REPRODUCTION IN ANIMALS

All living organisms produce young ones of their own kind e.g.a dog gives birth to puppies, a cat produces kittens. The production of new individuals from parents is known as reproduction. It is one of the most important property of living beings as it ensures the continuation of similar kinds of individuals generation after generation.

◈ Reproduction

Reproduction is the process by which plants and animals produce young ones of their own kind.

Modes of reproduction

Reproduction can be (a) Asexual (b) Sexual

◈ Reproduction in plants

In asexual reproduction, the vegetative part of the plant such as root, stem or leaf is capable of producing its own kind if it gets proper condition for its growth. Commonly plants reproduce asexually by roots, stems and leaves.

Banana, ginger potato are the examples of stems growing into a new plant.

In asparagus, sweet potato and dahlia, it is the roots which give rise to a new plant. In Bryophyllum, the leaves produce new plants.

In sexual reproduction there are male and female reproductive parts located in the flower. These produce male and female gametes and fertilization occurs and ultimately seeds are produced. These seeds produce a new plant.

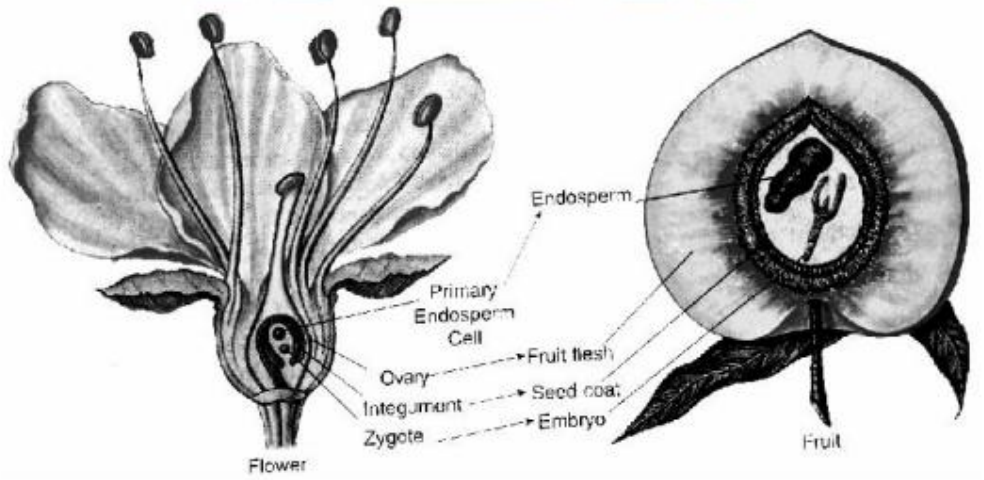


Fig. V.S. of flower and fruit

Reproduction in animals

Majority of the animals reproduce sexually. Sexual reproduction involves two individuals belonging to two different sexes-male and female. Both male and female produce specialized sex cells called gametes. Males produce male gametes (sperms) in testes and females produce female gametes (eggs) in ovaries. During fertilization, these two special cells, i.e., male gametes (sperm) and female gamete (egg) fuse together. Their fusion is termed as fertilization. As a result of the fusion of two gametes a structure (cell) is formed which is known as Zygote.

