For XAT , CMAT , MAT , IIFT Exam

HOW DO ORGANISMS REPRODUCE

- Reproduction, unlike other life processes, is not essential to maintain the life of an individual organism.
- Reproduction involves creation of a DNA copy and additional cellular apparatus by the cell involved in the process.
- Various organisms use different modes of reproduction depending on their body design
- There are two modes by which animals reproduce.
    (i) Sexual reproduction, and
    (ii) Asexual reproduction

ASEXUAL REPRODUCTION

- Unicellular organisms cell division or fission leads to the creation of new individuals Example for **fission is Amoeba**
- Formation of a daughter individual from a small projection, the bud, arising on the parent body is called budding. Asexual reproduction takes place through **budding** in **yeast**
- Organisms such as hydra can regenerate if they are broken into pieces. They can also give out buds which mature into new individuals. In Hydra a bud develops as an outgrowth due to repeated cell division at one specific site.
- In algae breaking of the filament into many fragments is called **fragmentation**. Each fragment at least have one cell. Example is **spirogyra**
- **Vegetative propagation**: The vegetative part of plant (root, stem, leaf or bud) gets detached from the parent body and grows into an independent daughter plant. Roots, stems and leaves of some plants develop into new plants through vegetative propagation.

- The individual is cut or broken up into many pieces many of these pieces grow into separate individuals. For example simple animals **like Hydra and Planaria** can be cut into any number of pieces and each piece grows into a complete organism. This is known as **regeneration**
- Asexual reproduction occurs by spore formation. This is the most common method of asexual reproduction in **fungi and bacterias**

SEXUAL REPRODUCTION

- Sexual reproduction involves two individuals for the creation of a new individual.
- Sexual reproduction involves the fusion of male and female gametes
- The sexual mode of reproduction incorporates such a process of combining DNA from two different individuals during reproduction
- DNA copying mechanisms creates variations which are useful for ensuring the survival of the species. Modes of sexual reproduction allow for greater variation to be generated.

SEXUAL REPRODUCTION IN FLOWERING PLANTS

- **Flower** is the **reproductive** part of a **plant**. The reproductive parts of **angiosperms** are located in the **flower**
- **Stamens** and **pistil** are the reproductive parts of a flower which contain the germ-cells
- **Stamen** is the male reproductive part and it produces pollen grains that are yellowish in colour.
- **Pistil** is present in the centre of a flower and is the **female** reproductive part
- A pistil consists of stigma, style and ovary. Ovary contains one or more ovules
- Flowers which contain either only pistil or only stamens are called **unisexual flowers**
- **Corn, papaya and cucumber** produce unisexual flowers
- Flowers which contain both **stamens and pistil** are called **bisexual flowers**
- **Mustard, Hibiscus, rose and petunia** have bisexual flowers
- The ovary contains ovules and each ovule has an egg cell. The male germ-cell produced by pollen grain fuses with the female gamete present in the ovule. This fusion of the germ-cells or fertilisation gives us the zygote which is capable of growing into a new plant
- Reproduction in flowering plants involves transfer of pollen grains from the anther to the stigma which is referred to as pollination.
- In self-pollination pollen grains are transferred from the anther to the stigma of the same flower
- In cross-pollination pollen grains are transferred from the anther of one flower to the stigma of another flower of the same kind
- Pollination takes place in plants with the help of wind, water and insects
- After the pollen lands on a suitable stigma, it has to reach the female germ-cells which are in the ovary
- The process of fusion of male and female gametes to form a zygote is called **fertilisation**.
- In sexual reproduction a male and a female gamete fuse to form a **zygote**.
- The **zygote** divides several times to form an embryo within the ovule
- The **zygote** develops into an **embryo**

- The **ovule develops a tough coat** and is gradually converted into a **seed**. The ovary grows rapidly and ripens to form a fruit.
- The seed contains the future plant or embryo which develops into a seedling under appropriate conditions. This process is known as germination.

SEXUAL REPRODUCTION IN HUMAN BEINGS

- Reproduction resulting from the fusion of male and female gametes is called sexual reproduction.
- Fertilisation that takes place inside the female body is called internal fertilisation. This is observed in human beings and other animals such as hens, cows and dogs.
- Fertilisation that takes place outside the female body is called external fertilisation. This is observed in frogs, fish, starfish, etc
- Animals such as human beings, cows and dogs which give birth to young ones are called **viviparous animals**.
- Animals such as hen, frog, lizard and butterfly which lay eggs are called **oviparous animals.**
- Organs of the reproductive system are divided into primary and secondary (accessory) sex organs.
- Primary reproductive organs include the gonads (Testes in male and Ovaries in female).

MALE REPRODUCTIVE SYSTEM

- The male reproductive system in human beings consists of testes which produce sperms, vas deferens, seminal vesicles, prostate gland, urethra and penis.
- The formation of germ-cells or sperms takes place in the testes.
- Testes are located outside the abdominal cavity in scrotum because sperm formation requires a lower temperature than the normal body temperature.
- The role of the **testes** is secretion of the hormone **testosterone**.
- The sperms formed are delivered through the vas deferens which unites with a tube coming from the urinary bladder. Along the path of the vas deferens, glands like the prostate and the seminal vesicles add their secretions so that the sperms are now in a fluid which makes their transport easier and this fluid also provides nutrition
- The urethra thus forms a common passage for both the sperms and urine.
- 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

FEMALE REPRODUCTIVE SYSTEM

- The female reproductive system in human beings consists of ovaries, fallopian tubes, uterus and vagina.
- The **ovary** produces female gametes called ova.
- **Oestrogen** is female sex hormones. Oestrogen regulates **menstrual cycle**
- The ovaries contain thousands of immature eggs.
- 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.

- Sexual reproduction in human beings involves the introduction of sperm in the vagina of the female. Fertilisation occurs in the **fallopian tube.**
- During fertilisation the nuclei of the sperm and the egg fuse to form a single nucleus. This results in the formation of a fertilised **egg or zygote**
- The stage of the embryo in which all the body parts can be identified is called a **foetus**.
- **Uterus** is the part where development of the baby takes place.
- The uterus prepares itself every month to receive and nurture 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.
- 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.**
- If the **egg** is not fertilized 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. Now, however, 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.
- Menstruation occurs in **28 day cycles**
- Contraception to avoid pregnancy can be achieved by the use of condoms, oral pills, copper-T and other methods