5. ADOLESCENCE

LEARNING OBJECTIVES:

1. What is adolescence
2. Puberty
3. Changes in puberty
4. Secondary sexual characters
5. Hormones

Scientific terminology:

1. Adolescene
2. Puberty
3. Maturity
4. Mesuration
5. Vagina
6. Adam's apple
7. Thyroid cartilage
8. Testosterone
9. Chromosomes

Real Life Applications :

Reproductive health and hygiene maintenance to protect from sexually transmitted diseases.

§§ Introduction :

The human beings can reproduce (by giving birth to babies) only after a **'certain age'** because their reproductive system start working only after **'certain age'**. In this chapter we will learn about the changes which takes place in a **'female' & 'male'** body after which a person becomes capable of reproduction. The changes which takes place in a human 'male body ' and a .female body ' after which a person becomes capable of reproduction. In other words we will learn about the changes which takes in a boy's body and in a girls'body after which they become capable of reproduction. We will also discuss role played by hormones in initiating the working of a male (boy's)and a female (girl's) reproductive systems, and make them fit for the process of reproduction. So, it is the hormones which bring about changes that make a child grow into an adult.

§§ Adolescence :

Growing up is a natural process. Growth begins from the day a baby is born. A baby grows and becomes a child. **A young human being below the age of full physical development is called a 'child'**. When a child crosses the age of 10 years to 11 years, there is a sudden spurt in his (or) her body growth which becomes noticable. The rapid changes which take place in the body from this age onwards are the part of **'growing up'.**

These change indicate that the person is no longer a child but he (or) she is on the way to becoming an adult. **A mature human being who is fully grown and developed is called an 'adult'.**

There is a period of life in human beings when a person is neither a child nor an adult. The transitional period of physical and mental development which occurs between childhood and adulthood is called **'Adolescence'.** In most simple words, the period of life between childhood and adulthood is called adolescence. Adolescence is the time when a lot of changes take place in the bodies of boys and girls which make their reproductive system ' mature '. We can now write another definition of adolescence as follows,

(OR)

The period of life between childhood and adulthood is called **'Adolescence'.**

(OR)

The period of a life of a person when the body udergoes a lot of changes leading to reproductive maturity is called **'Adolescence'.**

Adolescence usually begins around the age of **10 or 11 years** and lasts up to **18 or 19 years**.The period of adolescence however, varies from person to person. In girls, adolescence may begin a year or two earlier than in boys. A person who is in this process of growing from a child to an adult is called an **adolescent.** An adolescent can be a boy or a girl. Between the ages of 10 or 11 years and 18 or 19 years, the rapidly growing children are called adolescents. Since the period of adolescence covers the **' teen** ' years (thirteen to nineteen years), therefore adolescents are also called **' Teenagers' .** The human undergoes many changes during adolescence. These changes mark the onset of puberty. **Puberty** is the period during which adolescents reach sexual maturity and become capable of reproduction. From this discussion we conclude that :

1. Adolescence is the time between childhood and adulthood.
2. Puberty is the time when adolescents become sexually mature.

we will now discuss puberty in detail.

§§ Puberty

The period which adolescent boys and girls reach sexual maturity and become capable of reproduction is called **'puberty'.** After attaining puberty, an adolescent becomes capable of having a baby.

Puberty tends to start earlier in girls (females) than in boys (males). Generally girls attain puberty at a lower age of 10 - 13 years, while boys reach puberty at a comparatively higher age of 12 - 14 years. At puberty, many changes occur in the bodies of boys and girls.In both boys as well as girls, there is a **rapid increase in the rate of growth** (height etc) during puberty. Puberty is marked by the development of secondary sexual characteristics in boys and girls (such as growth of facial hair and deeper voice in boys and development of breasts and start mensuration in girls. The most significant sign of puberty in girls is the beginning of mensuration (or monthly periods).