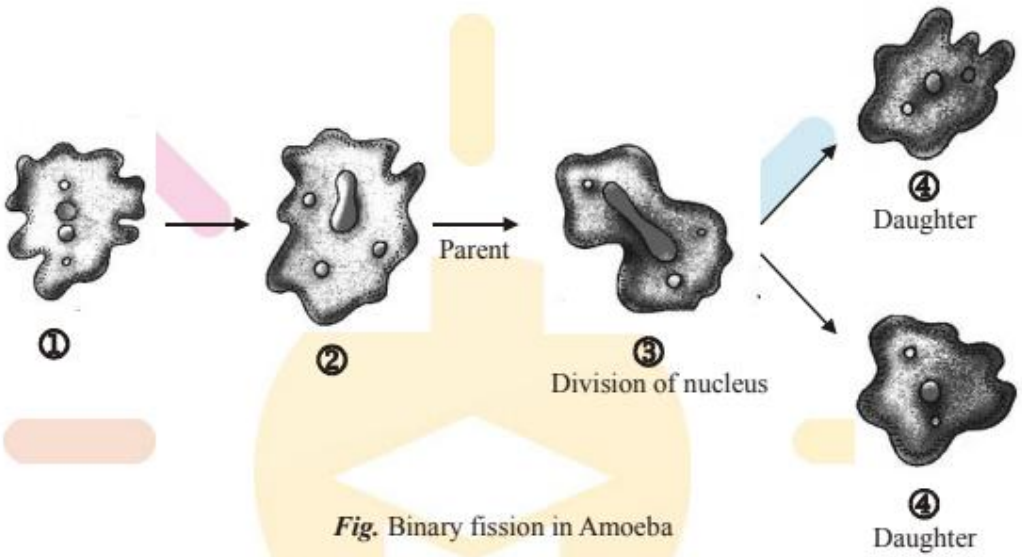


Fig. Binary fission in Amoeba

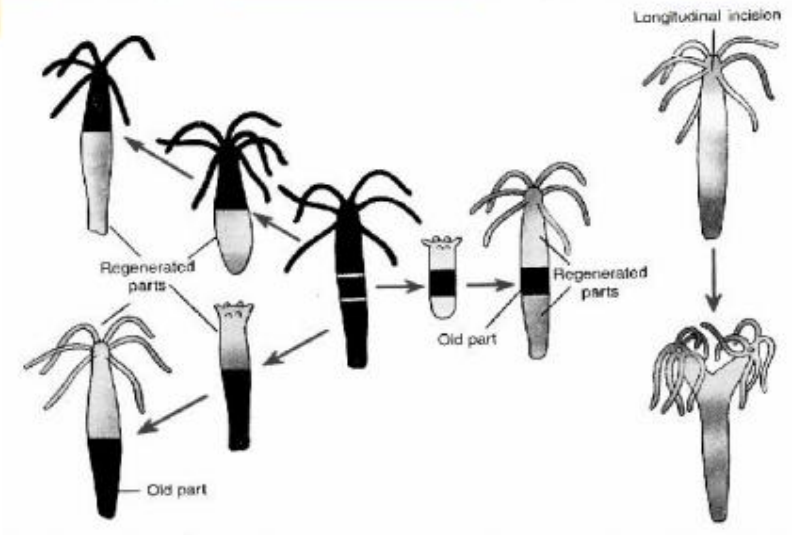


Fig. Regeneration in Hydra

◈ Fertilization

The process of fusion of male and female gametes to produce zygote is termed as fertilization.

◈ Development of Animals

- Some animals lay eggs.These are called oviparous Examples–insects, lizards, birds etc.
- Some animals produce or give birth to young ones. These are called viviparous Examples–Mammals.

Sexual reproduction in humans

Reproduction in humans is internal i.e. fertilization and development of zygote takes place inside the body of the female.

Active reproductive life in humans begins at puberty–a stage when reproductive organs become functional. The onset of sexual maturity occurs in boys between the age of 11 and 16 and in girls between the age of 10 and 15, which is marked by the appearance of secondary sexual characters.

Male reproductive system

Organs of the male reproductive system are

- **Testes :** A pair of testes lies in a small sac like structure called the scrotal sac. The function of testes is to produce Sperms (male gametes). It is the primary sex organ of male.
- **Epididymis :** It stroes sperms. Sperms become active and develop motility.
- **Vas deferens :** It is a duct which carries sperms from the testes to the penis for ejaculation.
- **Penis :** It is used for ejecting and depositing sperms in the female genital tract.

