peritubular blood into the cells of DCT.
4. The urine excreted contains both filtered and secreted substances. Once it enters the collecting duct, water is absorbed and concentrated hypertonic urine is formed.
5. For every H^+ secreted into the tubular filtrate, a Na^+ is absorbed by the tubular cell. The H^+ secreted combines with HCO_3^-, HPO_3^- and NH_3^- and gets fixed as $H_2CO_4^+$, $H_2PO_4^+$ and NH_4^+ respectively. Since H^+ gets fixed in the fluid, reabsorption of H^+ is prevented.

UNIT - IV

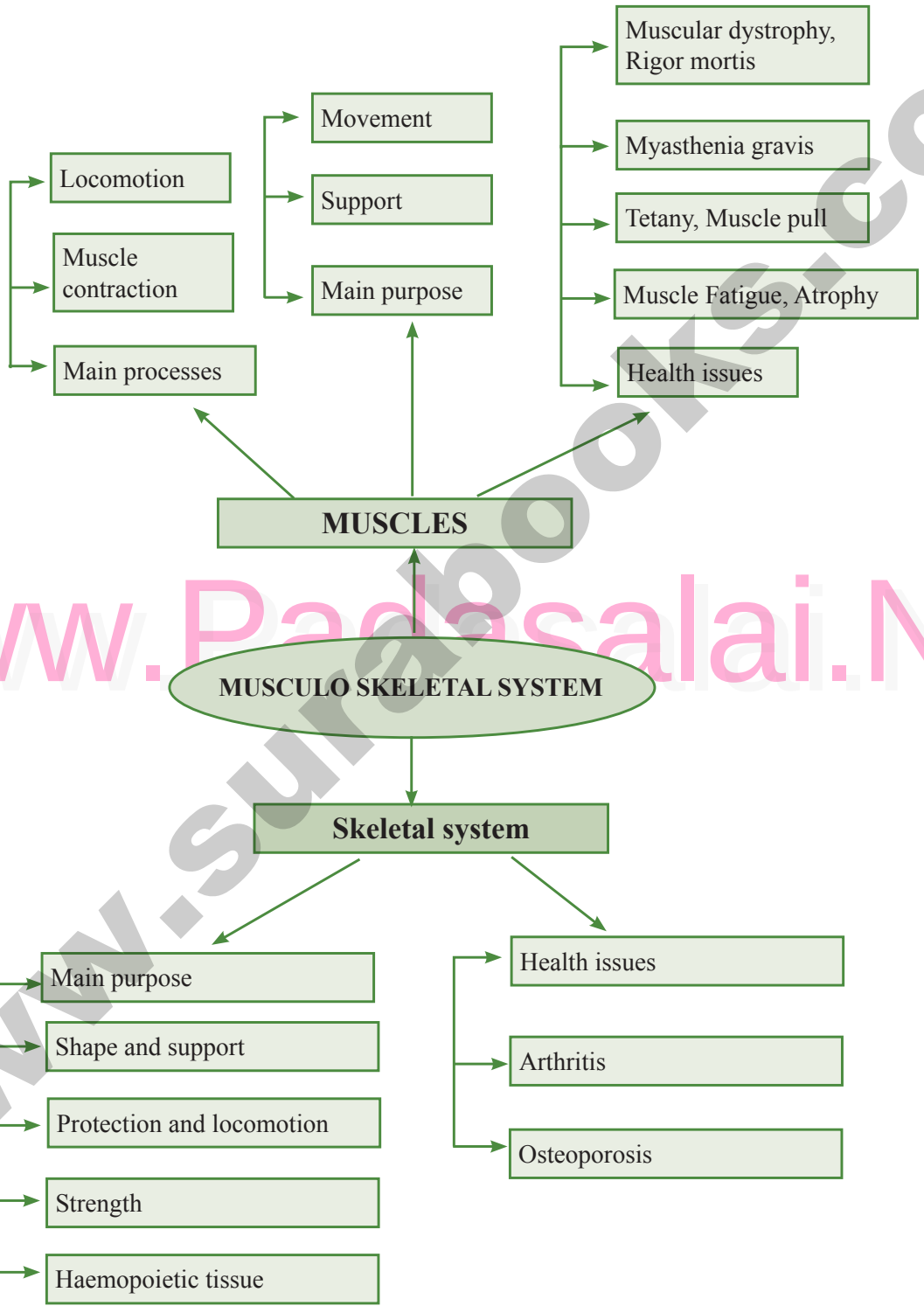
Chapter 9

LOCOMOTION AND MOVEMENT

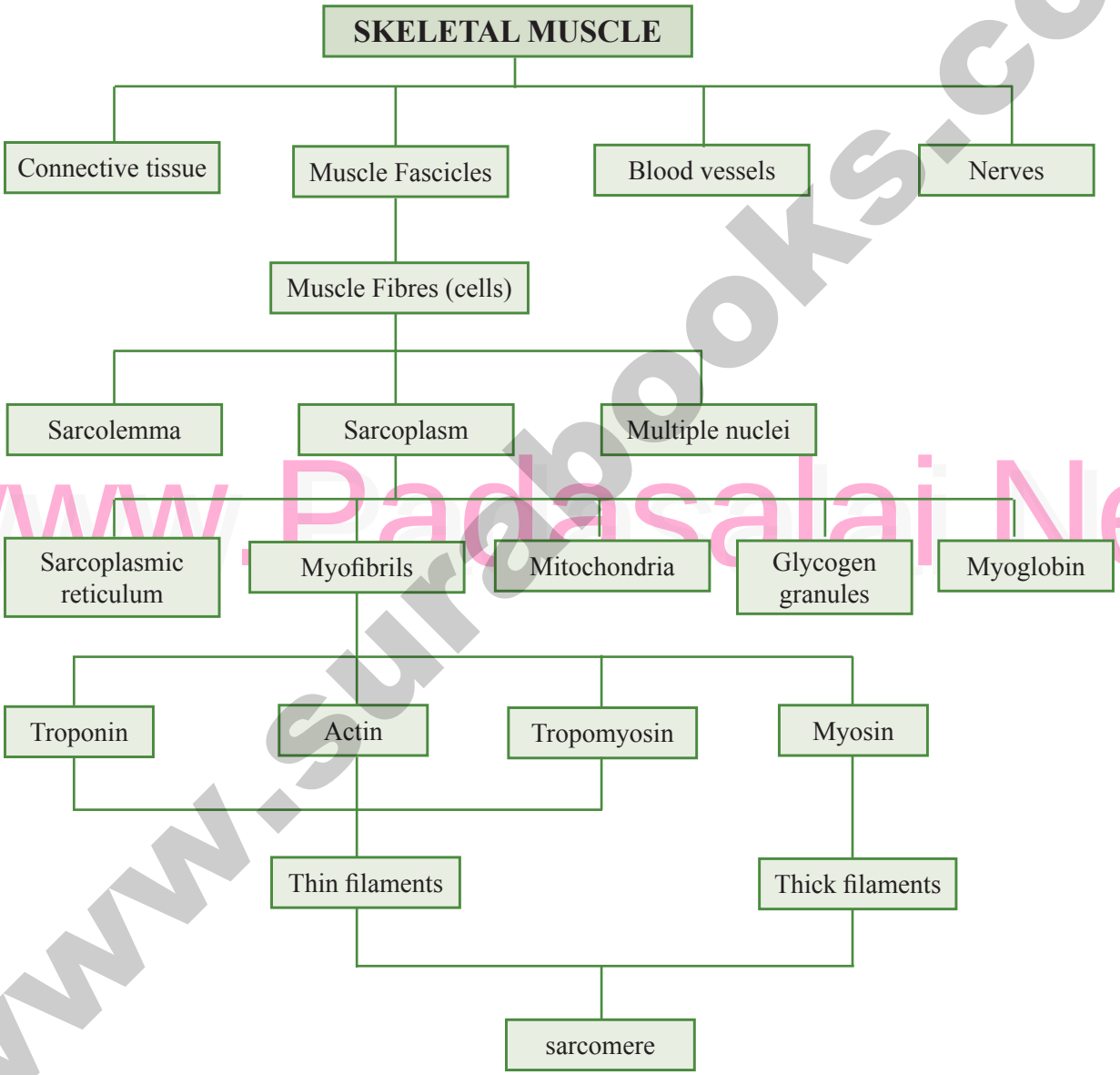
CHAPTER SNAPSHOT

9.1 Types of movement
9.2 Types of muscles
9.3 Skeletal muscle (Voluntary muscle)
9.3.1 Structure of a skeletal muscle fibre
9.4 Structure of contractile proteins
9.5 Mechanism of muscle contraction
9.6 Types of skeletal muscle contraction
9.7 Skeletal System and its functionw
9.8 The Axial skeleton
9.9 The Appendicular skeleton
9.10 Types of joints
9.11 Disorders of muscular and skeletal system
9.12 Benefits of regular Exercise

CONCEPT MAP



CONCEPT MAP



MUST KNOW DEFINITIONS

Locomotion	:	Movement of organism from one place to another in search of food, shelter, mate and to escape from predators is called **locomotion**.
Tendon	:	Skeletal muscles are attached to the bones by a bundle of collagen fibres known as **tendon.**
Skeletal system	:	The skeletal system is constituted by a framework of bones and cartilages.
Hydrostatic Skeleton	:	This type of skeleton is found in soft-bodied invertebrates. Eg: **Earthworm.** It is a fluid filled cavity encircled by muscles
Exoskeleton	:	Rigid hard case found outside the body of animals
Endoskeleton	:	Skeleton found inside the body of animals.
Axial Skeleton	:	It forms the main axis of the body. It consists of the skull, hyoid bone, vertebral column and thoracic cage.
Vertebral column	:	It is also called the back bone. It consists of vertebrae Cervical (7), Thoracic (12), Lumbar (5), Sacral (5 - fused to form 1 bone), Coccyx (4 - fused to form 1 bone).
Joints	:	Points of contact between bones.
Fibrous joints	:	They are immovable fixed joints.
Cartilaginous joints	:	They are slightly movable joints.
Synovial joints	:	They are freely movable joints.
Dislocation of joints	:	Dislocation of joints is the total displacement of the articular end of the bone from the joint cavity.
Physiotherapy	:	Physiotherapy is the therapeutic exercise to make the limbs work near normally. Therapeutic exercises are carried out by physiotherapists.

