### REPRODUCTION IN HUMAN BEINGS

Reproduction resulting from the fusion of male gamete and female gamete is called sexual reproduction.

#### OR

The type of reproduction in which fusion of male gamete & female gamete occur is called sexual reproduction.

#### Important features of sexual reproduction are given below :

- (i) It involves two different parents i.e. one male and one female.
- (ii) Each parent produces gametes.
- (iii) Male gametes are called **sperms** while female gametes are called **ova** or **eggs**.
- (iv) The fusion of male and female gametes is called **fertilization**. It results in to the formation of a single diploid cell **zygote**.
- (v) The zygote undergoes repeated mitotic divisions to form embryo which differentiate to form full organism.
- (vi) The organism produced in this type of reproduction are genetically different from both the parents and can resemble in certain features with parents.

#### HUMAN REPRODUCTIVE SYSTEM

**Puberty :-** The age at which the gametes and sex hormones to be produced and the boy and girl become sexually mature is called **puberty**.

Generally female pubertal age is 10-12 years, male pubertal age is 13-14 years.

#### Pubertal Changes (Secondary Sexual Characters) in Male :

Widening of shoulders.

Deepening of voice.

Growth of hairs under chest, armpits and around pubic area.

Appearance of beard and moustaches.

Growth of sex organs, [Testes & Penis].

Increased Activity of sweat and sebaceous glands.

Oily skin and appearance of pimples.

Darkening in skin colour of the genital area.

#### Pubertal Changes (Secondary Sexual Characters) in Female :

Widening of pelvis and hips.

High pitch voice

Growth of hairs under armpits and around pubic area.

Initiation of menstrual cycle.

Growth of mammary glands (breasts).

Darkening in skin colour of genital area.

Maturation of secondary sex organs like fallopian tubes, uterus.



The male reproductive system consists of portions which produce the germ-cells and other portions that deliver the germ-cells to the site of fertilisation.

The formation of germ-cells or sperms takes place in the **testes**. These are located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature  $[1-3^{\circ}C]$  than the normal body temperature.

Testes secrete male sex hormone called testosterone.

In addition to regulating the formation of sperms, testosterone brings about changes in appearance seen in boys at the time of puberty. These changes are called **secondary sexual characters**.

The sperms formed are delivered through the vas deferens which unites with a tube coming from the urinary bladder. The urethra thus forms a common passage for both the sperms and urine. Hence urethra is also known as **urinogenital tract**.

Along the path of the vas deferens, glands like the **prostate gland** and the **seminal vesicle** add their secretions so that the sperms are now in a fluid which makes their transport easier and this fluid also provides nutrition.

The sperms are tiny bodies that consist of mainly genetic material and a long tail that helps them to move towards the female germ-cell (ovum).



The female germ-cells or eggs are made in the ovaries. They are also responsible for the production of female sex hormones i.e., **Oestrogen** and **Progesterone**.

When a girl child is born, the ovaries already contain thousands of immature eggs. On reaching puberty, some of these start maturing.

One egg is produced every month by one of the ovaries.

The egg is carried from the ovary to the womb through a thin oviduct or fallopian tube.

The two oviducts unite into an elastic bag-like structure known as the uterus.

The uterus opens into the vagina through the cervix.

The sperms enter through the vaginal passage during sexual intercourse. They travel upwards and reach the oviduct where they may encounter the egg.

The fertilised egg (zygote) gets implanted in the lining of the uterus.

The mother's body is designed to undertake the development of the child. Hence the uterus prepares itself every month to receive and nurture the blood to nourish the growing embryo. The lining thickens and is richly supplied with blood to nourish the growing embryo.

The embryo gets nutrition from the mother's blood with the help of a special tissue called **placenta**. This is a disc which is embedded in the uterine wall. It contains **villi**. On the mother's side are blood spaces, which surround the villi. This provides a large surface area for glucose and oxygen to pass from the mother to the embryo.

The developing embryo will also generate waste substances which can be removed by transferring them into the mother's blood through the placenta. The development of the child inside the mother's body takes approximately **nine months**. The child is born as a result of rhythmic contractions of the muscles in the uterus, called **labour pain**.



### What Happens When the Egg is not Fertilised ?

If the egg is not fertilised, it lives for about one day.

Since the ovary releases one egg every month, the uterus also prepares itself every month to receive a fertilised egg. Thus its lining becomes thick and spongy. This would be required for nourishing the embryo if fertilisation had taken place.