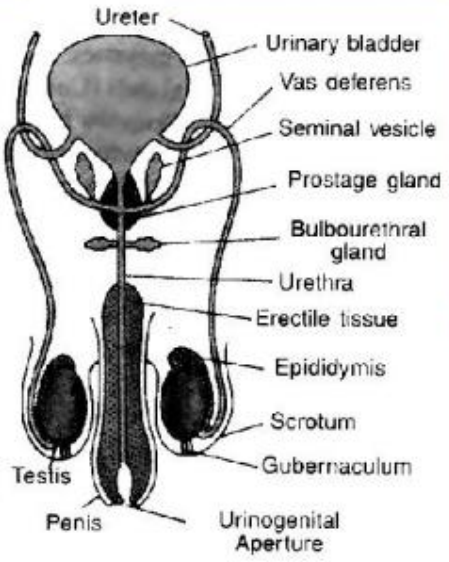


Fig. Human male reproductive system

◈ Female reproductive system

Organs of the female reproductive system are :

◆ **A pair of ovaries :** They are located in the abdominal cavity. Each ovary produces ova, the female gamete. It is the primary sex organ of female.

◆ **Oviduct or Fallopian tubes :** They are a pair of long tubes that carry the ova from the ovaries to the uterus. Oviduct has a funnel shaped opening near the ovary. Fertilization occurs in the fallopian tube.

◆ **Uterus (Womb) :** It is a pear shaped organ where the embryo develops.

◆ **Vagina :** Vagina receives sperms from the male. It also serves as the passage through which the fully developed foetus is born.

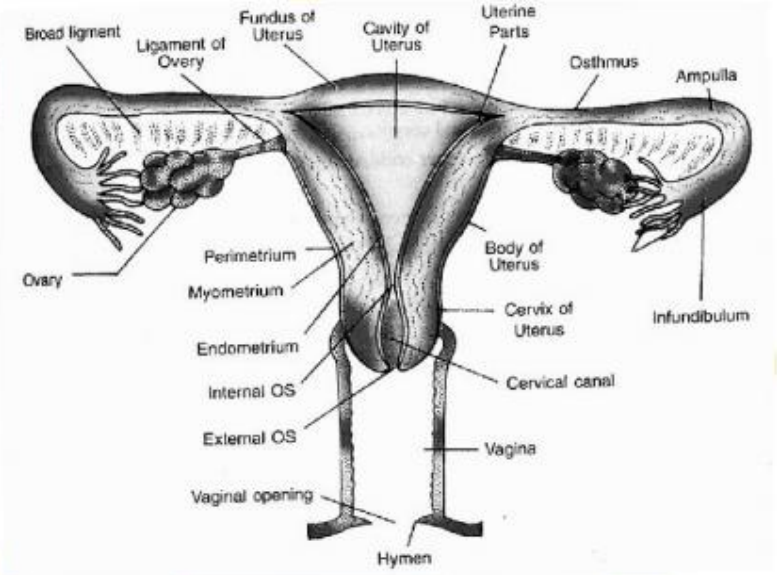


Fig. Human female reproductive system

◈ Menstrual cycle

The beginning of the menstrual cycle (monarche) marks the onset of puberty (at the age of 12–13 years) in human females and it lasts upto 40–50 years (menopause) when the reproductive capacity of the female is arrested.

◆ **Menstrual phase (Bleeding phase) :** This phase is also called the stage of menstrual flow and lasts about 4 days. During this phase, utlrus endomentrial lining is sloughed off and bleeding also takes place due to rupture of blood vessels.

◆ **Proliferactive phase :** This phase is also called **follicular phase** or stage of repair and proliferation. This is mainly influsenced by estrogens.

◆ **Ovulatory phase :** During this phase, no conspicuous chages occur in the uterus endometrium. It occurs midway between two menstrust periods.