EVALUATION

1. **Muscles are derived from** *[Sep-2021; Aug-'22]*
(a) ectoderm (b) mesoderm
(c) endoderm (d) neuro ectoderm
[Ans. (b) mesoderm]

2. **Muscles are formed by** *[May-'22]*
(a) myocytes (b) leucocytes
(c) osteocytes (d) lymphocytes
[Ans. (a) myocytes]

3. **The muscles attached to the bones are called**
(a) skeletal muscle (b) cardiac muscle
(c) involuntary muscle (d) smooth muscles
[Ans. (a) skeletal muscle]

4. **Skeletal muscles are attached to the bones by**
(a) tendon (b) ligament
(c) pectin (d) fibrin
[Ans. (a) tendon]

5. **The bundle of muscle fibres is called** *[Sep-2020]*
(a) Myofibrils (b) fascicle
(c) sarcomere (d) sarcoplasm
[Ans. (b) fascicle]

6. **The pigment present in the muscle fibre to store oxygen is** *[May-'22]*
(a) myoglobin (b) troponin
(c) myosin (d) actin
[Ans. (a) myoglobin]

7. **The functional unit of a muscle fibre is**
(a) sarcomere (b) sarcoplasm
(c) myosin (d) actin
[Ans. (a) sarcomere]

8. **The protein present in the thick filament is**
(a) myosin (b) actin (c) pectin (d) leucin
[Ans. (a) myosin]

9. **The protein present in the thin filament is**
(a) myosin (b) actin
(c) pectin (d) leucin
[Ans. (b) actin]

10. **The region between two successive Z-discs is called a** *[Sep- 2021]*
(a) sarcomere (b) microtubule
(c) myoglobin (d) actin
[Ans. (a) sarcomere]

11. **Each skeletal muscle is covered by**
(a) epimysium (b) perimysium
(c) endomysium (d) hypomysium
[Ans. (a) epimysium]

12. **Knee joint is an example of**
(a) saddle joint (b) hinge joint
(c) pivot joint (d) gliding joint
[Ans. (b) hinge joint]

13. **Name of the joint present between the atlas and axis is** *[May-'22]*
(a) synovial joint (b) pivot joint
(c) saddle joint (d) hinge joint
[Ans. (b) pivot joint]

14. **ATPase enzyme needed for muscle contraction is located in**
(a) actinin (b) troponin
(c) myosin (d) actin
[Ans. (c) myosin]

15. **Synovial fluid is found in**
(a) Ventricles of the brain (b) Spinal cord
(c) Immovable joint (d) Freely movable joints.
[Ans. (d) Freely movable joints]

16. **Inflammation of joints due to accumulation of uric acid crystals is called as**
(a) Gout (b) Myasthenia gravis
(c) Osteoporosis (d) Osteomalacia
[Ans. (a) Gout]

17. **Acetabulum is located in**
(a) collar bone (b) hip bone
(c) shoulder bone (d) thigh bone
[Ans. (b) hip bone]

18. **Appendicular skeleton is**
(a) girdles and their limbs
(b) vertebrae
(c) skull and vertebral column
(d) ribs and sternum
[Ans. (a) girdles and their limbs]

19. The type of movement exhibits by the macrophages are *[Sep- 2021]*

(a) flagellar (b) ciliary
(c) muscular (d) amoeboid

[Ans. (d) amoeboid]

20. The pointed portion of the elbow is *[Mar-2020]*

(a) acromion process (b) glenoid cavity
(c) olecranon process (d) symphysis

[Ans. (c) olecranon process]

21. Name the different types of movement. *[Aug-'22]*

Ans. **Types of movement :**

The different types of movements that occur in the cells of our body are amoeboid, ciliary, flagellar and muscular movement.

1. **Amoeboid movement**: Cells such as macrophages exhibit amoeboid movement for engulfing pathogens by pseudopodia formed by the streaming movement of the cytoplasm.
2. **Ciliary movement**: This type of movement occurs in the respiratory passages and genital tracts which are lined by ciliated epithelial cells.
3. **Flagellar movement:** This type of movement occurs in the cells which are having flagella or whip-like motile organelle. The sperm cells show flagellar movement.
4. **Muscular movement:** The movement of hands, legs, jaws, tongue are caused by the contraction and relaxation of the muscle which is termed as the muscular movement.

22. Name the filaments present in the sarcomere.

Ans. 1. Thick filament – Myosin.
2. Thin filament – Actin.

23. Name the contractile proteins present in the skeletal muscle *[Sep-2021]*

Ans. 1. Myosin – Thick filament.
2. Actin – Thin filament.

24. When describing a skeletal muscle, what does "striated" mean? *[Sep-2020]*

Ans. 1. Along the length of each myofibril there are a repeated series of dark and light bands.
2. The dark **A-bands** (Anisotropic bands) and the light **I-bands** (Isotropic bands) are perfectly aligned with one another.
3. This type of arrangement gives the cell a striated appearance.

25. How does an isotonic contraction take place? *[Aug-'22]*

Ans. **Isotonic contraction (iso-same, ton-weight/ resistance) :**

1. In isotonic contraction the length of the muscle changes but the tension remains constant.
2. Here, the force produced is unchanged.

Eg: Lifting dumbbells and weight lifting.

26. How does an isometric contraction take place?

Ans. **Isometric contraction (iso- same, metric-distance):**

1. In isometric contraction the length of the muscle does not change but the tension of the muscle changes.
2. Here, the force produced is changed.

Eg: Pushing against a wall, holding a heavy bag.

27. Name the bones of the skull.

Ans. 1. Cranial bones(8): Frontal(1), Parietals(2), Temporal(2), Occipitals(1), Sphenoid(1), Ethmoid(1)
2. Facial bones(14): Nasals(2), Maxillae(2), Zygomatics(2), Lachrymals(2), Palatines(2), Inferior nasals(2), Mandible(1), Vomer(1)
3. Hyoid bone(1): U-shaped bone found at the floor of buccal cavity.
4. Ear ossicles(6): Maleus(2), Incus(2), Stapes(2) (Left and Right ear)

28. Which is the only jointless bone in human body?

Ans. 1. A single U-shaped hyoid bone is present at the base of the buccal cavity.

2. It is the only bone without joint.

29. List the three main parts of the axial skeleton.

Ans.

Skeleton	Name of Bone		Number of bones	Total number of bones
Axial skeleton (80 bones)	Skull	Cranium	8	29
		Facial bone	14	
		Bones of middle	6	
		Ear	(2 × 3)	
		Hyoid bone	1	
	Vertebral column	Cervical	7	26 (in adults)
		Thoracic	12	
		Lumbar	5	
		Sacral	5 bones fused to 1 bone	
		Coccyx	4 bones fused to 1 bone	
	Sternum		1	1
	Ribs		12 × 2 = 24	24
Total number of bones in the axial skeleton = 80				

30. How is tetany caused?

Ans. Rapid muscle spasms occur in the muscles due to deficiency of parathyroid hormone resulting in reduced calcium levels in the body. This disease is called tetany and is a disorder of muscular system.

31. What are the functions of skeletal system.

[HY-2018, 19]

Ans. **Functions of skeletal system:**

1. **Support -** It forms a rigid framework and supports the weight of the body against gravity.
2. **Shape -** It provides and maintains the shape of the body.
3. **Protection -** It protects the delicate internal organs of the body.
4. **Acts as reservoir -** It stores minerals such as calcium and phosphate. Fat (Triglyceride) is stored in yellow bone marrow and represents a source of stored energy for the body.
5. **Locomotion -** It acts as lever along with the muscles attached to it.
6. **Strength -** It can withstand heavy weight and absorbs mechanical shock.
7. **As a haemopoietic tissue -** Red and White blood cells are produced in the bone marrow of the ribs, spongy bones of vertebrae and extremities of long bones.

32. What are the different types of rib bones that form the rib cage? ***[Mar-2020]***

Ans. **The Rib cage :**

There are 12 pairs of ribs. Each rib is a thin flat bone connected dorsally to the vertebral column and ventrally to the sternum. It has two articulation surfaces on its dorsal end, hence called bicephalic.

True ribs:

The first seven pairs of ribs are called '**true ribs**' or **vertebro–sternal ribs**. Dorsally they are attached to the thoracic vertebrae and ventrally connected to the sternum with the help of hyaline cartilages.

False ribs:

The 8th, 9th and 10th pairs of ribs do not articulate directly with the sternum but joined with the cartilaginous (hyaline cartilage) part of the seventh rib. These are called '**false ribs**' or **vertebro-chondral ribs**.

Floating ribs:

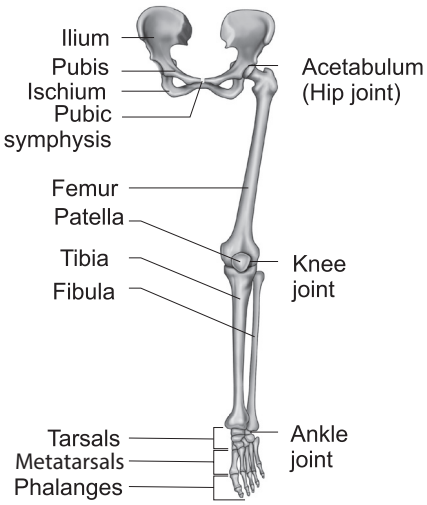
The last 11th and 12th pairs of ribs are not connected ventrally. Therefore, they are called as '**floating ribs**' or **vertebral ribs**.

Formation of rib cage :

1. Thoracic vertebrae, ribs and sternum together form the ribcage.
2. Rib cage protects the lungs, heart, liver and also plays a role in breathing.

33. What are the bones that make the pelvic girdle?

Ans. **Pelvic Girdle :**



1. The pelvic girdle is a heavy structure specialized for weight bearing. It is composed of two hip bones called **coxal bones** that secure the lower limbs to the axial skeleton. Together, with the sacrum and coccyx, the hip bones form the basin-like bony pelvis.
2. Each coxal bone consists of three fused bones, **ilium, ischium** and **pubis**. At the point of fusion of ilium, ischium, and pubis a deep hemispherical socket called the **acetabulum** is present on the lateral surface of the pelvis.
3. It receives the head of the femur or thigh bone at the hip joint and helps in the articulation of the femur.
4. Ventrally the two halves of the pelvic girdle meet and form the pubic symphysis containing fibrous cartilage.
5. The ilium is the superior flaring portion of the hip bone. Each ilium forms a secure joint with the sacrum posteriorly. The ischium is a curved bar of bone. The V-shaped pubic bones articulate anteriorly at the pubic symphysis.

The Lower limb:

1. The lower limb consists of 30 bones which carries the entire weight of the erect body.
2. The bones of the lower limbs are thicker and stronger than the upper limbs. The three segments of each lower limb are the thigh, the leg or the shank and the foot.
3. The femur is the single bone of the thigh. It is the largest, longest and strongest bone in the body. The head of femur articulates with the acetabulum of the pelvis to form the hip joint.
4. Two parallel bones, the tibia and fibula, form the skeleton of the shank. A thick, triangular patella forms the knee cap, which protects the knee joint anteriorly and improves the leverage of thigh muscles acting across the knee.
5. The foot includes the bones of **ankle**, the **tarsus**, the **metatarsus** and the **phalanges** or **toe bones**. The foot supports our body weight and acts as a lever to propel the body forward, while walking and running.
6. The tarsus is made up of seven bones called **tarsals**. The metatarsus consists of five bones called **metatarsals**. The arrangement of the metatarsals is parallel to each other. There are 14 phalanges in the toes which are smaller than those of the fingers.

34. List the disorders of the muscular system.

[Sep-2020]

Ans. **Disorders of muscular system:**

1. **Myasthenia gravis:** An autoimmune disorder affecting the action of acetylcholine at neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscles.
2. **Tetany:** Rapid muscle spasms occur in the muscles due to deficiency of parathyroid hormone resulting in reduced calcium levels in the body.
3. **Muscle fatigue:** Muscle fatigue is the inability of a muscle to contract after repeated muscle contractions.
4. **Atrophy:** A decline or cessation of muscular activity results in the condition called **atrophy** which results in the reduction in the size of the muscle and makes the muscle to become weak, which occurs with lack of usage as in chronic bedridden patients.
5. **Muscle pull:** Muscle pull is actually a muscle tear. A traumatic pulling of the fibres produces a tear known as **sprain**. This can occur due to sudden stretching of muscle beyond the point of elasticity.

6. **Muscular dystrophy:** The group of diseases collectively called the **muscular dystrophy** are associated with the progressive degeneration and weakening of skeletal muscle fibres, leading to death from lung or heart failure. The most common form of muscular dystrophy is called Duchene Muscular Dystrophy (DMD).

35. Explain the sliding- filament theory of muscle contraction.

Ans. Rolf Niedergerke Andrew F. Huxley proposed the sliding-filament theory to explain muscle contraction. According to this theory overlapping actin and myosin filaments of fixed length slide past one another is an energy requiring process resulting in muscle contraction.