This lining is not needed any longer. So, the lining slowly breaks and comes out through the vagina as blood and mucous. This cycle takes place roughly every month and is known as **menstruation**. It usually lasts for about two to eight days.



## Reproductive Health :

#### Sexually Transmitted Diseases (STDs)

There are many infectious diseases which are spread by sexual contact, called *Sexually Transmitted Diseases (STDs)* e.g. AIDS, Hepatitis.

STDs occur mostly in the individuals who are involved in sexual activities with many partners.

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		Some	common sexually transmitted diseas	ses (STDs)
S.	No.	Name of STDs	Causal Organism	Symptoms
	1	AIDS (Acquired Immuno Deficiency Syndrome)	HIV (Human Immuno Deficiency Virus)	Destroy the immune system of body. Presistent cough and fever. Body attacked by other diseases like pneumonia, T.B. and certain cancers.
	2	Syphilis	<i>Treponema pallidum</i> (a bacterium)	Causes sores and lesions in the genital tract. Burning sensation at urination.
	3	Gonorrhoea	<i>Neisseria gonorrhoeae</i> (a bacterium)	Infects mucous membranes of the urinogenital tract. Genital discharge, painful urination.
	4	Trichomoniasis	<i>Trichomonas vaginalis</i> (a protozoan)	Vaginal irritation, itching and discharge.

## Methods of prevention of STDs :

- (i) The people should be educated about various STDs.
- (ii) Extra marital relations should be avoided.
- (iii) No sex without proper precaution.

(iv) High standard of moral education should be given to the people.

Methods adopted for population control :- The prevention of pregnancy in women is called contraception.

## 1. Planned control of population :

- (i) By education people about the advantages of small family
- (ii) Raising the age of marriage can help in reducing population growth.
- (iii) By family planning.

## 2. Natural method :-

- (i) Intercourse is safe for a week before and week after menstruation.
- (ii) Coitus interruptus involves withdrawing penis before ejaculation.

## 3. Mechanical methods :

- (i) It includes use of condoms which are the rubber or plastic sheets put on the penis before coital activity.
- (ii) Use of **diaphragms** or **cervical caps** fitted in vagina of female to check the entry of sperms into the uterus and also helps in avoiding conception.
- (iii) Use of **IUCD** i.e., Intra Uterine Contraceptive Devices like **copper-T** and **loops** fitted in the uterus, help to prevent fertilization. They can cause side effects due to irritation of uterus.

## 4. Chemical methods :

- (i) It consists of using some chemicals which are **spermicidal**. They may be in form of tablets, jellies, paste and creams introduced in the vagina before coital activity.
- (ii) Another chemical method is the use of oral contraceptive (OC) pills which inhibit the secretion of FSH and LH from the anterior lobe of pituitary gland and thus inhibiting ovulation from the ovary. These contraceptive therefore change the hormonal balance so that egg cell are not released and hence prevent fertilization.

## 5. Surgical methods :

- (i) **Tubectomy** involves cutting of fallopian tubes in females and **Vasectomy** involves cutting of vas deferens of each side.
- (ii) Removal of ovaries surgically is known as **ovariectomy** and removal of testes is known as **castration**.
- (iii) Another surgical method is MTP i.e. Medical Termination of Pregnancy or abortion.
- (iv) Other method is tubal ligation in which fallopian tubes are blocked by an instrument called laproscope.