◆ **Secretory phase :** This phsae is under the control o progesterone and estrogens. If pregancy does not retain it is followed by menstruation and so it is called **premenstrual phase.** This phase lests for about 13 to 14 days.

◈ Fertilization

Fertilization is a process in which, the egg from a female (mother) fuses with the sperm of male (father). The nuclei of the sperm and the egg fuse to form a single nucleus which is called a fertilized egg known as zygote. Zygote is the beginning of a new individual.

◈ Types of fertilization.

There are two types of fertilization in animals.

- **Internal fertilization :** When the fertilization occurs inside the body of female, as it happens in humans, it is called internal fertilization. Internal fertilization takes place in most of higher animals, e.g. birds, mammals.
- **External fertillization :** When the eggs are fertilized outside the body of the female, it is called external fertilization. Fertilization in animals like frog and fish is external. In these organisms, the eggs are discharged ouside the body, i.e., in water. On these eggs, the male discharges the sperms to fertilize them.

◈ Development of Embryo

As a result of fertilization of sperm and egg, zygote is formed. As the zygote passes down the oviduct, the zygote divides repeatedly by mitotic cell division into a small ball of cells by the process of cleavage to form a hollow ball of cells. The cells are called **blastomeres** and the cavity as **blastocoel.** Within 5-6 days after fertilization, the 'ball' moves to uterus. It attaches itself to the wall of the uterus. This process is called **implantation.**

A fertilized egg splits over and over again (two; the two into four; the four into eight) to form more and more cells. This mass of cells is called **embryo**. Gradually and slowly foundation of organs is laid in the embryo.

The growing embryo inside the uterus needs food and oxygen. It also produces nitrogenous wastes which need to be removed. These functions are performed by placenta. It is a disc like structure attached from uterine wall. A cord gets attached from the placenta with the foetus. The stage of embryo in which all body parts are identifiable is called **foetus.**

It takes about 9 months for the embryo to develop inside the mothers body.

◈ Parturition

Parturition is the act of expelling the full term young one from the mother's uterus at the end of gestation. Gestation (pregnancy) is completed in about 280 days from the start of mother's last menstruation.

Adolescence and puberty

The period of life, when the body undergoes changes, leading to reproductive maturity is called adolescence. This period of age is commonly called as teenage (13 to 18 or 19 years of age.) However, this period of adolescence varies from person to person. Usually adolescence, in girls begins a year or two earlier than in boys.

During adolescence, the body undergoes several changes. These change mark the beginning of puberty. At puberty the boys and girls start becoming capable of reproduction. The period of puberty ends when an adolescent becomes fully mature for reproduction.

◈ Changes during puberty

Many changes take place during the puberty. Some of the noticeable changes are mentioned below.

◆ **Increase in height :** During the beginning of puberty the height of the childern starts increasing. The long bones of legs and arms elongate and make the individuals tall and lanky. Sudden increase in height makes them 'slimmer'.

◈ Changes in body shape

During puberty, the pattern of growth differs in girls and boys.

◆ **In boys :** The chests and shouldern become wider as compared to girls. The body also appears more muscular than girls.

◆ **In girls :** The growth of muscles is not as much as in boys. The body shows curves in certain parts. The region below the waist becomes wider and broader.

◈ Change in voice

At puberty there is change in voice.

◆ **In boys :** The voice becomes hoarse and heavy due to the extra growth of voice box or the larynx. In most of the boys, you can see the growing voice box in the neck region just below the chin. This is called **Adam's Apple.**

◈ Activity of sweat and sebaceous glands

Sweat glands, as the name suggests are the glands which secrete sweat. These glands become active and secrete more sweat. Similarly, the sebaceous glands are glands which secrete oil. Because of the activity of these glands, the skin of young girls and boys becomes oily. Many young girls and boys develop acne and pimples at this ege due to this reason.

evelopment of sex organs

At puberty in boys, the sex organs–testes and penis develop completely and become functional. They start producing sperms. In girls, during this period ovaries enlarge and become functional. Eggs begin to mature. The ovaries also release mature eggs periodically.