¶¶ The various changes which occur in boys during puberty :

1. Hair grows on the face of boys and on chest.
2. Voice deepens in boys. It becomes low pitched voice.
3. Testis starts to make sperms.
4. Testis and penis become larger.
5. Chest and shoulders of boys become broaden.
6. Body becomes muscular.
7. Rapid increase in height occurs.
8. Hair grows in armpits and in pubic regions between the thighs.
9. Rapid increase in height occurs.
10. Feelings and sexual drives associated with adult hood begin to develop.

¶¶ The various changes which occur in girls during puberty :

1. Breasts develop and enlarge in girls.
2. Ovaries start to release eggs.
3. Menstruation begins.
4. Ovaries, oviducts, uterus and vagina enlarge.
5. Hips of girls broaden. Extra weight is deposited on hips and thighs.
6. Hair grow in armpits and in pubic regions.
7. Rapid increase in heights occur.
8. Feelings and sexual drives associated with adult hood begin to develop.

All the changes which occur in boys and girls at puberty are brought about by various hormones. When a boy or girl reaches puberty, he or she becomes an adolescent. Adolescence continues until the age of about 18 years. When the growth stops and the person becomes an adult. We will now describe the changes taking place during puberty in detail.

§§ Changes at puberty :

Puberty marks the beginning of the reproductive period when one becomes capable of reproduction. We will now discuss some of the changes which take place in adolescent boys and girls at puberty in detail.

1. Increase in height :

The most conspicuous change during puberty is the **sudden increase in the height** of boys and girls. At the time puberty, the long bones elongate or lengthen and make a person tall. Thus, the children gain a lot of height during puberty. Initially, girls grow faster than boys but by about 18 years age, both boys abd grirls reach their maximum height. Generally the maximum height of girls is slightly less than that of boys.

The rate of growth in height varies in different persons. Some boys and girls may grow suddenly at puberty and then slow down , while others say grow gradually. All the parts of the body do not grow at the same rate. Sometimes the arms and legs, or hands and feet of adolescent boys and girls look overised and out of proportion with the body. But soon the other parts catch up with them in growth. This results in a more proportionate body. The average rate of growth in height of boys and girls with age is given in the following table

The height of a person depends on the genes inherited from the parents. The height of a person can be calculated by the formula :

Full height of a person = Present height of a person / % of full height at present age x 100

We can use the unit centimeter or metre for height. The calculations of full height of a person will become clear from the following example

Problem : A ten year old boy is 125 cm tall. If the present height of the boy is 78% of his full height which the boy will eventually reach at the end of growth period.

Solution : Hence,

Present height of the boy = 125 cm.

Percentage of full height = 78

So, full height of the boy = Present height of boy /Percentage of full height x 100.

= 125 / 78 **x**100 cm.

= 160.25 cm.

Thus the full height of boy will be 160.25 cm.

Please note that the height of a person depends on the genes inherited from the parents. For example, if both the parents (or one of the parents) are very tall, the son or daughter is likely to be very tall. The height of a person is more or less similar to that of some family member.

Age in Years	% of Full Height	
	Boys	Girls
8	72%	77%
9	75%	81%
10	78%	84%
11	81%	88%
12	84%	91%
13	98%	95%
14	92%	98%
15	95%	99%
16	98%	99.5%
17	99%	100%
18	100%	100%

2. Change in Body shape and appearance :

When a child is small sometimes it becomes difficult to tell from appearance whether it is a boy or a girl. This is because small boys and girls have the same body shape. So it is usually the type of the clothes worn by a small child which help us in telling whether it is a boy or a girl. **When puberty sets in , a time of a rapid changes in body shape and appearance starts in boys and girls which make the boys and girls look different from one another.**

Changes in body shape and apperance :

In Boys :

(i) The shoulders become broader.

(ii) The chest becomes wider.

(iii) The body becomes more muscular.

(iv) Boys develop Adam's apple.

(v) Boys develop facial hair .