	(a) vasectomy in male	methods o	(b) Tubectomy in Temale	
L	BEVIEW	OUESTI	ONS	
Expand (i) IUCI	A the following terms :   D (ii) STD (iii) HIV	QUEST	(iv) AIDS	
How d	o oral contraceptives function ?	3. F	What is contraception ?	
What d	a namely planning ?	5.	what is vasectomy ?	
What is	s the product of fusion of a sperm and	an ouum	known as?	
What c	hanges occur in girls in the age group	of 10-13	vears ?	
Draw a	well-labelled diagram depicting vasector	my and tu	ibectomy.	
Why is cycle ?	fertilization in humans possible, if copu	ilation tak	es place during the middle of the r	nenstrual
	COMPETI	rive wii	NDOW	
India w	as the first country to adopt family plan	nning as t	he government sponsored program	me in 1951.
Menaro	he : The onset of menstruation in a young	g female a	t about the age of 13 years is termed	as <b>menarche</b> .
Menop	ause : The permanent stoppage of menstr	ruation at	about the age of 45 years is termed a	s menopause.
Menstr	ual cycle is also called <b>ovarian cycle.</b>			
In hum menstri	an temale, ovulation starts only after put ial cycle.	perty and	occurs once in a month and midway	) through the
Menstri	ual cycle is absent before puberty and t	emporarily	y stopped during pregnancy.	
Menstr	ual cycle occurs only in the primates	among th	ne mammals.	6 1 1.1
<b>Parther</b> adult or In frest	ogenesis : A primitive type of sexual rep ganisms. It is found in female aphids, dro water sponges <i>(Spongilla)</i> internal bud	production ones (male is are form	in which untertilized eggs develop to es) of honey bees and termites, and c ned within the parent body. Such h	torm haploid ertain lizards. uds are called
gemmu	les. The gemmules, on arrival of favou	irable con	ditions, develop into a sponge colo	my.
After f monos	ertilization, membrane appears around permy. After the entry of sperm, ovum	the egg n complet	to prevent further entry of sperms es its maturation division.	s. It is called
<b>Amnio</b> any, of female been b	<b>centesis</b> :- Amniocentesis is a prenatal of the foetus. Unfortunately, the useful tec foetuses as it can help to detect the sex anned.	diagnostic hnique of of foetus	technique to determine the genetic amniocentesis is being misused to k also. Determination of sex by amni	t disorders, if ill the normal locentesis has

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1.

2. 4. 6. 7. 8. 9. 10.

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# FOR SCHOOL / BOARD EXAMS.

## **OBJECTIVE QUESTIONS**

**1**. Binary fission occurs in :

	(A) Amoeba	(B) Paramecium	(C) Planaria	(D) A & B both
2.	Which one of the following is c	oncerned with asexual rep	roduction ?	(_)
	(A) Zygote	(B) Spores	(C) Gametes	(D) Gonads
3.	Which type of reproduction of .	<i>Hydra</i> is most common ?		
	(A) Budding		(B) Fragmentation	
	(C) Sexual reproduction		(D) Gametogenesis	
4.	The most fundamental characte	ristics of living being :-		
	(A) Locomation	(B) Regeneration	(C) Fragmentation	(D) Reproduction
5.	Multiple fission occurs in :-			
	(A) <i>Hydra</i>	(B) <i>Plasmodium</i>	(C) <i>Planaria</i>	(D) All of these
6.	The animals consist of both ma	le & female sex known as	:-	
	(A) Viviparous	(B) Oviparous	(C) Sterile	(D) Hermaphrodite
7.	Animals which give birth to you	ing ones are called :-		
	(A) amphibious	(B) oviparous	(C) triploblastic	(D) viviparous
8.	Testes of man occur :-			
	(A) inside body		(B) upper side of kidney	
	(C) on either side of dorsal aorta	a	(D) in scrotal sacs	
9.	Fertilization of ovum takes place	e in :-		
	(A) ovary	(B) fallopian tube	(C) cervix	(D) uterus
10.	Oogenesis is a process of forma	ation of :-		
	(A) Sperms	(B) Ova	(C) Sperms and ova	(D) None of these
11.	Middle piece of a mammalian s	perm contains :-		
	(A) nucleus	(B) acrosome	(C) vacuole	(D) mitochondria
12.	Male hormone is :-			
	(A) Corpus luteum	(B) Testosterone	(C) Progesterone	(D) Gonadotropin
13.	Sperms move by :-			
	(A) head	(B) acrosome	(C) middle piece	(D) tail

#### CBSE : CLASS-X 14. Binary fission is a form of :-(A) sexual reproduction (B) asexual reproduction (C) both of these (D) none of these 15. Fertilization of frog takes place in :-(A) Uterus (B) Fallopian tube (C) Water (D) Cervix **16.** Which of the following can reproduce through regeneration ? (B) Planaria (A) Hydra (C) Wall lizard (D) Both (A) and (B) 17. Development of an organism from an unfertilised ovum is called :-(A) oogenesis (B) parthenogenesis (C) vegetative propagation (D) asexual reproduction 18. Egg-producing animals such as birds are called :-(A) unisexual (B) oviparous (C) viviparous (D) hermaphrodite **19**. What is true for gametes ? (B) They form gonads (A) They are diploid (C) They are formed from gonads (D) They produce hormones **20.** Which of these secretes seminal fluid ? (C) Seminal vesicle (D) All of these (A) Prostate gland (B) Cowper's gland 21. The normal duration of menstrual cycle is :-(A) 7-8 days (C) 3-4 days (D) none of the above (B) one day 22. Female sex hormones are :-(D) A & B Both (A) Progesterone (B) Estrogen (C) Testosterone 23. The process of attachment of blastocyst in the endometrium of uterus is known as :-(A) placentation (B) implantation (C) gestation (D) cleavage 24. Which of the following is an IUCD ? (A) Copper-T (B) Diaphragm (C) Oral pills (D) Tubectomy 25. The primary reason for increase in human population is :-(A) the increase in agricultural production (B) the increase in birth rate and decrease in death rate (C) the improvement in medical technology (D) all of the above