◈ Emotional aspects

Young boys and girls during this period become conscious of their figure and attire. Boys and girls start taking interest in the opposite sex. Often, because of the body changes, they feel insecure and very sensitive. This is the period when they require counselling that there is no reason to feel ashamed or insecure because of the physical and emotional changes. The changes are natural part of growing and take place in the life of all individuals.

◈ Mental and intellectual Development

This period is marked by the mental development. It is the period when brain has the greatest capacity to observe and learn. Individuals during adolescence period start thinking independently. They would like to take decisions independently. Sometimes conficts develop between them and their elders at this stage. Young ones should try to remain active and problems, the young ones should talk frankly with thier parents to remove thier doubts.

◈ Secondary sexual characters

You have learnt that during puberty and adolescence period the reproductive organs mature and start functioning. In addition to the above some changes take place both in boys and girls which are visible externally as well. These changes are termed as secondary sexual characters.

Some of the secondary sexual characters are mentioned below

◆ In males :

Voice becomes deeper.

Facial hairs in the form of beard and moustaches start appearing.

Body starts becoming muscular.

Shoulders broaden

Hairs under the arm pit, chest and pubic region start growing.

◆ In females :

Development of breasts takes place

Lower region below the waist starts broadening.

Hairs start growing in the arm pits, and pubic region.

Menstruation starts.

◈ What initiates changes in males and females at puberty

The changes which take place both in males and females are controlled by certain hormones secreted by endocrine glands.

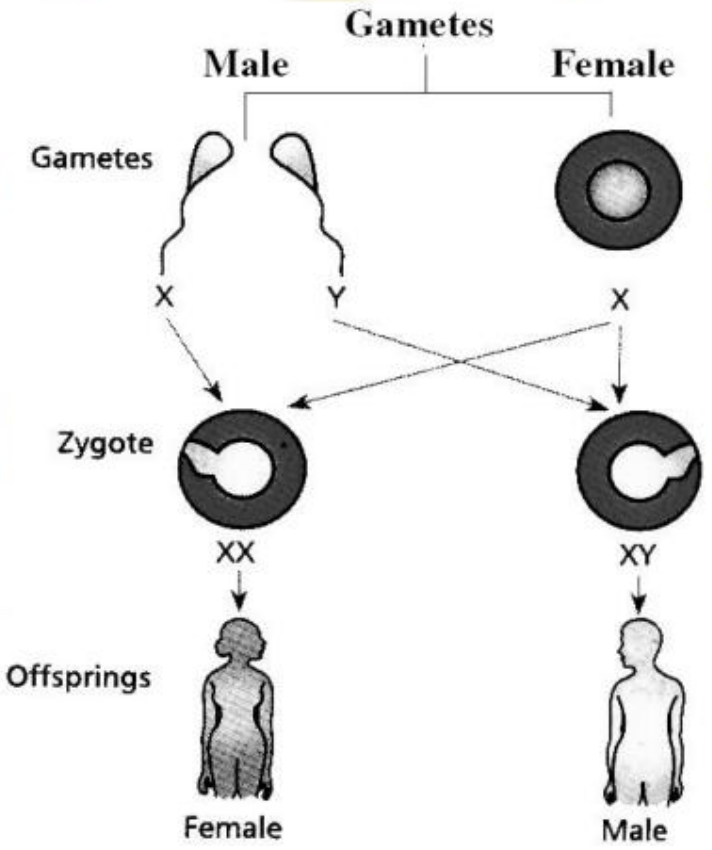
In males, the **testosterone** or male hormone is secreted by the testes at the start of puberty. This hormone is responsible for changes (secondary sexual characters) that occur during puberty.