In Girls :

(i) The pelvic region widens (ii) Hips gets broaden

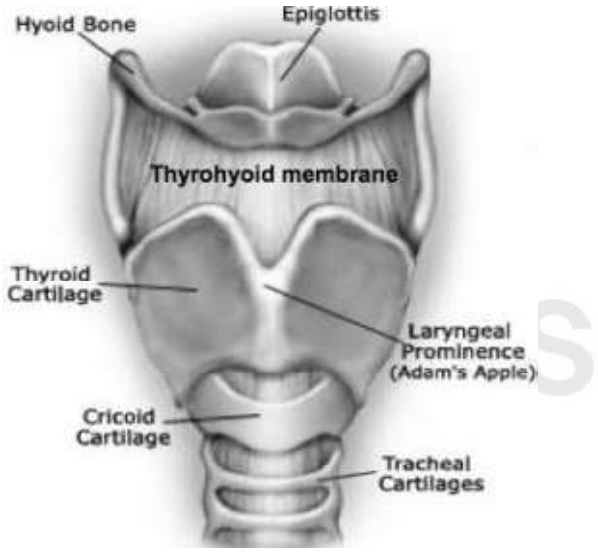
(iii) Breasts develop and increase in size. The mammary glands (milk secretion glands) develops inside the breasts.

3. Voice :

When we are taking, our voice is produced by the voice box. The voice box is in our throat . Voice box is also called **'larynx'**. At Puberty , the voice box begins to grow in boys as well as in girls.**Growth of voice box in boys is much more than the growth of voice box in girls.**Due to this, the voice box in boys becomes much bigger than the voice box in girls. This means that the grown up boys have bigger voice box in their throat whereas grown up girls have a smaller voice box in their throats. Thus, the voice of boys changes at puberty and be-

comes deeper because their voice boxes enlarge too much and become bigger in size. The bigger voice box in a grown up boy can be seen as a bulge in front of the throat (or) neck. The bulge in front of throat (or) neck in boys is called **'Adam's apple'.** Adam's apple is formed in grown up boys because of their bigger voice box in the throat. It is called an **'Adams Apple'.**

After the story of **Adam** (the first man created by god) and **Eve** (the first woman created by god) described in Bible in which Adam ate a piece of forbidden fruit (apple) in the garden of Eden which got stuck in his throat. An Adam's apple sometimes looks like a small rounded apple just under the skin in front of the throat. **Thus Adam'apple is a feature of throat of grown up boys. It is bulge in the throat (or) neck.**



According to the science :

Adam"s apple is actually a partial growth of our voice box (or) larynx. The larynx is made up of a cartilages. One of which is the largest, called a **'thyroid cartilage'**. The adam's apple is formed is due to the elongation of the thyroid cartilage, which protrudes out in front of the neck this is carried mainly by some male hormones during adolesence. As a result of this, muscles attached to the cartilage get loosened and thickened when air spaces passes through these loosened and thickened chords a hoarse sound is produced. The laryngeal prominence is usually more . More prominent in adult men than in adolescent. This is the reason for disturbance in your voice in the stage of adolescence. At the end of the adolescence stage you will get perfect voice.

4. Sweat and pimples on the face :

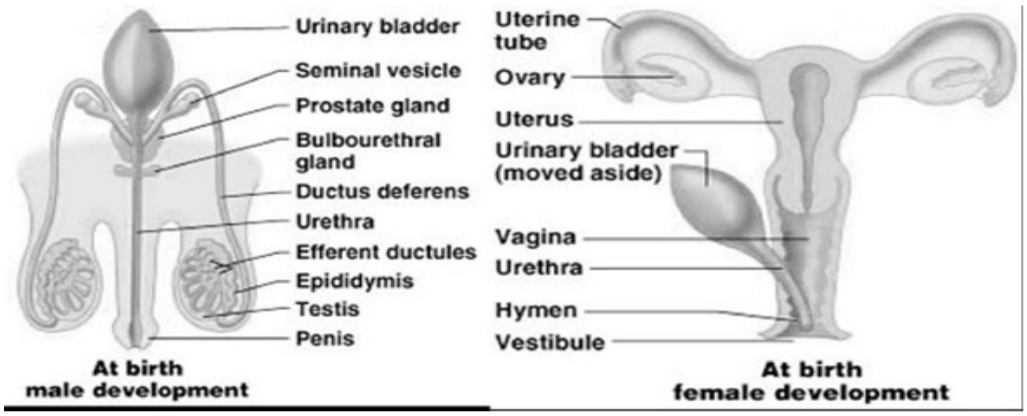
Many young boys and girls get pimples and acne on the face during puberty. **The pimples and acne are formed due to the increased activity of sebaceous glands and sweat glands present in the skin.** This happens as follows : The level of hormones in boys and girls rises too much at puberty. These hormones stimu-