### FILL IN THE BLANKS

- 1. The ..... is also called womb.
- 2. The ..... is primary reproductive organ in male.
- **3.** The ..... is connecting structure which helps in the transfer of substance to and from the foetus body.
- 4. The process of laying eggs in large number is called .....
- 5. ..... is the primary reproductive organ in female.
- **6**. Testes produce .....
- 7. The cells involved in sexual reproduction are called .....
- 8. In animals like fish and frog ..... fertilisation take place.
- 9. The human zygote gets implanted in the .....
- 10. IVF stands for .....

## CHOOSE TRUE AND FALSE STATEMENTS

- 1. Internal fertilisation takes place outside the female's body.
- 2. Birds and snakes are oviparous animals.
- **3.** A tadpole is the young one of a frog.
- 4. Animals like Amoeba multiply by budding.
- 5. The fusion of male and female sex cells is called fertilisation.

## MATCH THE COLUMNS

Column-A								Colu	ımn-E	5						
1.	Ta	Tapeworm						Uterus								
2.	Va	Vasectomy						STD								
3.	8. Copper-T						(c)	IUCE	)							
4.	Implantation						(d)	Vas o	defere	ns						
5. AIDS					(e)	Hern	naphro	odite								
PROD	UCTIC	DN IN	HUMA	N BEI	NGS		A	NSW	ER I	KEY				EX	ERCIS	SE-1 (X
Objective Question :																
	Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Ans.	D	В	А	D	В	D	D	D	В	В	D	В	D	В	С
	Que.	16	17	18	19	20	21	22	23	24	25					
	Ans.	D	В	В	С	D	С	С	В	А	D					
-ill In	N THE	Bnalk	s :													
<b>1</b> . Ut	erus		<b>2</b> . 1	Testis		3.	Place	nta	4	. Sup	er ovu	Ilation				
<b>5.</b> Ovary <b>6.</b> Testosterone <b>7</b> .							Germ	erm cells <b>8</b> . External								
9. Uterus 10. In vitro fertilization							n									
<b>Frue</b>	& Fals	SE :														
<b>l</b> .F			<b>2</b> . 1	Γ		3.	Т		4	. F			<b>5</b> . T			
MATCH	н Тне	COLUM	IN:													
	0	(2) - d	I (	3)-c	(4)-	-a	(5)–b									

## CBSE : CLASS-X

## EXERCISE # 2

# FOR SCHOOL / BOARD EXAMS.

#### VERY SHORT ANSWER TYPE QUESTIONS :

- 1. Where does fertilization take place ?
- 2. What is a foetus ?
- **3**. How is an embryo produced ?
- 4. What is a zygote ?
- 5. Write three examples of animals in which external fertilization occur.
- 6. Draw a labelled diagram of male reproductive system.
- 7. Name the parts present in human sperm. Show by labelled diagram.
- 8. What is syngamy ?
- 9. What is the name given to primary sex organs ?
- 10. What are copulatory organs ?

#### SHORT ANSWER TYPE QUESTIONS :

- 1. What are the parts of a male reproductive system ?
- 2. Define metamorphosis.
- 3. How is internal fertilization differ from external fertilization ?
- 4. How does a sperm differ from an ovum ?
- 5. Draw a labelled diagram of female reproductive system.
- 6. What are oviparous & viviparous animals ?
- 7. Describe the process of development from zygote to foetus in brief.
- 8. What is puberty ?
- 9. At what age do human males and females attain puberty ?
- 10. What is tubectomy ?
- 11. Why is it important to study about reproductive health?
- 12. What is ovulation ?
- 13. Which organ enables the developing foetus to obtain nourishment from the mother's blood ?
- 14. What are Graafian follicles ?
- 15. What is gestation ?
- 16. How many follicles mature every month during the reproductive phase of a human female ?
- **17.** What is internal fertilization ? Give an example.
- 18. What happens if the mature ovum is not fertilised in a female ?
- **19.** Distinguish between

(i) Egg and Embryo (ii) Male and Female Urethra

20. Why is vagina called as 'birth canal' ?

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## LONG ANSWER TYPE QUESTIONS :

- 1. Why do female frogs produce eggs in large number ?
- 2. "Sexual reproduction is more advance than asexual reproduction" why ?
- 3. How foetus is different from embryo ?
- 4. In which female reproductive organ does the embryo get embedded and why ?
- 5. How could a single cell become such a big individual ?