In females, on the onset of puberty **estrogen** or female hormone is secreted by the ovaries. Estrogen makes the breasts to develop. The female hormone is responsible for the development of mammary glands (milk producing glands) in the breasts. However, the production of milk is under the control of another hormone released by pituitary gland located in the brain **(oxytocin)**

◈ How is the sex of the child to be born determined

The body cells of every human individual, whether male or female, possess 23 pair of chromosomes. Of these 23 pairs of chromosomes are similar in all respects. However 23rd pair is different. The chromosomes of 23rd pair are called sex chromosomes. In females these chromosomes are 22 + XX pairs of chromosomes and in males they are 22 + XY pairs of chromosomes. When female gametes (eggs) are produced, each egg contains 22 + X and 22 + X chromosomes. The males on the other hand produce male gametes (sperms) having 22 + X and other having 22 + Y chromosomes. During fertilization, the sex of the unborn gets decided as shown in the figure

From the above it is clear that all childern will inherit an X chromosome from thier mother regardless of whether they are boys or girls. Thus the sex of the children will be determined by what they inherit from their father. A child inheriting an X chromosome from the father will be a girl and the one who inherits Y from the father will be a boy. In our society it is often the mother who is blamed for giving birth to a girl child which is incorrect scientifically and medically.



Table

Glands, their Secretion and Hormonal Action

Glands	Hormone Secreted	Action of Hormone
Pituitary (Master Gland)	(i) Growth Hormone (GH)	Stimulates thyroid to produce throxin. Controls growth
	(ii) Prolacin	Milk production in females
	(iii) Oxytocin	Milk ejection, Child birth
	(iv) Vasopressin or ADH	Water reabsorption in kidney
	(v) Follicular stimulating Hormone (FSH)	Stimulates gonads to secrete hormones in both male and female
Thyroid	Thyroxin	Regulates growth and metabolism
Adrenal	Adrenalin (energency hormon)	Controls heart beat and blood pressure.
Pancreas	Insulin	Regulates the amount of sugar in blood.
Testes	Testosterone	(i) Sperm production (ii) Development of secondary sexual character in males
Ovary	Estrogen	(i) Egg production (ii) Development of secondary sexual character in females
	Progesterone	Maintain pregnancy

EXERCISE - 1

Single Correct Answer type Questions

Q.1 Birds are

(A) oviparous with internal fertilization (B) oviparous with external fertilization

(C) ovoviviparaous

(D) viviparous

Q.2 External fertilization occurs almost exclusively in habitat that are

(A) warm (B) tropical

(C) aquatic (D) crowded

Q.3 The period whem menstrual cycle stops is

(A) menarche (B) luteal phase

(C) menopause (D) heat period

Q.4 The gestation period refers to the period

(A) between fertilization and birth (B) of zygote developement

(C) when lining of uterus is replaced

(D) of development of secondary sexual characters

Q.5 Proliferative phase of menstrual cycle lasts for days

(A) 5 (B) 8

(C) 10 (D) 12

Q.6 A human female reaches menopause around the age of

(A) 70 years (B) 25 years

(C) 15 years (D) 50 years

Q.7 Grestation period in human beings is

(A) 80 days (B) 180 days

(C) 270 days (D) 380 days

Q.8 Onset of menstruation is due to

(A) fall in level of progesterone

(B) increse in oestrogen level

(C) increase in FSH level

(D) decrese in oxytoain level

Q.9 The hormone which sitmulates milk production in mammal is known as

(A) glucagon (B) prolactin

(C) progesterone (D) estrogen

Q.10 The set of female hormones is

(A) adrenocorticotropic and androgens (B) estradiol and progesterone

(C) testosteone androgens

(D) all above

Q.11 Repair of endometrium is undertaken by

(A) LH (B) FSH

(C) estrogen (D) protaction

Q.12 Male hormone is

(A) progesterone

(B) cropus lutecum

(C) gonadotropin

(D) testosterone.