late the sebaceous glands present in the skin. The increased activity of sebaceous glands (oil glands) causes them to secrete more 'oil' and the increased activity of sweat glands makes them secrete more sweat. The excess oil and sweat get collected in the tiny pores of the skin. The accumulation of oil, sweat and dead skin cells blocks the tiny pores of the skin. The accumulation of oil, sweat and dead skin cells block the tiny pores in the skin of the face. Bacteria grow in the mixture of oil, sweat and dead skin cells in the 'blocked skin pores' causing the swelling and redness of skin which leds to the formation of pimples. **Thus, pimples are caused by the clogged and infected skin pores.**

5. Development of sex organs :

a. At puberty, the male sex organs like testis and penis enlarge and develop completly. The testis begin to produce male sex cells called sperms of puberty. This makes male (boy's) reproductive system functional at puberty.

b. At puberty, the female sex organs like ovaries, oviducts and uterus enlarge and develop completely. The egg begins in mature at this stage , the ovaries start releasing mature eggs at puberty. This makes female (girl's) reproductive system functional at puberty



§§ Reaching mental, Intellectual and emotional maturiry :

During adolescene, a boy (or girl) reaches mental, intellectual and emotional maturity (Mental is called maansik, intellectual is called baudhik and emotional is called bhavatamak in Hindi).

(a) Adolescence is a period which brings maturity in a person's way of thinking,

At this stage, adolescent boys and girls spend considerable time thinking about many things occuring in their minds.

(b) Adolescnce is a period which also brings intellectual marturity. Due to intel lectual development, the boys and girls get into the habit of reasoning, and understanding things objectively. In fact, **adolescence is the time in one's life when the brain has the greatest capacity for learning.**

(c) The changes which occur in the body of boys and girls during adolescene may cause emotional swings. These emotional swings show intense feelings such as joy, anger, boredom, worries or sadness which are not based on reasoning or knowledge.

§§ Secondary sexual characteristics in humans :

These are controlled by hormones which distinguish between sexually mature males and females, but are not directly involved in reproduction are called secondary sexual characteristics. In secondary sexual characteristics, the body parts (other than sex organs) develop special features which make it easier to distingush a boy from a girl. For example, the **growth of facial hair** (like moustache and beard) in boys is a secondary sexual characteristic which helps to distinguish between a mature boy and a girl (because facial hair do not grow in girls). Similarly, the **development of breasts** in girls is a secondary sexual characteristic which helps to distinguish a girl from a boy (because boys do not develop breasts). The secondary sexual characterists start developing at the time of puberty and continue to develop through the period of adolescence.

§§ Hormones And Pubertal Changes:

The secondary sexual characterts that appear during adolescence are initiated and controlled by sex hormones. These are secreated by testes and ovaries.

1.Testes secrete male hormone or **testosterone.** This causes changes in boys.

2. In girls, ovaries produce female hormone or **estrogen.** It induces changes in girls.

The production of sex hormones is under the control of **pituitary gland.** Pituitary secretes many hormones. It is also known as **master endocrine gland.** It is located at the base of the brain.

The hormonal control of the development of secondary sexual characters in boys and girls at puberty is as follows :

1.Pituitary hormone stimulates testes/ovaries to release testosterone in male or estrogen in female.

2.Testosterone / estrogen reaches the target site. It stimulates changes in the body and produces secondary sexual characters.

§§ Menstrual cycle

Menstrual cycle consists of four phases

Menstrual phase (1 - 5) days : The wall of the uterus breaks down and men

struation begins.

Proliferative phase (6 - 13) days : Proliferation of the uterine wall occurs. The uterine wall becomes thicker by cell division.