1. Contraction is the creation of tension in the muscle and relaxation is the release of tension created by contraction.
2. Muscle contraction is initiated by a nerve impulse sent by the central nervous system (CNS) through a motor neuron.
3. The junction between the motor neuron and sarcolemma of the muscle fibre is called the **neuromuscular junction** or **motor end plate**. When nerve impulse reaches this junction acetylcholine is released.
4. An action potential is generated which initiates opening of multiple gated channels of sarcolemma.
5. This causes the flow of large quantities of calcium ions from sarcoplasmic reticulum. The Ca^{+} ions bind to the troponin of thin filaments. The active sites are exposed to the heads of myosin to form a cross bridge and phosphate ion is released.
6. Hydrolysis of ATP occurs and energy released helps the myosin head to rotate (90° angle with long axis of filament). In this position myosin binds to an actin and activates contraction - relaxation cycle which is followed by a power stroke.
7. Power stroke (cross - bridge tilting) begins after rest of myosin binding sites are uncovered. Myosin head and hinge region tilt from 90° angle to 45° angle. Cross bridges are transformed into high - force bonds as myosin releases phosphate ions allowing myosin head to swivel.
8. At the end of power stroke, the myosin head releases actin and swivels back to bind to a new actin molecule to start another contraction cycle. The power stroke repeats many times until a muscle fibre contracts. The process continues as long as muscle receives stimuli and there is steady flow of calcium ions.
9. Myosin returns back to relaxed state and releases ADP. A new ATP then binds to the head of myosin and cross-bridge is broken. The cycle of cross-bridge formation and breakage repeatedly causes sliding of the filaments. similar to motion of oar on a boat.
10. **Relaxation**
    - i) Motor impulses stop.
    - ii) Calcium ions are pumped back into sarcoplasm.
    - iii) Masking of active sites of actin filament.
    - iv) Failure of binding of myosin head with active sites of actin.
    - v) The thin filaments assume their normal position and muscle is released.

36. What are the benefits of regular exercise?

Ans. **Regular exercises can produce the following beneficial physiological changes:**

1. The muscles used in exercise grow larger and stronger.
2. The resting heart rate goes down.
3. More enzymes are synthesized in the muscle fibre.
4. Ligaments and tendons become stronger.
5. Joints become more flexible.
6. Protection from heart attack.
7. Influences hormonal activity.
8. Improves cognitive functions.
9. Prevents Obesity. Promotes confidence, esteem.
10. Prevents depression, stress and anxiety.

UNIT - IV

Chapter 11

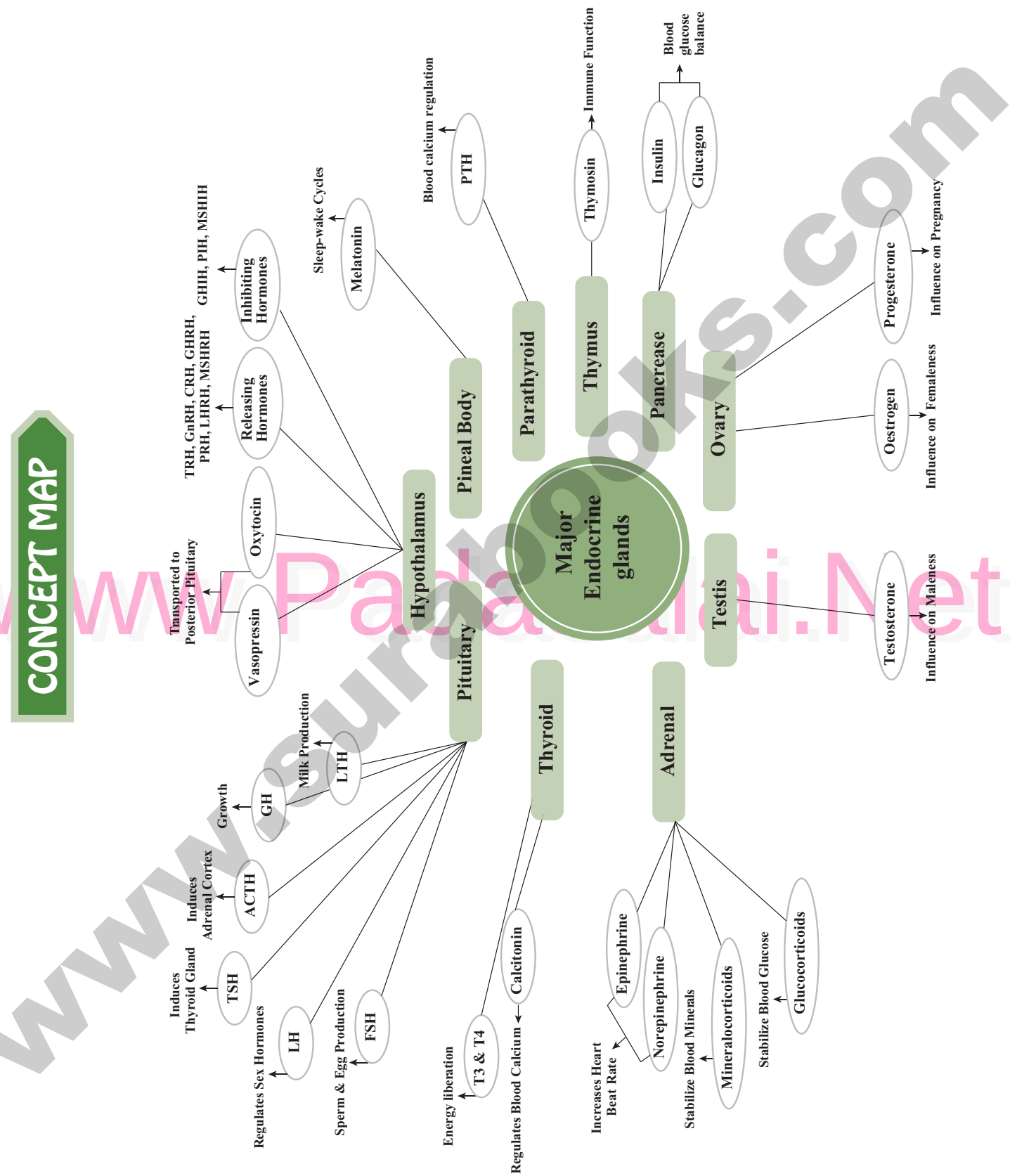
CHEMICAL COORDINATION AND INTEGRATION

CHAPTER SNAPSHOT

11.1 Endocrine glands and hormones
11.2 Human endocrine system
- 11.2.1 Hypothalamus
- 11.2.2 Pituitary gland or Hypophysis
- 11.2.3 Pineal gland
- 11.2.4 Thyroid gland
- 11.2.5 Parathyroid gland
- 11.2.6 Thymus gland
- 11.2.7 Adrenal gland
- 11.2.8 Pancreas
- 11.2.9 Gonads
- 11.2.10 Hormones of heart, kidney and gastro intestinal tract

11.3 Hypo and Hyper activity of endocrine glands and related disorders
- Dwarfism
- Gigantism
- Acromegaly
- Cretinism
- Myxodema
- Simple goitre
- Tetany
- Hyperparathyroidism
- Addison's disease
- Cushing's syndrome
- Hypoglycaemia
- Hyperglycaemia
- Diabetes insipidus

11.4 Mechanism of hormone action



MUST KNOW DEFINITIONS

Hormones	:	Hormones are chemical messengers because they act as organic catalysts and coenzymes to perform specific functions in the target organs.
Homeostasis	:	Maintenance of constant internal environment of the body by the different coordinating system.
Growth Hormone	:	It is also known as somatotropic hormone (STH) or Somatotropin. It promotes growth of all the tissues and metabolic process of the body.
Thyroid stimulating Hormone (TSH)	:	TSH is a glycoprotein hormone, which stimulates the thyroid gland to secretes Tri-iodothyronine **(T_3)** and thyroxine **(T_4)**.
Adreno cortico tropic hormone (ACTH)	:	ACTH is a peptide hormone that stimulates the adrenal cortex to secrete **glucocorticoids** and **mineralocorticoids**.
Follicle stimulating hormone (FSH)	:	FSH is a glycoprotein hormone which regulates the functions of the gonads (ovary and testis).
Luteinizing hormone (LH)	:	LH is a glycoprotein hormone which is also known as **interstitial cell stimulating hormone (ICSH).**
Luteotropic hormone (LTH)	:	LTH is also called **luteotropin** or **lactogenic hormone** or **prolactin** or **mammotropin**.
Oxytocin	:	It is a peptide hormone which stimulates vigorous contraction of the smooth muscles of uterus during child birth and ejection of milk from the mammary glands.
Parathyroid hormone or Parathormone (PTH)	:	PTH is a hypercalcemic hormone. It is a peptide hormone involved in controlling the calcium and phosphate homeostasis.
Pancreas	:	Pancreas is a composite gland which performs both exocrine and endocrine functions.
Insulin	:	Insulin is a peptide hormone and plays an important role in glucose homeostasis.
Glucagon	:	Glucagon is a polypeptide hormone it is a potent hyperglycaemic hormone. It act on the liver and promotes the breakdown of glycogen to glucose.
Renin	:	Renin is secreted by juxta glomerular cells (JGA), which increases blood pressure when angiotensin is formed in blood.
Erythropoietin	:	Erythropoietin is also secreted by the JGA cells of the kidney and stimulates erythropoiesis (formation of RBC) in bone marrow.
Calcitriol	:	Calcitriol is sercreted by proximal tubules of nephron. It is an active form of vitamin D_3 which promotes calcium and phosphorus absorption from intestine and accelerates bone formation.

EVALUATION

1. The maintenance of constant internal environment is referred as *[Sep-2021; Aug-'22]*
(a) Regulation (b) homeostasis
(c) co-ordination (d) hormonal control
[Ans. (b) homeostasis]

2. Which of the following are exclusive endocrine glands?
(a) Thymus and testis
(b) adrenal and ovary
(c) parathyroid and adrenal
(d) pancreas and parathyroid
[Ans. (c) parathyroid and adrenal]

3. Which of the following hormone is not secreted under the influence of pituitary gland?
(a) thyroxine (b) insulin
(c) oestrogen (d) glucocorticoids
[Ans. (b) insulin]

4. Spermatogenesis in mammalian testes is controlled by
(a) Luteinising hormone
(b) Follicle stimulating hormone
(c) FSH and prolactin
(d) GH and prolactin
[Ans. (b) Follicle stimulating hormone]

5. Serum calcium level is regulated by
(a) Thyroxine (b) FSH
(c) Pancreas
(d) Thyroid and parathyroid
[Ans. (d) Thyroid and parathyroid]

6. Iodised salt is essential to prevent
(a) rickets (b) scurvy
(c) goitre (d) acromegaly
[Ans. (c) goitre]

7. Which of the following gland is related with immunity? *[Sep-2021; Aug-'22]*
(a) Pineal gland (b) adrenal gland
(c) thymus (d) parathyroid gland
[Ans. (c) thymus]

8. Which of the following statement about sex hormones is correct?
(a) Testosterone is produced by Leydig cells under the influence of luteinizing hormone.
(b) Progesterone is secreted by corpus luteum and softens pelvic ligaments during child birth.
(c) Oestrogen is secreted by both sertoli cells and corpus luteum.
(d) Progesterone produced by corpus luteum is biologically different from the one produced by placenta. **[Ans. (a) Testosterone is produced by Leydig cells under the influence of luteinizing hormone]**

9. Hypersecretion of GH in children leads to
(a) Cretinism (b) Gigantism
(c) Graves disease (d) Tetany
[Ans. (b) Gigantism]

10. A pregnant female delivers a baby who suffers from stunted growth, mental retardation, low intelligence quotient and abnormal skin. This is the result of
(a) Low secretion of growth hormone
(b) Cancer of the thyroid gland
(c) Over secretion of pars distalis
(d) Deficiency of iodine in diet.
[Ans. (d) Deficiency of iodine in diet]

11. The structure which connects the hypothalamus with anterior lobe of pituitary gland is the *[Sep-2020]*
(a) Dendrites of neuro hypophysis
(b) Axons of neurohypophysis
(c) Bands of white fibers from cerebellar region
(d) Hypophysial portal system
[Ans. (d) Hypophysial portal system]

12. Which one of the following statement is correct
(a) Calcitonin and thymosin are thyroid hormones
(b) Pepsin and prolactin are secreted in stomach
(c) Secretin and rhodopsin are polypeptide hormones
(d) Cortisol and aldosterone are steroid hormones
[Ans. (d) Cortisol and aldosterone are steroid hormones]

13. Which of the given option shows all wrong statements for thyroid gland.

Statements

(i) It inhibits process of RBC formation

(ii) It helps in maintenance of water and electrolytes

(iii) Its more secretion can reduce blood pressure

(iv) It Stimulates osteoblast

(a) (i) and (ii) (b) (iii) and (iv)

(c) (i) and (iv) (d) (i) and (iii)

[Ans. (a) (i) and (ii)]

14. Comment on homeostasis. *[May-'22]*

Ans. Maintenance of constant internal environment of the body by the different coordinating system.