Q.13 In mammals the female secondary sexual chracters are developed by the hormone

(A) relaxin (B) estrogens

(C) progesterone (D) gonadotropins

Q.14 Which one of the following is concerned with asexual reproduction

(A) Zygote (B) Gametes

(C) Gonads (D) Spores

Q.15 Mosquito is

(A) Oviparous (B) Ovoviviparous

(C) Viviparous (D) Parthenogentic

Q.16 Viviparity is found in :

(A) Earthowrm (B) Rabbit

(C) Frog (D) Pigeon

Q.17 Animals which give rise to more of less developed young ones are called :

(A) Oviparous (B) Ovoviviparous

(C) Vivparous (D) Parthenogentic

Q.18 Human beings are :
(A) Ovoviviparous (B) Oviparous
(C) Parthenogentic (D) Viviparous

Q.19 Animals which show viviparty include :
(A) whales (B) bony fishes
(C) running birds (D) turtles

Q.20 Which one is an oviparous animal
(A) Whale (B) Amoeda
(C) Penguin (D) Bet

Q.21 Larva of frog is called :
(A) Maggot (B) Tadpole
(C) Nymph (D) Miracdium

Q.22 The tadpole resperes by means of :
(A) Gills (B) Lungs
(C) Calls (D) Air bladder

Q.23 The extra structure that provide nutrition to the embro is
(A) chorion (B) placenta
(C) umbilicus (D) ammion

Q.24 Structure connecting the foetus to placenta is
(A) chorion (B) amnion
(C) yolk sac (D) umbilical cord

Q.25 Sperms are produced by the
(A) testes (B) ebididymis
(C) penis (D) scrotal sac

EXERCISE - 2

FILL IN THE BLANKS TYPE QUESTIONS

Q.1 Hormones are secreted by ..... glands

Q.2 Estrogen is secreted by the .....

Q.3 .....glands produce milk

Q.4 FSH is called .....stimulating .....

Q.5 The first menstruation in called .....

TRUE OR FALSE TYPE QUESTIONS

Q.6 Insulin increase blood sugar level

Q.7 Thyroxine is secreted from adrenal gland

Q.8 Testes is site for production of sperm

Q.9 Human fenale produce only one ovum in a month

Q.10 Parturition is the term for child birth

SHORT ANSWER TYPE QUESTIONS

Q.11 Define puberty and Adolescence

Q.12 What are secondary sexual characters ?

Q.13 What is adolascence ?

Q.14 What are sex hormones? Name two sex hormones.

Q.15 List the changes that occur in boys and girls during puberty.

VERY SHORT ANSWER TYPE QUESTIONS

Q.16 What is term for onset of menstruation ?

Q.17 Name the normal controlling secondary sexual charactertics in human male ?

Q.18 Name the gland secreting hormone responsible for lowering blood sugar ?

Q.19 Name the master endocrine gland ?

Q.20 Which hormone is known as emergency hormone ?

LONG ANSWER TYPE QUESTIONS

Q.21 Give an account of sex determination in humans ?

Q.22 Describe the phases of menstrual cycle

Q.23 Explain male reproductive system in human with the help of a diagram

Q.24 Explain female reproductive system with the help of a diagram

Q.25 What are hormones. List the important hormones with function secreted from endocrine glands ?

ANSWER KEY

EXERCISE-1

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	A	C	C	A	D	D	C	A	B	B	C	D	B	D	A	B	C	D	A	C
Q.No.	21	22	23	24	25															
Ans.	B	A	B	D	A															

EXERCISE-2

FILL IN THE BLANKS TYPE QUESTIONS.

Sol.1 Indocrine

Sol.2 Ovaries

Sol.3 Mammary

Sol.4 Follicle, Hormone

Sol.5 Manarche

TRUE OR FALSE TYPE QUESTIONS.

Sol.6 False

Sol.7 False

Sol.8 True

Sol.9 True

Sol.10 True