Ovulatory phase (14) day : Ovulation (release of ovum) occurs.

Secretory phase (15 - 28) days : Uterine glands produce increased amount of watery mucus. Such a uterine wall is necessary for the implantation of the fertilized ovum.

This results in **pregnancy.** In the absence of fertilization, uterine wall breaks leading to menstruation marking a new cycle.

In case fertilization does not occur, the released egg and the lining of uterus are shed. This causes bleeding in women for every 28 days. This phenomenon is called **mensuration.**

The first menstrual flow begins at puberty and is called **menarche.**

At 45 to 50 years of age, the menstrual cycle stops. This stoppage of menstruation is termed as **menopause.**

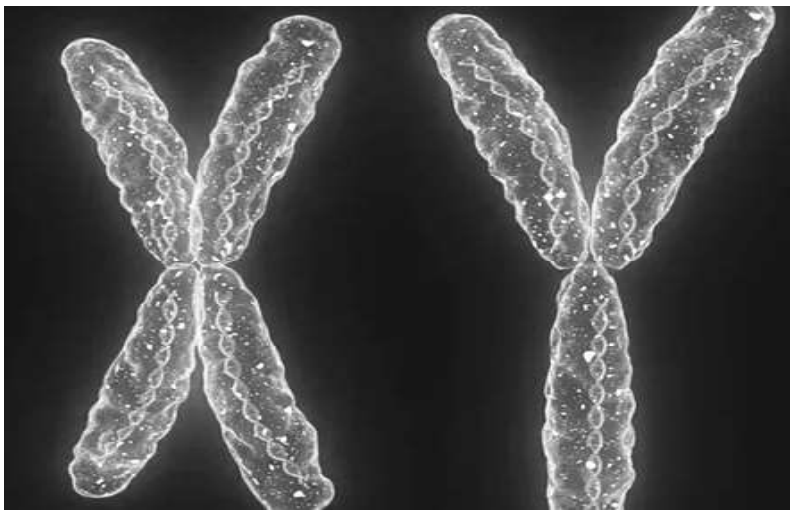
§§ Sex Determination in Humans:

Inside the fertilized egg or zygote is the instruction for determining the sex of the baby. This instruction is present in the thread-like structures, called **chro mosomes** in the fertilized egg. All human beings have 23 pairs of chromosomes in the nuclei of thier cells. Two chromosomes out of these are the sex chromosemes, named X and Y.

1. A male has one X and one Y chromosome.
2. A female has two X chromosomes.
3. Half of the male gametes (sperms) carry X chromosomes and the other half carry only Y chromosome.
4. All the female eggs carry only X chromosome.
5. When a sperm containing X chromosome fertilizes an egg (containing X chromo some), the zygote would have two X chrosomes and develop into a female child.
6. When a sperm containing Y chromosome fertilizes the egg (containing X chro mosomes) the resulting zygote (XY condition) develops into a male baby.

Egg	Sperm	Fertilized egg	Sex of the baby
X	Y	XY	Male
X	X	XX	Female

From the above discussion, it is clear that the **sex chromosome of father deter mines the sex of an unborn baby.** The old belief that the mother is responsible for giving birth to a female baby is completely wrong and full of ignorance. Thus, to blame her for the birth of a female baby is totally unjustified.



§§ Reproductive Health

According to the Health Organization (WHO), **reproductive health is defined as a state of physical, mental and social well-being of a person in all matters relating to the reproductive system at all stages of life.** Through reproductive health is required at all stages of life, but it is more essential during the period of adolescence when the body is growing rapidly and many changes are taking place in it. Some of the important **conditions of good reproductive health during adolescene** are given below **:**

(i) It is necessary to eat balanced diet during adolescene.

(ii) It is necessary to maintain personal hygiene during adolescence.

(iii) It is necessary to take adequate physical exercise during adolescence.

(iv) It is necessary to avoid taking any drugs during adolescence.

We will now describe all these conditions for maintaining good reproductive health in detail, one by one.