15. Hormones are known as chemical messenger. Justify. *[May-'22]*

Ans.

1. The endocrine system influences the metabolic activities of the body by means of **hormones.**
2. The hormones are chemical messengers released into the blood and circulated as chemical signals.
3. They act as organic catalyst and coenzymes to perform specific functions on the target organs.
4. They slowdown or speed up or alter the activity of the target organ.
5. Deficiency or excess secretion of hormones will lead to disorders.
6. Thus hormones as chemical messengers co-ordinate different physical, physiological mental activities and maintain homeostasis.

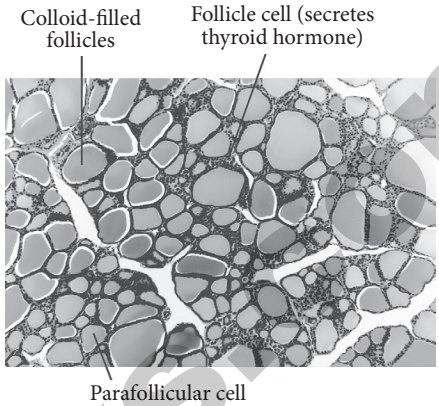
16. Write the role of oestrogen in ovulation.

Ans. Oestrogen is responsible for the maturation of reproductive organs and the development of secondary sexual characters at puberty. Along with progesterone, oestrogens promotes breast development and initiate the cyclic changes during menstrual cycle.

17. Comment on Acini of thyroid gland.

[May & Aug-'22]

Ans. **Acini of Thyroid gland :**



1. The butterfly shaped thyroid gland is a bilobed gland located below the larynx on each side of upper trachea. Its two lateral lobes are connected by a median tissue mass called **isthmus.**
2. Each lobe is made up of many lobules .The lobules consist of follicles called **acini (acinus in singular).**
3. Each acinus is lined with glandular, cuboidal or squamous epithelial cells.
4. The lumen of acinus is filled with colloid, a thick glycoprotein mixture consisting of thyroglobulin molecules.
5. Hormones of the thyroid gland are often called the major metabolic hormones.
6. The follicular cells of thyroid gland secretes two hormones namely tri-iodothyronine (T_3) and thyroxine or tetra- iodothyronine (T_4).
7. The parafollicular cells or 'C' cells of thyroid gland secrete a hormone called **thyrocalcitonin.**
8. Iodine is essential for the normal synthesis of thyroid hormones.

18. Write the causes for diabetes mellitus and diabetes insipidus. *[Sep.2021]*

Ans. **Diabetes mellitus:**

1. **Diabetes mellitus** is otherwise known as **Hyperglycaemia.**
2. It is caused due to reduced secretion of insulin. As the result, blood glucose level is elevated. Diabetes mellitus is of two types, **Type I Diabetes** and **Type II Diabetes**.
3. Type I diabetes (or) Insulin dependent diabetes, caused by the lack of insulin secretion due to illness or viral infections.

4. Type II diabetes (or) Non-Insulin dependent diabetes, caused due to reduced sensitivity to insulin, often called as insulin resistance.
5. Symptoms :
   (i) Polyurea (excessive urination),
   (ii) Polyphagia (excessive intake of food),
   (iii) Polydipsia (excessive consumption liquids due to thirst),
   (iv) Ketosis (breakdown of fat into glucose results in accumulation of ketone bodies) in blood.

Diabetes insipidus : *[Sep.2021]*

1. It is caused due to hyposecretion of vasopressin (ADH) from neurohypophysis.
2. **Symptom :** Frequent urination (polyurea) and excessive consumption of liquids due to thirst (polydipsia).

19. Specify the symptoms of acromegaly.

Ans. **Symptoms of acromegaly :**

Acromegaly is due to excessive secretion of growth hormone in adults.

Over growth of hand bones, feet bones, and jaw bones, malfunctioning of gonads. enlargement of viscera, tongue, lungs, heart, liver, spleen and endocrine gland like thyroid, adrenal etc., are the symptoms of acromegaly.

20. Write the symptoms of cretinism.

Ans. **Symptoms of Cretinism :**

In infants, hypothyroidism causes **Cretinism**.

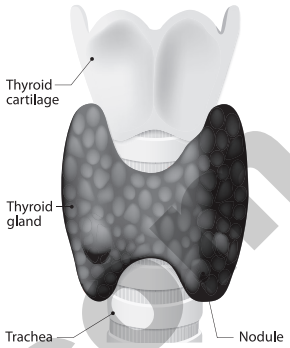
1. A cretin shows retarded skeletal growth.
2. Absence of sexual maturity.
3. Retarded mental ability.
4. Thick wrinkled skin.
5. Protruded enlarged tongue.
6. Bloated face.
7. Thick and short limbs occurs.
8. The other symptoms are low BMR, slow pulse rate, subnormal body temperature and elevated blood cholesterol levels.

21. Briefly explain the structure of thyroid gland.

Ans. **Structure of thyroid gland :**

Thyroid gland is the largest endocrine gland in the body .

1. It is a butterfly shaped, bilobed gland located below the larynx on either side of upper trachea.
2. The two lateral lobes are connected by a median tissue mass called **isthmus.**
3. Each lobe is made up of many lobules. The lobules consist of follicles called **acini.**



Structures of thyroid gland

4. Each acinus is lined with glandular, cuboidal or squamous epithelial cells. The lumen of acinus is filled with colloid, a thick glycoprotein mixture consisting of thyroglobulin molecules.
5. The follicular cells of thyroid gland secretes two hormones namely tri-iodothyronine (T_3) and thyroxine or tetra- iodothyronine (T_4).
6. The parafollicular cells or 'C' cells of thyroid gland secrete a hormone called **thyrocalcitonin.** Iodine is essential for the normal synthesis of thyroid hormones.

22. Name the layers of adrenal cortex and mention their secretions. *[Aug-'22]*

Ans.

1. A pair of adrenal glands are located at the anterior end of the kidneys.
2. Anatomically the outer region is the cortex and the inner region is the medulla.
3. Histologically the adrenal cortex has three distinct zones, zona glomerulosa, zona fasciculata and zona reticularis.
4. **Zona glomerulosa** an outer thin layer constitutes about 15% of adrenal cortex, and secretes mineralocorticoids.
5. **Zona fasciculata,** the middle widest layer constitutes about 75% of adrenal cortex and secretes glucocorticoids such as cortisol, corticosterone and trace amounts of adrenal androgen and oestrogen.
6. **Zona reticularis,** an inner zone of adrenal cortex constitute about 10% of adrenal cortex and secretes the adrenal androgen, trace amount of oestrogen and glucocorticoids.

GOVERNMENT EXAM QUESTIONS

Zoology (Long version)

CHOOSE THE CORRECT ANSWERS 1 MARK

1. The hormone which regulates the circadian rhythm of our body is _____. *[Mar-2021]*

(a) melatonin (b) melanin
(c) oxytocin (d) vasopressin

[Ans. (a) melatonin]

2. _____ is the largest endocrine gland in the body. *[May-'22]*

(a) Pineal gland (b) Pituitary
(c) Adrenal gland (d) Thyroid

[Ans. (d) Thyroid]

3. Which of the following hormones are catecholamines? *[Aug-'22]*

(a) Adrenalin and nor adrenalin
(b) Thyroxine and Glyoxine
(c) Growth hormone and ACTH
(d) Oxytocin and Melatonin

[Ans. (a) Adrenalin and nor adrenalin]

VERY SHORT ANSWERS 2 MARKS

1. Trace the location of hypothalamus. *[Sep-2021]*

Ans. Hypothalamus is a small cone shaped structure that projects downward from the brain ending into the pituitary stalk. It interlinks both the nervous system and endocrine system.

2. Name the RBC and WBC diluting fluids used in blood cell counting. *[May-'22]*

Ans. RBC - Erythrocytes
WBC - Leucocytes

SHORT ANSWERS 3 MARKS

1. Why do old people fall sick often? *[Mar-2020]*

Ans. Due to degeneration of thymus gland, thymosine level decreases, as a result the immunity of old age people become weak and causes sickness.

2. What is sporodic goitre? *[Mar-2020]*

Ans. Sporodic goitre is a genetic disease and is not caused by iodine or thyroxine deficiency.

3. Retention of Na^+ in our body is done by one hormone. Name it and mention its functions. *[Aug-'22]*

Ans. **Name :** Growth Hormone (GH)

Functions :

1. Growth hormone promotes growth of all the tissues and metabolic process of the body.
2. It influences the metabolism of carbohydrates, proteins and lipids and increases the rate of protein biosynthesis in the cells.
3. It stimulates chondrogenesis (cartilage formation), osteogenesis (bone formation) and helps in the retention of minerals like nitrogen, potassium, phosphorus, sodium etc., in the body.
4. GH increases the release of fatty acid from adipose tissue and decreases the rate of glucose utilization for energy by the cells.

LONG ANSWERS 5 MARKS

1. Tabulate the major hormones produced by hypothalamus and their functions. *[Sep-2021]*

Ans.

No	Hormones	Funtions
1	Thryotopin releasing hormone (TRH)	Stimulates the secretion of TSH
2	Gonadotropin relasing hormone (GnRH)	Stimulates the secretion of FSH
3	Corticotropin releasing hormore (CRH)	Stimulates the secretion of ACTH
4	Growth hormone releasing hormone (GHRH)	Stimulates the secretion of GH
5	Prolactin releasing hormone (PRH)	Stimulates the secretion of Prolactin
6	Luteinizing hormore releasing hormone (LHRH)	Stimulates the secretion of LH
7	MSH releasing hormone	Stimulates the secretion of MSH
8	Growth hormone - inhibiting hormone (GHIH)	Inhibits the secretion of GH
9	Prolactin inhibiting hormone (PIH)	Inhibitis the secretion of Prolactin
10	MSH inhibiting hormoe	Inhibits the secretion of MSH

2. What are the hormones secreted by thyroid gland? Mention their functions. *[May-'22]*

Ans. (i) TSH is a glycoprotein hormone, which stimulates the thyroid gland to secrete Tri-iodothyronine (T_3) and thyroxine (T_4).

(ii) TSH secretion is regulated by negative feedback mechanism. It's release from the anterior pituitary is induced by the thyrotropin releasing hormone (TRH).

(iii) When thyroxine level in the blood increases, TRH acts on both the pituitary and hypothalamus to inhibit TSH secretion.

Functions of thyroxine or tetraiodothyronine (T4):

(i) Thyroxine regulates the basal metabolic rate (BMR) and body heat production. It stimulates protein synthesis and promotes growth.

(ii) It is essential for the development of skeletal and nervous system. Thyroxine plays an important role in maintaining blood pressure.

(iii) It reduces serum cholesterol levels, Optimum levels of thyroxine in blood is necessary for gonadial functions.