#### NCERT QUESTIONS :

- 1. What is the role of the seminal vesicles and the prostate gland ?
- 2. What are the change seen in girls at the time of puberty ?
- 3. How does the embryo get nourishment inside the mother's body ?
- 4. If a woman is using a copper-T, will it help in protecting her from sexually transmitted diseases ?
- 5. What are the functions performed by the testis in human beings ?
- 6. Why does menstruation occur ?
- 7. What are the different methods of contraception ?
- 8. What could be the reason for adopting contraceptive methods ?

## CBSE : CLASS-X

## EXERCISE # 3

# COMPETITIVE EXAMS.

- 1. The importance of reproduction in organisms is because of :-
  - (A) Formation of new individuals
  - (B) Production of individuals with same traits
  - (C) Production of individuals with different traits so as to being varieties in a population
  - (D) All of the above
- 2. Twins absolutely resembling each other in sex and external appearance result when :
  - (A) Two similar sperms fertilise two similar eggs
  - (B) Same sperm fertilises two eggs
  - (C) Two halves of the same egg develop separately after it is fertilised by one sperm
  - (D) Two halves of the same egg are fertilised by two separate sperms
- 3. Copulation in human beings may result in fertilisation during (normal menstrual cycle is for 28 days)
  - (A) 4th day and 10th day

(B) 21th day and 28th day

Parent Cell

Daughter cells

(C) 11th day and 21st day (D) any day between 1st day and 28th day

4. The chart given here shows a cell division. The division is :-

- (A) Mitosis
- (B) Meiosis
- (C) Division of a zygote during development
- (D) Division of an Amoeba during binary fission
- 5. The gametes are formed as a result of :-
  - (A) Vegetative propagation
  - (C) Meiosis

(B) Asexual reproduction

(D) Mitosis

6. Which of the following tests is for determining, the sex of the foetus ?

(A) Blood group test	(B) Amniocentesis	(C) Blood sugar test	(D) pH value test
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7. The structure which provides a place for attachment and exchange of materials between mother and the foetus is called :

(A) Uterus	(B) Umbilical cord	(C) Oviduct	(D) Placenta
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8. Reproduction by budding takes place in :-

	(A) Hydra and Earthworm	(B) Hydra and Yeast								
	(C) Yeast and Bacteria	(D) Bacteria and Amoeba								
9.	During mitosis which of the following is/are equally distrib	outed in daughter cells ?								
	(A) Chloroplasts	(B) Cytoplasm								
	(C) Chromosomes	(D) Centrosome								
10.	In cells after they attain a certain size, growth stops and the this is :-	ne cell undergoes division. The probable reason for								
	(A) The volume increases more than the surface area and	the ratio between the two becomes less								
	(B) Both the volume and surface area increase in equal pr	oportion								
	(C) The surface area increases faster than the volume									
	(D) The surface area is several times more than the volume.									
11.	Puberty age in girls is between :-									
	(A) 12–18 years of age	(B) 10–16 years of age								
	(C) 14–20 years of age	(D) 15–18 years of age								
12.	Fertilisation of an ovum with a sperm takes place in :-									
	(A) Uterus	(B) Vagina								
	(C) Fallopian tube	(D) Cervix								
13.	A human zygote has :-									
	(A) 46 chromosomes	(B) 23 chromosomes								
	(C) 47 chromosomes	(D) 48 chromosome								
14.	Regeneration is a process in which :-									
	(A) A tumour is produced	(B) A new individual is produced								
	(C) Missing parts grow again	(D) Old individuals are replaced by new ones								
15.	As compared to human egg the spermatozoa has less :-									
	(A) Chromosomes	(B) Centrosomes								
	(C) Cytoplasm	(D) Mobility								

# ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Ans.	D	С	С	В	С	В	D	В	С	А	В	С	А	С	С

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CBSE : CLASS-X Important Notes