1. Nutritional needs of adolescents.

   a. The diet of adolescents ahould include food items made from cereals.

   b. The diet of adolescents should include fats which also give energy.

   c. The diet of adolescents should include food items containing proteins which are required for the growth of the body.

   d. The diet of adolescents should include fruits and vegetables which provide vitamins and minerals necessary for keeping good health.

2. Personal hygiene for adolescents :

   a. adolescents boys and girls should take bath regularly .

b. Adolescents girls should take special care of cleanliness of the body during the time of menstrual flow.

3. Physical exercise for adolescents :

a. All the adolescent boys and girls should do physical exercise such as brisk walking, jogging, swimming, cycling, dancing, playing, out door games or any other type of exercise.

4. No drugs for adolescents :

Drugs are chemical substances which when taken into the body changes the functions of the body, influence the mind and some times even change the behaviour of the person.

TEACHING TASK

SINGLE CORRET ANSWER MCQ's

1. Reproductive age in women starts when their

A. Menstruation starts B. Breasts start developing

C. Body weight D. Height increases

2. The sex of child is determined by

A. The presence of an ' x ' chromosome inegg.

B. The presence of a ' y ' chromosome in sperm.

C. the age of father and mother

D. The length of mother's pregancy

3. Menstrual cycle in women is controlled by

A. Nutrition B. Height C. Hormones D. All

4. The changes occuring in body and mind during adolescence are a natural part of

A. Adolescent B. puberty C.enlarging D.Growing

5. Secondary sexual charcters in girls are produced by the female sex hormone called

A. Testosterone B. Oestrogen C. Progesterone D. B&C

6. The combination of ' xy ' sex chromosomes in zygote will be ---

A. Girl B. Boy C. Both D. None

7. The right meal for adolescents consists of :

A. chips, noodles, coke B. chapati, dal, vegetables

C. rice, noodles and burger D. vegetable cutlets, chips, and lemon drink.

8. Adolescents should be careful about what they eat because :

A. proper diet develops their brains.

B. proper diet is needed for the rapid growth taking place in their body.

C. adolescents feel hungry all the time.

D. taste buds are well developed in teenagers.

9. Which of the following hormone prepares our body for action in emergency situations?

A. his blood pressure was high B. his heart beat was high

C. his blood sugar was high D. adrenaline.

ADVANCED QUESTIONS

More than one answer

¨ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D), out of which **ONE or MORE** is correct. Choose the correct options*

10. Pimples and acne are formed due to the increased activity of

1. Adrenal glands 2. sebaceous glandds

3. Thyroid glands 4. Sweat glands

A. 1 & 2 B. 2 & 3 C. 1 & 3 D. 2 & 4

11. Which of the following can lead to menstruation in a 21 year old woman during ovulation?

A. Sperms available for fertilization B. Oviducts blocked

C. Sperms are not available for fertilisation D. Oviducts not blocked

A. A and B B. B and D C. A and C D. B and D

12. Following are the events of the menstrual cycle in a correct sequence

i.Ovum dies within 24 hours after the ovulation.

ii. Uterus wall thickened withe blood vessels.

iii. Uterus walls breaks down.

iv. The ovary discharges the ovum.

A. i,iii,ii,iv B. ii,iv,i,iii C. iii,i,iv,ii D. iv,ii,iii,i

Assertion and reason

¨ *This section contains certain number of questions. Each question contains Statement – 1 (Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and*

*(D) out of which **ONLY ONE** is correct Choose the correct option.*

A. A&R are true , R explains

B. A&R are true , R doesn't explains A

C. A is true , R is false

D. A& R are false

13. **A.** Thyroid is called the gland of fight ,fright and flight.

R. The hormone thyroxine helps the body to combat against stress and emergency conditions.

14. **A.** Puberty is the stage at which an individual becomes sexually matured.

R. In girls, puberty occurs at younger stage than boys.

Match the following

¨ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in **Column–I** have to be matched with statements (p, q, r, s) in **Column–II**. The answers to these questions have to be appropriately bubbled as illustrated in the following example.*

*If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

15.