ADDITIONAL

CHOOSE THE CORRECT ANSWERS 1 MARK

I. CHOOSE THE CORRECT OPTIONS FOR THE BELOW QUESTIONS:

1. What is the other name of neurohypophysis?
(a) pars distalis (b) pars nervosa.
(c) pars intermedia (d) pars tuberalis
[Ans. (b) pars nervosa]

2. The name of this hormone means quick birth.
(a) Progesterone (b) Oxytocin
(c) Testosterone (d) Melanin
[Ans. (b) Oxytocin]

3. Which is also called stress combat hormone?
(a) Adrenalin (b) Cortisol
(c) Epinephrine (d) Aldosterone
[Ans. (b) Cortisol]

II. CHOOSE THE CORRECT OPTIONS FOR THE BELOW FILL IN THE BLANKS:

1. The hormone _____ is insignificant in mammals.
(a) TSH (b) MSH
(c) CCK (d) ICSH
[Ans. (b) MSH]

2. _____ is also known as interstitial cell stimulating hormone.
(a) LTH (b) LH
(c) FSH (d) ACTH
[Ans. (b) LH]

3. Prolactin or luteotropin refers to _____.
(a) TSH (b) GH (c) LTH (d) LH
[Ans. (c) LTH]

4. FSH and LH are collectively called _____.
(a) Oestrogens (b) Androgens
(c) Gonadotropins (d) Corticoids
[Ans. (c) Gonadotropins]

5. ADH refers to _____.
(a) Insulin (b) Glucagon
(c) Thymosin (d) Vasopressin
[Ans. (d) Vasopressin]

6. The normal sleep - wake cycle of human body is regulated by _____.
(a) Melatonin (b) Melanin
(c) Thyroxine (d) Growth hormone
[Ans. (a) Melatonin]

7. Cell mediated immunity is the function of _____.
(a) Thymus gland (b) Pineal gland
(c) Adrenal gland (d) Pituitary gland
[Ans. (a) Thymus gland]

8. The disease ____ is not related to malfunctioning of Thyroid gland.
(a) Gull's disease (b) Grave's disease
(c) Cretinism (d) Tetany
[Ans. (d) Tetany]

9. The normal blood glucose level in fasting is ____.
(a) 110-140mg/dl (b) 120-130mg/dl
(c) 70-110mg/dl (d) 80-130mg/dl
[Ans. (c) 70-110mg/dl]

10. Frequent urination is linked to malfunctioning of the hormone ____.
(a) ADH (b) TSH (c) FSH (d) LH
[Ans. (a) ADH]

11. The functioning of ____ glands regulates serum calcium levels.
(a) Thyroid (b) Pituitary
(c) Thymus (d) Parathyroid
[Ans. (d) Parathyroid]

12. Majority of islets of Langerhans is composed of _____ cells.
(a) Beta (b) Alpha (c) Acini (d) Delta
[Ans. (a) Beta]

III. Identify the correct Statements:

1. Identify the correct statements from the below .
(I) The exocrine glands secrete enzymes, saliva and sweat.
(II) The endocrine glands, called ductless glands produce hormones and lack ducts.
(III) The hormones circulate around the body and eventually reach the target organs.
(IV) Hypothalamus is a small rod shaped structure.
(a) I, II and III only (b) I, II and IV only
(c) II, III and IV only (d) I, II, III and IV
[Ans. (a) I, II and III only]

2. Identify the correct statements from the below about "Pituitary gland".
(I) The pituitary gland means to grow under is ovoid in shape.
(II) It is located in the sella turcica.
(III) It is about two centimetre in diameter and 0.2 gm in weight.
(IV) A bony cavity of the sphenoid bone at the base of brain.
(a) I, II and III only (b) I, II and IV only
(c) II, III and IV only (d) I, II, III and IV
[Ans. (b) I, II and IV only]

3. Identify the correct statements from the below about "Growth hormone".
(I) It is also known as somatotropic hormone.
(II) It is a peptide hormone.
(III) Growth hormone promotes growth of all the tissues.
(IV) It influences the metabolism of carbohydrates, proteins and lipids.
(a) I and III only (b) I and IV only
(c) II, III and IV only (d) I, II, III and IV
[Ans. (d) I, II, III and IV]

4. Identify the correct statements from the below about "TSH".
(I) TSH is a glycoprotein hormone.
(II) It increases the release of fatty acid.
(III) TSH secretion is regulated by negative feedback mechanism.
(IV) Stimulates the thyroid gland to secrete Tri-iodothyronine (T_3) and thyroxine.
(a) I and II only (b) I, II and IV only
(c) I, III and IV only (d) I, II, III and IV
[Ans. (c) I, III and IV only]

5. Identify the correct statements from the below .
(a) Mineralocorticoids regulate water and electrolyte balance.
(b) Aldosteron stimulates reabsorption of chloride ions.
(c) Cortisol is a mineralocorticoid.
(d) Laughing increases the adrenaline levels in the body. **[Ans. (a) Mineralocorticoids regulate water and electrolyte balance.]**

IV. Identify the wrong statements :

1. Identify the wrong statement from the below.
(a) Zona glomerulosa is the outermost layer of adrenal cortex.
(b) All the hormones secreted by adrenal cortex are steroidal in nature.
(c) Glucocorticoids secreted by adrenal cortex stimulates gluconeogenesis.
(d) Cortisol regulate water and mineral balance in the body.
[Ans. (c) Glucocorticoids secreted by adrenal cortex stimulates gluconeogenesis.]

2. Identify the wrong statement from the below about "Adreno cortico tropic hormone".
(a) ACTH is a peptide hormone.
(b) It is also called luteotropin.
(c) ACTH secretion is regulated by negative feedback mechanism.
(d) It stimulates melanin synthesis in melanocytes.
[Ans. (b) It is also called luteotropin]

2. Peptide hormones cannot cross the phospolipid cell membrane and bind to the receptors on the exterior cell surface. They are are transported to the golgi, which is the site of modification. It acts as a first messenger in the cell.
3. Hormones on binding to their receptors do not enter the target cell but generate the production of second messengers such as cyclic AMP (cAMP), which in turn regulates cellular metabolism. This is catalyzed by the enzyme adenylate cyclase.
4. The interaction between the hormone at the surface and the effect brought out by cAMP within the cell is known as signaling cascade. At each step there is a possibility of amplification.
   (i) One hormone molecule may bind to multiple receptor molecule before it is degraded.
   (ii) Each receptor may activate several adenylate cyclases each of which make much cAMP.
   (iii) Thus there is more signal after each step. The actions of cAMP are terminated by phosphodiesterases. The effect of peptide hormones like insulin, glucagon, somatotropin are usually short lived because they work through second messenger system.

6. Explain the hormones secreted by adrenal glands and Mention the hormone which is referred as '3F' hormone.

Ans. **Cortex of adrenal gland secretes Glucocorticoids and Mineralocorticoids:**
Function of adrenal hormones:
1. **Glucocorticoids** stimulate gluconeogensis, lipolysis and proteolysis (the life saving activity).
2. **Cortisol** is a glucocorticoid involved in maintaining cardio vascular and kidney functions. It produces anti-inflammatory reactions and suppresses the immune response. It stimulates the RBC production. It is also known as stress combat hormone.
3. **Mineralocorticoids** regulates water and electrolyte balance of our body. Aldosterone stimulates the reabsorption of sodium and water and eliminates potassium and phosphate ions through excretion, thus it helps in maintaining electrolytes, osmotic pressure and blood pressure. Adrenal androgen plays a role in hair growth in the axial region, pubis and face during puberty.
4. The **adrenal medulla** secretes the hormones adrenalin and noradrenalin and are referred as "3F hormone" (fight, flight and fright hormone).
5. **Adrenalin** increases liver glycogen breakdown into glucose and increases the release of fatty acids from fat cells.
6. During emergency it increases heart beat rate and blood pressure. It stimulates the smooth muscles of cutaneous and visceral arteries to decrease blood flow.
7. It increases blood flow to the skeletal muscles thereby increases the metabolic rate of skeletal muscles, cardiac muscles and nervous tissue.

HOTS

1. On an educational tour to Nilgiris, Nitish and his friends observed the local people. Few of them were with swollen neck.
Is it a disease? If so what is the cause? How is the disease treated?

Ans.
1. Swollen neck is due to **Simple goitre,** a disease caused by hyposecretion of thyroxine by thyroid gland.
2. It is due to deficiency of Iodine which is obtained from salt.
3. In coastal areas the salt content of the soil is good and all fruits, vegetables etc are rich in salts.
4. In hilly areas, the soil has very little salt content so people do not get enough iodine through their diet.
5. Treatment is done by medication.

2. Swathy comes to India from America through air after a long journey, she suffers with jetlag. Find out the reason.

Ans. Circadian Rhythm is the 24 hour cycle of biological activities associated with natural periods of light and darkness. Eg: Sleep wake cycle, body temperature, appetite etc.

When we travel across countries / continents with different time zones the circadian rhythm is disturbed and we suffer from sleeplessness, loss of appetite, headache etc. which is called **Jetlag.** After a day or two the body regains its normal functioning.

UNIT - V

Chapter 12

TRENDS IN ECONOMIC ZOOLOGY (SHORT VERSION & LONG VERSION)

CHAPTER SNAPSHOT

12.1 Scope of Zoology
12.2 Vermiculture
12.3 Sericulture
12.4 Apiculture
12.5 Lac culture
12.6 Aquaponics
12.7 Aquaculture
12.7.1 Fish culture
12.7.2 Prawn culture
12.7.3 Pearl culture
12.8 Animal Husbandry and Management

MUST KNOW DEFINITIONS

Vermiculture	:	It is the process of using earthworms to decompose organic food waste, into a nutrient-rich material capable of supplying necessary nutrients which helps to sustain plant growth.
Vermitech	:	Applications of earthworm in technology of composting and bioremediation of soils and other activities is called **Vermitech.**
Vermicast	:	The breakdown of organic matter by the activity of the earthworms and its elimination from its body is called **Vermicast.**
Vermicompost	:	It is the compost produced by the action of earthworms in association with all other organisms in the compost unit.
Sericulture	:	Production of silk from the silk worm, by rearing practices on a commercial scale is called **sericulture.**
Moriculture	:	Mulberry leaves are widely used as food for silkworm and the cultivation of mulberry is called as **moriculture.**
Stifling	:	The process of killing the cocoons is called **stifling.**
Reeling	:	The process of removing the threads from the killed cocoon is called **Reeling.**
Apiculture	:	Care and management of honey bees on a commercial scale for the production of honey is called **Apiculture** or **Bee keeping.**
Queen bee	:	Queen bee is a functional female bee present in each hive and feeds on Royal Jelly.
Pheromone	:	The queen bee produces a hormonal chemical substance called **pheromone.**
Worker cell	:	Worker bee lives in a chamber called 'worker cell' and it takes about 21 days to develop from the egg to adult and its lifespan is about six weeks.
Drone	:	**Drone** is the functional male member of the colony which develops from an unfertilized egg.
King of the colony	:	The sole duty of the drone is to fertilize the virgin queen and hence called **'King of the colony'.**
Bee Hive	:	The house of honey bee is termed as **Bee hive** or **Comb.**
Brood Cells	:	The young stages of honey bees accomodate the lower and central cells of the hive called the **Brood cells.**
Honey	:	Honey is the healthier substitute for sugar.
Lac culture	:	The technique used for culture of Lac insect for the procurement of lac on large scale is known as **Lac culture.**
Swarming	:	The mass emergence of larvae from the egg in search of a host plant is called **Swarming** in lac culture.
Aquaponics	:	It is a technique which is a combination of **aquaculture** and **hydroponics.**

EVALUATION

1. Which one of the following is not related to vermiculture?

(i) Maintains soil fertility
(ii) Breakdown of inorganic matter
(iii) Gives porosity, aeration and moister holding capacity
(iv) Degradation of non biodegradable solid waste

(a) i and ii is correct
(b) iii and iv is correct
(c) ii and iv is not correct
(d) i and iii is not correct

[Ans. (c) b and d is not correct]

2. Which one of the following is not an endemic species of earthworm?

(a) *Perionyx* (a) *Lampito*
(b) *Eudrillus* (c) *Octochaetona*

Note : Correct Order

(a) *Perionyx* (b) *Lampito*
(c) *Eudrillus* (d) *Octochaetona*

[Ans. (c) *Eudrillus*]

3. Match the following and select the correct option. *[Aug-'22]*

1. *Bombyx mori* -
(i) Champa - (I) Muga
2. *Antheraea assamensis* -
(ii) Mulberry - (II) Eri
3. *Antheraea mylitta* -
(iii) Arjun - (III) Tassar
4. *Attacus ricini* -
(iv) Castor - (IV) Mulberry

Select the correct one.