1. Menstrual phase	( )	a. 6 - 13 days
2.Proliferative phase	( )	b. 14 th day
3.Ovulatory phase	( )	c. 15 - 28 days
4 Secretory phase	( )	d. 1 - 5 days

A. 1-d,2-a,3-b,4-c B. 1-c,2-d,3-a,4-b

C. 1-c,2-a,3-b,4-d D. 1-d,2-b,3-a,4-c

16.

1.Pituitary gland	( )	a. 13-19 years
2.Adam's apple	( )	b. 18 years
3.Adolescence age	( )	c. Master gland
4. Legal age for marriage for girls	( )	d. Laynx

A. 1-d,2-c,3-a,4-b B. 1-c,2-d,3-a,4-b

C. 1-c,2-a,3-b,4-d D. 1-c,2-b,3-d,4-a

Comprehensive

¨ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which **ONLY ONE i**s correct. Choose the correct option.*

17. Hormones are the chemical substances which coordinate the activities of living organisms and also their growth.Hormones are made and secreted by specialised tissues in the body called 'endocrine glands'. The hormones are poured directly into the blood and carried through out the body by the blood circulatory ysem.Th hormones act on 'specifie tissues' or 'specific organs' in the body called ' target sites'. A hormone is produced by an endocrine gland in one part of human body but causes a particular effect in another part of the body.

Questions

i. Hormones are released by

A) Exocrine glands B) Endo crine glands

C) A &B D) None

ii. Hormones are poured directly releasing into

A) Circulatory system B) Respiratory system

c) Digestive system D) Nervous system

iii. Insulin is a hormone released by gland

A) Adrenalln B) Thyroid C) Pancreas D) Liver

iv. Hormone acts on

A) Cells B) Tissues C) Organs D) Specific tissues

1.

Choose the correct answer

1. The legal age for the marriage of boys in our country is

A. 16 years B. 18 years C. 21 years D. 24 years

2. The onset of puberty is controlled by

A. Nutrition B. Height C. Hormones D.All

3. Sexual maturity is reached at

A. Adolescent B. puberty C. both a&bD. none

4. Initially girls grow _____ than in boys

A. Less than B.more than C.faster than D.All

5. Each normal body cell in humans contains ____ pairs of chromosomes

A.21 pairs B.22 pairs C.23 pairs D.24 pairs

6. X and Y chromosomes are called ____chromosomes

A. Female chromosomesB.male chromosomes

C. Autosomes D. None

7. Secondary sexual charcters in boys are produced by the male sex hormone called

A. Testosterone B. Oestrogen C. Progesterone D. Aldosterone

8. The stoppage of menstruation in women is called

A. Menarche B Menopause C. A & B D. None

9. The first occurence of menstruation at puberty is called

A. Menarche B Menopause C. A & B D. None

10. Menstrual cycle is a period of about --- days

A. 25-30 days B.26-30 days C.27-30 days D.28-30 days

11. The combination of 'xx ' sex chromosomes in zygote will be

A. Girl B. Boy C. Both D. None

12. The age of full physical development is called

A. Adult B. CHild C. Adolescent D. All

13. A young human being below the age of full physical development is called

A. Adult B.Childhood C. Puberty D. None

ADVANCED QUESTIONS

More Than One Answer

¨ *This section contains multiple choice questions. Each question has 4 choices (A), (B), (C),(D), out of which **ONE or MORE** is correct. Choose the correct options*

1. Which of the following statements are correct concerning the menstrual cycle ?

(i) An ovum is developed and released during the menstrual cycle.

(ii) The uterine lining becomes very thin immediately after mensuration.

(iii) The fertile period is the period immediately after mensuration.

A. (i) and (ii) B. (i) and (iii) C. (ii) and (iii) D. (i), (ii) and (iii).

2. Which of the following will occur in females at puberty ?

(i) Ovulation (ii) Enlargement of breasts (iii) Broadening of breasts

A. i.ii & iii B. ii & iii C. i & iii D. None

Assertion and reason

¨ *This section contains certain number of questions. Each question contains Statement – 1 (Assertion) and Statement – 2 (Reason). Each question has 4 choices (A), (B), (C) and (D) out of which **ONLY ONE** is correct Choose the correct option.*

A. A&R are true , R explains B. A&R are true , R doesn't explains A

C. A is true , R is false D. A& R are false

3. **A.** The human beings can reproduce only after a certain age .