(A) 1 – ii – IV (B) 2 – i – I
(C) 3 - iii - III (D) 4 - iv - II

[Ans. (*All Options are correct)]

4. Silk is obtained from _____. *[June-2019; May-'22]*

(a) *Laccifer lacca* (b) *Nosema bombycis*
(c) *Attacus ricini* (d) *Attacus mylitta*

[Ans. (c) *Attacus ricini*]

5. Assertion : Nuptial flight is a unique flight taken the queen bee followed by several drones.
Reason : The queen bee produces a chemical substance called pheromone. The drones in that area are attracted to the pheromone and then mating takes place.

(a) Assertion and reason is correct but not related
(b) Assertion and reason is incorrect but related
(c) Assertion and reason is correct but related
(d) Assertion and reason is incorrect but not related

[Ans. (c) Assertion and reason is correct but related]

6. Rearing of honey bee is called

(a) Sericulture (b) Lac culture
(c) Vermiculture (d) Apiculture

[Ans. (d) Apiculture]

7. Which of the statement regarding Lac insect is TRUE?

(a) A microscopic, resinous crawling scale insect
(b) Inserts its proboscis into plant tissue suck juices and grows
(c) Secretes lac from the hind end of body.
(d) The male lac insect is responsible for large scale production of lac.

[Ans. (d) The male lac insect is responsible for large scale production of lac]

8. Prawn belongs to the class *[Sep-2021]*

(a) Crustacea (b) Annelida
(c) Coelenterata (d) Echinodermata

[Ans. (a) Crustacea]

9. Aquaponics is a technique which is *[HY-2019]*

(a) A combination of aquaculture and fish culture
(b) A combination of aquaculture and hydroponics
(c) A combination of vermiculture and hydroponics
(d) A combination of aquaculture and prawn culture

[Ans. (b) A combination of aquaculture and hydroponics]

10. Inland fisheries are

(a) deep sea fishing
(b) capturing fishes from sea coast
(c) raising and capturing fishes in fresh water
(d) oil extraction from fish **[Ans. (c) raising and capturing fishes in fresh water]**

11. Induced breeding technique is used in

(a) Marine fishery (b) Capture fishery
(c) Culture fishery (d) Inland fishery

[Ans. (d) Inland fishery]

12. Isinglass is used in *[Sep-2021]*

(a) Preparation (b) Clearing of wines
(c) Distillation of wines (d) Preservation of wines

[Ans. (b) Clearing of wines]

13. Choose the correctly matched pair.

1. Egg layers – Brahma
2. Broiler types – Leghorn
3. Dual purpose – White Plymouth rock
4. Ornamental breeds – Silkie

[Ans. (4) Ornamental breeds – Silkie)]

14. Animal husbandry is the science of rearing, feeding and caring, breeding and disease control of animals. It ensures supply of proper nutrition to our growing population through activities like increased production and improvement of animal products like milk, eggs, meat, honey, etc.

a. Poultry production depends upon the photo period. Discuss.

b. Polyculture of fishes is of great importance. Discuss.

Ans. **(a)** Light has three important functions in poultry farming

1. Facilitate sight of birds.
2. Stimulate internal cycles due to day-length changes.
3. Initiate hormone release.

Light can influence the growth, development and production of chickens.

Light colour: Blue light has a calming effect on chickens. Blue green light is said to stimulate growth. Orange red light stimulates reproduction.

Duration: New born chicks need 21-23 hours of continuous light for few days(3-4days). It should be reduced to 15-16 hours by the time the chicks are about 3 weeks old following which 10-12 hours /Natural day light length would suffice for growth & development.

Intensity: The intensity of light is also linked to temperature. The lamps/lights giving light with a cooling effect is preferred over lamps which generate lot of heat.

Thus photoperiod(length of exposure to light) has a impact on growth of chicks along with light colour and intensity of the incident light.

(b) Composite fish farming :

Few selected fishes belonging to different species are stocked together in proper proportion in a pond. This mixed farming is termed composite fish farming or **polyculture.** The advantages include,

1. All available niches are fully utilized.
2. Compatible species do not harm each other.
3. No competition among different species is found.
4. *Catla catla, Labeo rohita and Cirrhinus mrigala* (surface feeder) are the commonly used fish species for composite fish farming.

15. Write the advantages of vermicomposting.

Ans. **Advantages of Vermicomposting :** *[HY-2019 ; Sep-2020]*

1. Vermicompost is rich in essential plant nutrients.
2. It improves soil structure texture, aeration, and water holding capacity and prevents soil erosion.
3. Vermicompost is a rich in nutrients and an eco-friendly amendment to soil for farming and terrace gardening.
4. It enhances seed germination and ensures good plant growth.

16. Name the three castes in a honey bee colony.

[Sep-2020]

Ans. 1. A well developed honey bee colony consists of the **Queen, Drones** and **Workers.**

2. All the three types depend on each other for their existence. There is normally one queen, 10,000 to 30,000 workers and few hundred drones (male bees) in a colony.

17. Name the following.

i. The largest bee in the colony.

ii. The kind of flight which the new virgin queen takes along with the drones out of the hive.

Ans. i. Queen bee.

ii. Nuptial flight.

18. What are the main duties of a worker bee?

Ans. 1. Each worker has to perform different types of work in her life time.

2. During the first half of her life, she becomes a nurse bee attending to indoor duties such as secretion of royal jelly, prepares bee-bread to feed the larvae, feeds the queen, takes care of the queen and drones, secretes bees wax, builds combs, cleans and fans the bee hive.

3. Then she becomes a soldier and guards the bee hive. In the second half her life lasting for three weeks, she searches and gathers the pollen, nectar, propolis and water.

19. What happens to the drones after mating flight?

Ans. 1. The sole duty of the drone is to fertilize the virgin queen hence called **"King of the colony".**

2. During swarming (the process of leaving the colony by the queen with a large group of worker bees to form a new colony) the drones follows the queen, copulates and dies after copulation.

The offspring of such a cross is called **outcross.** This method is suitable for breeding animals below average in productivity.

ii. **Cross breeding :** Breeding between a superior male of one breed with a superior female of another breed. The cross breed progeny has superior traits (hybrid vigour or heterosis).

iii. **Interspecific hybridization :** Method of breeding between male and female of two different species. Eg: **Mule** (male donkey and a female horse). The progeny obtained from such crosses are different from their parents, and may possess the desirable traits of the parents. It was produced by the process of interspecific hybridization between a male donkey and a female horse.

3. **Artificial insemination :** *[Mar-2020]*

i. It is a technique in which the semen collected from the male is injected to the reproductive tract of the selected female.

ii. Artificial insemination is economical measure where fewer bulls are required and maximum use can be made of the best sire.

Multiple ovulation embryo transfer technology (MOET)

i. It is another method of propagation of animals with desirable traits. This method is applied when the success rate of crossing is low even after artificial insemination.

ii. Instead of one egg per cycle, 6-8 eggs can be produced by this technology. The eggs are carefully recovered non-surgically from the genetic mother and fertilized artificially.

iii. The embryos at 8-32 celled stages are recovered and transferred to a surrogate mother.

28. Mention the advantages of MOET.

Ans. **MOET**

Multiple Ovulation Embryo Transfer technology:

1. Advantage of this technology is to produce high milk yielding females and high-quality meat yielding bulls in a short time.
2. It is applicable to cattle, sheep and buffaloes.
3. It is a method of propagation of animals with desirable traits in animal breeding.
4. This method can be applied when the success rate of crossing is low even after artificial insemination.

29. Write the peculiar characters of duck. *[May-'22]*

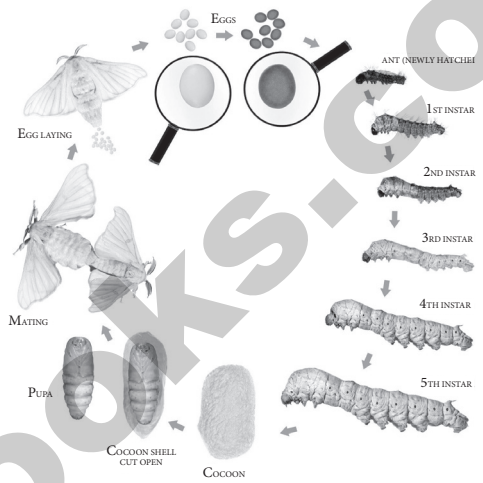
Ans. **Peculiarity characters of ducks :**

1. The body is fully covered with oily feathers.
2. They have a layer of fat under their skin which prevents it from getting wet.
3. They lay eggs at night or in the morning.
4. The ducks feed on rice bran, kitchen wastes, waste fish and snails.

30. Explain the life cycle of *bombyx mori.*

[Sep-2021; May & Aug-'22]

Ans.



Life cycle of *Bombyx mori*

1. The adult *Bombyx mori* is about 2.5 cm in length and pale creamy white in colour.
2. Due to heavy body and feeble wings, flight is not possible by the female moth. This moth is unisexual in nature and does not feed during its very short life period of 2-3 days.
3. Male moth copulates with female for about 2-3 hours and if not separated, they may die.
4. A single female moth lays 400 to 500 eggs depending upon the climatic conditions. Two types:
   - (i) **Diapause type:** Laid by silkworms inhabiting the temperate regions
   - (ii) **Non-diapause type:** Laid by silk worms inhabiting subtropical region like India.
5. The eggs after ten days of incubation hatch into larva called as caterpillar.
6. The newly hatched caterpillar is about 3 mm in length and is pale, yellowishwhite in colour.
7. The caterpillars are with well developed mandibulate type of mouth-parts to feed easily on the mulberry leaves.
8. After 1st, 2nd, 3rd and 4th moultings caterpillars get transformed into 2nd, 3rd, 4th and 5th instars respectively. It takes about 21 to 25 days after hatching.
9. The fully grown caterpillar is 7.5 cm in length and develops salivary glands, stops feeding and undergoes pupation.

ii. **Artificial incubation :**

More number of eggs can be incubated in a chamber (Incubator).

4. **Brooding :**

Caring and management of young chicks for 4 – 6 weeks immediately after hatching is called **brooding.** It can also be categorized into two types namely **natural brooding** and **artificial brooding.**

5. **Housing of Poultry :**

To protect the poultry from sun, rain and predators it is necessary to provide housing to poultry. Poultry house should be moisture- proof, rat proof and it should be easily cleanable and durable.

6. **Poultry feeding :**

The diet of chicks should contain adequate amount of water, carbohydrates, proteins, fats, vitamins and minerals.