R. Their reproductive system start working only after certain age.

4. **A.** Young human beings below the age of full physical development is called a child.

R. A matured human being who is fully grown and developed is called an adult.

5. **A.** Adolescence usual begins around the age of10 or 11.

R. It is lasts upto the age of 45 - 50 years.

Matching the following :

¨ *This section contains Matrix-Match Type questions. Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in* ***Column–I*** *have to be matched with statements (p, q, r, s) in* ***Column–II****. The answers to these questions have to be appropriately bubbled as illustrated in the following example. If the correct matches are A-p,A-s,B-r,B-r,C-p,C-q and D-s,then the correct bubbled 4*4 matrix should be as follows:*

6. 1. Testosterone ( ) a. Menapausse

2. Progesterone ( ) b. Menstrual cycle

3. 45 - 50 years ( ) c. Male hormone

4. 28 - 30 days ( ) d. Female hormone

A. 1-d,2-c,3-b,4-a B. 1-c,2-d,3-a,4-b

C. 1-c,2-a,3-b,4-d D. 1-d,2-b,3-a,4-c

7. 1.Menarch ( ) a. Estrogen

2.Endocrnie gland ( ) b. Pituitary

3.Testes ( ) c. First menstruation

4. Female hormone ( ) d. sperm

A. 1-d,2-c,3-b,4-a B. 1-c,2-d,3-a,4-b

C. 1-c,2-a,3-b,4-d D. 1-c,2-b,3-d,4-a

Comprehensive :

¨ *This section contains paragraph. Based upon each paragraph multiple choice questions have to be answered. Each question has 4 choices (A) , (B) ,(C) and (D) out of which* ***ONLY ONE i****s correct. Choose the correct option.*

8. Sex determination in human beings

Each human cell contains 23 pairs (46) of chromosomes out of 23 pairs 22 pairs of chromosomes are autosomes.Chromosomes whose number and morphology do not differ between male and females of aspecies are called autosomes.The remaining pair

is called allosomes or sex chromosomes. Females have two 'X' chromosomes in their cells (XX) . Males have one 'X' and on 'y' chromosomes in their cells (XY) The gametes produced by a man of two types on with X chromosome and other Y chromosome.If sperm carries Y chrmosome and Fertilize the ovum. Then the baby will have XY condition.So the baby will be a boy.

Questions

i. Male chromosomes are

a) XX b) XY c) YY d) None

ii. Chromosomes whose number morphology do not differ in males and females

a) auto somes b) Allo somes c) A & B d) None

iii. If Y chromosome fertilize he ovum result will be

a) Girl b) Twins c) boy d) None

iv. Number of chromosomes in human

a) 36 b) 42 c) 46 d) 24

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Single answer questions

1. Secreted materials from ductless glands are called . **(Uttrakhand 2011)**

A.Hormones B. Enzymes C.Plasma D.None of these

2. Which of the following pairs of harmones controls the onset of puberty in boys and girls respectively. **(NTSE 2008)**

A. Testosterone B. Progesterone C. Both D. None

3. Ductless glands are also known as **(NTSE 2009)**

A.Salivary glands B.Endocrine glands C.Exocrine glands. D.A&B

4. Read the following paragraph and choose the correct sequence of words to be filled in the gaps of the paragraph .

The changes which occurs at adolescence are,controlled by ..... . These are secretions from ..... glands the ..... begins to release from the testis at the onstet of puberty. Once puberty is reached in girls ovaries begin to produce ..... The production of these hormones is under the control of anoother hormone secreted from ..... gland. **(NTSE 2009)**

A. Chemical substances, thyroid, testosterone, estrogen, thyroid.

B. hormones, endocrine, testosterone, estrogen, thoroid.

C chemical substances, pituitary, sperms, ovules, thyroid.

D. hormones, endocrine, testosrerone, estrogen, pituitary.