ADDITIONAL

CHOOSE THE CORRECT ANSWERS 1 MARK

I. CHOOSE THE CORRECT OPTIONS FOR THE BELOW QUESTIONS:

1. **Which is a breed of West Bengal?**
   (a) Silkie (b) Chittagong
   (c) Deoni (d) Brahma
   [Ans. (b) Chittagong]

2. **Which is not a characteristic of leghorn?**
   (a) Small size (b) Meat production
   (c) Single comb
   (d) Wattles with brown colour
   [Ans. (b) Meat production]

3. **Which is known as Brine shrimp?**
   (a) Chanos (b) *Artemia salina*
   (c) Carp (d) Pearl spot
   [Ans. (b) *Artemia salina*]

4. **Which is the breed of Aylesbury?**
   (a) chicken (b) fishes
   (c) duck (d) cow **[Ans. (c) duck]**

5. **Pearl oyster belongs to the Class**
   (a) Gastropoda (b) Cephalopoda
   (c) Scaphapoda (d) Pelecypoda
   [Ans. (d) Pelecypoda]

II. CHOOSE THE CORRECT OPTIONS FOR THE BELOW FILL IN THE BLANKS:

1. **The pupal period lasts for ____.**
   (a) 10 - 12 days (b) 12 - 14 days
   (c) 15 days (d) 8 - 10 days
   [Ans. (a) 10 - 12 days]

2. **Life cycle of *Bombyx mori* shows ____.**
   (A) Cocoon (B) Pupa
   (C) Eggs (D) Instars
   Select the correct order of development
   (a) C B A D (b) C A B D
   (c) C D B A (d) C D A B
   [Ans. (d) C D A B]

3. **_____ is called African bee.**
   (a) *Apis indica* (b) *Apis dorsata*
   (c) *Apis adamsoni* (d) *Apis mellifera*
   [Ans. (c) *Apis adamsoni*]

4. **There are _____ well defined breeds of cattle.**
   (a) 24 (b) 26 (c) 20 (d) 18
   [Ans. (b) 26]

5. **Jersy is a _____ breed.**
   (a) Milch breed
   (b) Draught purpose breed
   (c) Game breed
   (d) Dual purpose breed **[Ans. (a) Milch breed]**

6. **Bombyx mori is divided into three races depending on ____.**
   (a) silk produced (b) length of caterpillar
   (c) voltinism (d) cocoon formation
   [Ans. (c) voltinism]

7. **The silk glands are _____ glands.**
   (a) sweat glands (b) salivary glands
   (c) oral glands (d) digestive glands
   [Ans. (b) salivary glands]

8. **The process of removing the threads from the killed cocoon is called _____.**
   (a) stifling (b) reeling
   (c) spinning (d) weaving
   [Ans. (b) reeling]

9. **In _____ the brood cells are of similar size and shape.**
   (a) *Apis dorsata* (b) *Apis adamsoni*
   (c) *Apis indica* (d) *Apis mellifera*
   [Ans. (a) *Apis dorsata*]

2. (a) Vechur breed - Smallest breed cow
(b) *Lamellidens* - Artificial pearl culture
(c) Univoltines - more than two broods
(d) Pebrine - Dangerous disease

[Ans. (c) Univoltines - more than two broods]

X. Identify the Odd-man out from the below :

1. **Identify the odd-man out regarding "Mulberry varieties".**
(a) Victoryl (b) S36
(c) G9 (d) G4 [Ans. (c) G9]
Reason: Except G9, others are improved mulberry varieties.

2. **Identify the odd-man out regarding "Indigenous or native fresh water fishes".**
(a) Major carps (b) *Catla*
(c) *Clarias* (d) Grey mullet
[Ans. (d) Grey mullet]
Reason: Grey mullet is Fish cultured in brackish water. Others are the Indigenous or native fresh water fishes.

Very Short Answers 2 Marks

1. **What are biological indicators of soil fertility?**
Ans. 1. Earthworms are also called as **"biological indicators of soil fertility"**.
2. The reason is that they support bacteria, fungi, protozoans and a host of other organisms which are essential for sustaining a healthy soil.

2. **What is Vermitech?**
Ans. Applications of earthworm in technology of composting and bioremediation of soils and other activities is called **Vermitech.**

3. **Define Vermiculture.**
Ans. **Vermiculture** is the process of using earthworms to decompose organic food waste, into a nutrient-rich material capable of supplying necessary nutrients which helps to sustain plant growth.

4. **What are the components of the sericulture industry?**
Ans. It is an agro-based industry comprising three main components :
1. Cultivation of food plants for the silkworms.
2. Rearing of silkworms.
3. Post cocoon processing.

5. **What is post cocoon processing?**
Ans. The method of obtaining silk thread from the cocoon of silkworm is known as post cocoon processing. This includes **stifling** and **reeling.**

6. **What is moriculture?**
Ans. 1. In sericulture, the first component, is to grow the food plants for the silkworms.
2. Mulberry leaves are widely used as food for silkworm *Bombyx mori* and the cultivation of mulberry is called as **Moriculture.**

7. **What is apiculture?**
Ans. Care and management of honey bees on a commercial scale for the production of honey is called **Apiculture** or **Bee Keeping.**

8. **Name the two types of bee hives.**
Ans. Langstroth and Newton.

9. **Mention the uses of honey.**
Ans. 1. It is used as an antiseptic, laxative and as a sedative.
2. It is generally used in Ayurvedic and Unani systems of medicine.
3. It is also used in the preparation of cakes, breads and biscuits.

10. **What is bee wax and where it is secreted?**
Ans. 1. **Bee wax** is secreted by the abdomen of the worker bees at the age of two weeks.
2. The wax is masticated and mixed with the secretions of the cephalic glands to convert it into a plastic resinous substance.
3. The resinous chemical substance present in the wax is called **propolis.**

11. **What is swarming in lac culture?**
Ans. 1. The mass emergence of larvae from the egg of lac insect in search of a host plant is called 'swarming'.
2. After settling on the host, the larvae start feeding continuously and the secretion of lac also starts simultaneously.

12. **What is aquaponics?**
Ans. Aquaponics is a technique which is a combination of aquaculture (growing fish) and hydroponics (growing plants in non-soil media and nutrient-laden water).

13. **What are the advantages of aquaponics?**
Ans. 1. Aquaponics may also prevent toxic water runoff.
2. It also maintains ecosystem balance by recycling the waste and excretory products produced by the fish.

14. What is aquaculture?

Ans. Aquaculture is a branch of science that deals with the farming of aquatic organisms such as fish, molluscs, crustaceans and aquatic plants.

15. Name some indigenous cow breeds in India.

Ans. Red Sindhi, Gir, Sahiwal, Ongole.

16. What is harvesting in fish culture?

Ans.
1. Harvesting is done to capture the fishes from the water.
2. Well grown fishes are taken out for marketing.
3. Different methods of fishing are carried out to harvest fishes. These include Stranding, Angling, Traps, Dipnets, Cast nets, Gill nets, Drag nets and Purse nets.

17. What is Isinglass?

Ans.
1. **Isinglass** is a high-grade collagen produced from dried air bladder or swim bladder of certain fishes viz. catfish and carps.
2. The processed bladder which is dissolved in hot water forms a gelatin having adhesive property.
3. It is primarily used for clarification of wine, beer and vinegar.

18. Define brooding and its types?

Ans.
1. In poultry farming caring and management of young chicks for 4 – 6 weeks immediately after hatching is called **brooding.**
2. It can also be categorized into two types namely **natural brooding** and **artificial brooding.**

19. What are the advantages of duck breeding?

Ans.
1. They can be reared in small backyards where water is available and needs less care and management as they are very hardy.
2. They can adapt themselves to all types of environmental conditions and are breed for feed efficiency, growth rate and resistance to diseases.

20. What is meant by cooking in sericulture?

Ans. The cocoons of silkworm are soaked in hot water (95° -97°C) for 10-15 minutes to soften the gum that binds the silk threads together. This process is called cooking. The "cooked" cocoons are kept in hot water and the loose ends of the thread are caught by hand for spinning.

21. Name some exotic fish varieties introduced in India.

Ans. *Cyprinus carpio*, *Oreochromis mossambicus*.

22. What is the purpose of feeder in a beehive?

Ans. Feeder is a basin with sugar syrup covered by grass to feed the bees during drought season. The grass prevents the bees from sinking into the syrup. It is an accessory equipment used in apiculture.

23. Name some methods employed in aquaponics.

Ans.
1. Deep water culture
2. Media based method
3. Nutrient Film technique
4. Aqua vertica

24. What is Mariculture?

Ans. Culturing of animals in the water salinity ranging from 30 - 35% is called Mariculture. Some fishes like *Chanos* sp, *Mugil cephalus* are cultured here.

25. What is fish meal?

Ans. **Fish meal** is prepared from fish waste after extracting oil from the fish. The dried wastes are used to prepare food for pig, poultry and cattle. The wastes obtained during the preparation of fish meal are widely used as manure.

26. Name the factors that determine the success of marine prawn culture.

Ans. 1. Selection of site 2. Water quality 3. Soil quality 4. Availability of seed.

27. What is a 'graft' in pearl culture?

Ans. In artificial pearl culture, the piece of tissue which is inserted inside the mantle is called as 'graft' tissue.

28. What are the uses of poultry by products.

Ans. **Poultry by products:**
1. The feathers of poultry birds are used for making pillows and quilts.
2. Droppings of poultry can be used as manure in fields. The droppings are rich in nitrogen, potash and phosphates.
3. A number of poultry by products like blood-meal, feather meal, poultry by-product meal and hatchery by-product meal are used as good sources of nutrients for meat producing animals and poultry. These byproducts supply proteins, fats, vitamins and good amount of minerals.

29. Name some cattle diseases.

Ans. Rinderpest, Foot and Mouth disease, Cow pox, Hemorrhagic fever, Anthrax.

30. What is Vermiwash?

Ans. 1. Vermiwash is a liquid collected after the passage of water through a column of vermibed.
2. It is useful as a foliar spray to enhance plant growth and yield. It is obtained from the burrows or drilospheres formed by earthworms. Nutrients, plant growth promoter substances and some useful microorganisms are present in vermiwash.

31. What is a wormery or wormbin?

Ans. Earthworms can be used for recycling of waste food, leaf, litter and biomass to prepare a good fertilizer in container known as **wormery** or **wormbin**.

32. Give examples of fishes grown in Brackish water aquaculture.

Ans. *Chanos chanos,* Grey Mullet, *Pearl spots.*

Short Answers 3 MARKS

1. How are earthworms classified based on their activity?

Ans. 1. Earthworms are divided into two major groups.
2. The first group, the humus formers, dwell on the surface and feed on organic matter. They are generally darker in colour.
These worms are used for vermicomposting.
3. The second group, the humus feeders, are burrowing worms that are useful in making the soil porous, and mixing and distributing humus through out the soil.

2. How is a cocoon formed?

Ans. 1. The fully grown caterpillars of silkworm stop feeding and move towards the corner among the leaves and secretes a sticky fluid through their silk gland.
2. The secreted fluid comes out through spinneret 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.**

3. List the objectives of Animal breeding.

Ans. **Objectives of Animal breeding :**
1. To improve growth rate.
2. Enhancing the production of milk, meat, egg etc.,
3. Increasing the quality of the animal products.
4. Improved resistance to diseases.
5. Increased Reproductive rate.

4. Write two advantages of Aquaponic gardening.

Ans. **Advantages of Aquaponic gardening :**
1. **Water conservation :**
No need of water discharge and recharge as the water is maintained by recycling process.
2. **Pesticides :**
In this system use of pesticides is avoided and hence it is eco-friendly.

5. What are hatching hapas?

Ans. 1. In fish culture, the fertilized eggs are removed from the spawning place and kept into hatching hapas.
2. Hatching hapas are rectangular trough shaped tanks made up of mosquito net cloth supported by bamboo poles and fixed in the river.

6. Why are leghorns preferred in commercial farms?

Ans. 1. Leghorn breed mature early and begin to lay eggs at the age of 5 or 6 months.
2. They can also thrive well in dry areas. So they are preferred in commercial farms.

7. Define incubation in poultry farming.

Ans. 1. The maintenance of newly laid eggs in optimum condition till hatching is called **incubation.**
2. The fully developed chick emerges out of egg after an incubation period of 21 – 22 days.
3. There are two types of incubation namely natural incubation and artificial incubation. In the natural incubation method, only a limited number of eggs can be incubated by a mother hen. In artificial incubation, more number of eggs can be incubated in a chamber (Incubator).

8. How are cattles classified?

Ans. Cattles are classified into three groups based on the purpose they serve to man.
1. **Dairy breeds or Milch breeds :**
They are high milk yielders with extended lactation.
Eg: Sindhi, Gir, Sahiwal, Jersy, Brown Swiss, Holstein cattle.
2. **Draught purpose breeds :**
Bullocks are good for draught purpose.
Eg: Kangayam, Malvi.
3. **Dual Purpose breeds :**
Cows are meant for yielding more milk and bullocks are used for better drought purpose.
Eg: Ongole, Hariana.

9. Name the different methods of poultry farming.

Ans. The types of poultry farming are Free range farming, Organic method, Yarding method, Battery cage method and Furnished cage method.

10. Which bee develops from unfertilized eggs?

Ans.
1. The drone is the functional male member of the colony which develops from an unfertilized egg.
2. It depends on worker bees for honey.
3. The sole duty of a worker bee is to fertilize the queen bee.

11. How are chicken breeds classified? Name them with an example.

Ans. They are classified based on the purpose for which it is farmed.

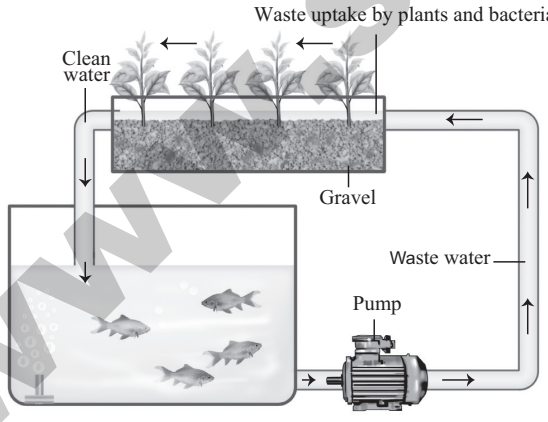
1. Egg layers	-	**Eg:** Leghorn
2. Broiler type	-	**Eg:** White Plymouth Rock
3. Dual purpose breed	-	**Eg:** Brahma
4. Game breed	-	**Eg:** Aseel
5. Ornamental breed	-	**Eg:** Silkie

12. What are the functions of a queen bee?

Ans.
1. **Queen bee** is a functional female bee present in each bee hive and feeds on Royal Jelly.
2. Its sole function is to lay eggs throughout its life span.
3. The virgin queen bee mates only once in her life.

13. Draw a diagram to show the set up for Aquaponics.

Ans.



Aquaponics – Media based method

LONG ANSWERS 5 MARKS

1. Write a note on the characteristics of cultivable fishes.

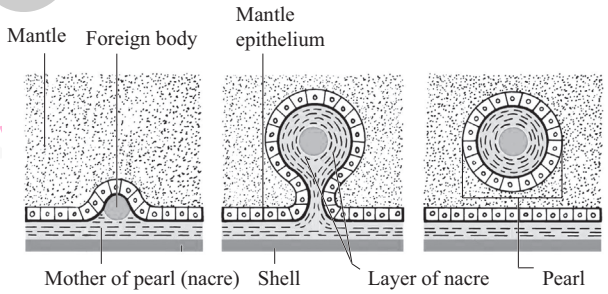
Ans. **Characteristics of cultivable fishes :**

The special characteristic features of cultivable fishes are :

1. Fishes should have high growth rate in short period for culture.
2. They should accept supplementary diet.
3. They should be hardy enough to resist some common diseases and infection of parasites.
4. Fishes proposed for polyculture should be able to live together without interfering or attacking other fishes.
5. They should have high conversion efficiency so that they can effectively utilize the food.

2. How is a pearl formed?

Ans. **Pearl Formation :**



1. When a foreign particle accidently enters into the space between mantle and shell of the oyster, it adheres to the mantle.
2. The mantle epithelium encloses it like a sac and starts to secrete concentric layers of nacre around it as a defensive mechanism.
3. Nacre is secreted continuously by the epithelial layer of the mantle and is deposited around the foreign particle and over a period time the formation of repeated layers of calcium carbonate makes the hard and glossy pearl.
4. When the pearl enlarges the oyster dies.
5. The shell is then carefully opened and the pearls are manually separated and graded.

3. Write a note on types of chicken breeds.

Ans. **Types of Chicken breeds:** There are more than 100 breeds. The commonly farmed chicken breeds are categorized into five based on the purpose for which it is farmed.

1. **Egg layers:** These are farmed mainly for the production of egg.

   Leghorn: Most popular commercial breed in India and originated from Italy. They are small, compact with a single comb and wattles with white, brown or black colour. They mature early and begin to lay eggs at the age of 5 or 6 months. Hence these preferred in commercial farms. They can also thrive well in dry areas.

   Chittagong: Chiefly found in West Bengal. They are golden or light yellow coloured. The beak is long and yellow in colour. Ear lobes and wattles are small and red in colour.

2. **Broiler type:** These are well known for fast growth and soft quality meat.

   White Plymouth rock: They have white plumage throughout the body. It is commonly used in broiler production. This is an American breed. It is a fast growing breed and well suitable for growing intensively in confined farms.

3. **Dual purpose breeds:** These are for both meat and egg production purpose.

   Brahma: Popularly known for its massive body having heavy bones, well feathered and proportionate body. Pea comb is one of the important breed characters. It has two common varieties namely, **Light Brahma** and **Dark Brahma**.

4. **Game breeds:** Since ancient times, special breed of roosters have been used for the sport of cockfighting.

   Aseel: This breed is white or black in colour. The hens are not good egg layers but are good in incubation of eggs. It is found in all states of India. Aseel is noted for its pugnacity, high stamina, and majestic gait and dogged fighting qualities. This breed is well-known for their meat qualities.

5. **Ornamental breeds:** Ornamental chicken are reared as pets and used for egg production and meat.

   Silkie: It is a breed of chicken has a typical fluffy plumage, which is said to feel like silk and satin. Has numerous additional special characters, such as black skin and bones, blue earlobes, and five toes on each foot, while the majority chickens only have four. Exhibited in poultry shows, and come out in various colours. Silkies are well recognized for their calm, friendly temperament. It is especially simple to maintain as pets.

❋ ❋ ❋

11th STD. **INSTANT SUPPLEMENTARY EXAM - August 2022**

PART - III - BIOLOGY

Reg. No.

Time Allowed : 3.00 Hours] **(with Answers)** **[Maximum Marks : 70**

Instructions: (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

PART - II

(BIO - ZOOLOGY)

(Marks : 35)

SECTION - 1

Note : (i) Answer **all** the questions: **(8 × 1 = 8)**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. The symmetry exhibited in Cnidarians is :

(a) Radial (b) Bilateral

(c) Pentamerous radial

(d) Asymmetrical

2. Sexually, earthworms are:

(a) Sexes are separate

(b) Hermaphroditic but not self fertilizing

(c) Hermaphroditic and self fertilizing

(d) Parthenogenic

3. **Assertion (A) :** In human Large intestine also shows the presence of villi like small intestine.

Reason (R) : Absorption of water takes place in large intestine.

(a) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

(b) Both **(A)** and **(R)** are true but **(R)** is not the correct explanation of **(A)**.

(c) **(A)** is true but **(R)** is false.

(d) **(A)** is false **(R)** is true.

4. Breathing is controlled by:

(a) Cerebrum (b) Medulla Oblongata

(c) Cerebellum (d) Pons

5. The hormone which helps in the reabsorption of water in kidney tubules is:

(a) Cholecystokinin

(b) Angiotensin II

(c) Antidiuretic hormone

(d) Pancreozymin

6. Which of the following pairings is correct?

(a) Sensory nerve - afferent

(b) Motor nerve - afferent

(c) Sensory nerve - ventral

(d) Motor nerve - dorsal

7. The maintenance of constant internal environment is referred as :

(a) Regulation (b) Homeostasis

(c) Coordination (d) Hormonal control

8. Match the following.

(1)	Bombyx mori	(i)	Arjun
(2)	Antheraea assamensis	(ii)	Mulberry
(3)	Antheraea mylitta	(iii)	Castor
(4)	Attacus ricini	(iv)	Champa

(a) (1)-(ii), (2)-(iv), (3)-(iii), (4)-(i)

(b) (1)-(iv), (2)-(iii), (3)-(i), (4)-(ii)

(c) (1)-(ii), (2)-(iv), (3)-(i), (4)-(iii)

(d) (1)-(iii), (2)-(iv), (3)-(ii), (4)-(i)

SECTION - 2

Note: Answer **any four** questions. **(4 × 2 = 8)**

9. Why blood is considered as a 'typical connective tissue'?

10. Differentiate between peristomium and prostomium in earthworm.

11. Name the two main hormones involved in the regulation of the renal function.

12. What is lymph? Write its function.

13. Comment on Acini of thyroid gland.

14. Define cross breeding.

11th STD. **INSTANT SUPPLEMENTARY EXAM - August 2022**

PART - III - ZOOLOGY

Reg. No.

Time Allowed : 3.00 Hours] **(with Answers)** **[Maximum Marks : 70**

Instructions: (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

PART - I

Note : (i) Answer **all** the questions: **(15 × 1 = 15)**

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

1. The book written by Aristotle is:
(a) History of Animals
(b) Species Plantarum
(c) Species Animalium
(d) Origin of Species

2. Which of the following have the highest number of species in nature?
(a) Insects (b) Birds
(c) Angiosperms (d) Fungi

3. Blood is the _____ connective tissue.
(a) Binding (b) Fluid
(c) Solid (d) Compound

4. Kidney of frog is :
(a) Archinephros (b) Pronephros
(c) Mesonephros (d) Metanephros

5. The Sphincter of Oddi, guards :
(a) Hepatopancreatic duct
(b) Common bile duct
(c) Pancreatic duct (d) Cystic duct

6. CO_2 is transported through blood to lung as :
(a) Carbonic acid (b) Oxy haemoglobin
(c) Carbamino haemoglobin
(d) Carboxy haemoglobin

7. Which of the following is not involved in blood clotting?
(a) Fibrin (b) Calcium
(c) Platelets (d) Bilirubin

8. Podocytes are the cells present on the :
(a) Outer wall of Bowman's capsule
(b) Inner wall of Bowman's capsule
(c) Neck of Nephron
(d) Wall of glomerular capillaries

9. Concentration of urine depends upon which part of the nephron?
(a) Bowman's capsule
(b) Length of Henle's loop
(c) Proximal convoluted tubule
(d) Network of capillaries arising from glomerulus

10. Muscles are derived from :
(a) Ectoderm (b) Mesoderm
(c) Endoderm (d) Neuroectoderm

11. Which structure in the ear converts pressure waves to action potentials?
(a) Tympanic membrane
(b) Organ of Corti
(c) Oval window
(d) Semicircular canals

12. Which of the following gland is related to immunity?
(a) Pineal gland (b) Adrenal gland
(c) Thymus gland (d) Parathyroid gland

13. Which of the following hormones are catecholamines?
(a) Adrenalin and nor adrenalin
(b) Thyroxine and Glyoxine
(c) Growth hormone and ACTH
(d) Oxytocin and Melatonin

14. PET scan uses :
(a) Radio isotopes (b) UV rays
(c) Ultra sound (d) IR rays

15. Which of the statement regarding Lac insect is false?

(a) A microscopic, resinous, crawling scale insect

(b) Inserts its proboscis into plant tissue suck juices and grow

(c) Secretes lac from the hind end of body

(d) The male lac insect is responsible for large scale production of lac.

Part - II

Note: Answer **any six** questions. Q. No **24** is **compulsory**. **(6 × 2 = 12)**

16. List two features that characterise Bony fishes.

17. What are the major functions of connective tissue?

18. What are worm castings?

19. What is Residual volume?

20. Draw ornithine cycle.

21. How does an isotonic contraction takes place?

22. Draw the structures of Rod and Cone cells.

23. Which instrument is known as "Berger wave"? Why?

24. Ducks always swim in water but does not get wet. Why?

Part - III

Note: Answer **any six** questions. Q. No. **33** is **compulsory.** **(6 × 3 = 18)**

25. Expand:

(i) ALIS **(ii)** DAISY **(iii)** ABIS

26. List the uses of air bladder in fishes.

27. Write the types of respiration seen in frog.

28. Write the actions of enzymes Maltase, Sucrase and Lactase on their substrates.

29. Draw and label all the types of WBC.

30. Draw cross-section of spinal cord.

31. Classify receptors, based on type of stimuli.

32. Mention the three distinct zones of Adrenal cortex.

33. Retention of Na^+ in our body is done by one hormone. Name it and mention its functions.

Part - IV

Note: Answer **all** questions **(5 × 5 = 25)**

34. (a) Compare Schizocoelom with Enterocoelom. Draw a neat labelled diagram of their development.

(OR)

(b) Draw a neat labelled diagram of the digestive system of frog.

35. (a) Write cause and symptoms of the following digestive disorders.

(i) Indigestion

(ii) Jaundice

(iii) Appendicits

(OR)

(b) Describe the events in inspiration and expiration with the help of flow chart.