How do Organisms Reproduce?

CHAPTER 8

EXAM DRILL

ANSWERS

1. Tuber of potato is the swollen underground stem and bears number of nodes or eyes. Each eye bears one or many buds. New plants are produced from the buds on the eyes of the stem tuber.

OR

Vegetative propagation is the process of formation of the plant from vegetative propagules or units, such as stem, root, leaf, buds, etc.

2. The secondary sex organs of human female are external genitilia (vulva) and mammary glands.

3. Placenta is a physiological connection between an embryo and uterine wall of the mother through which nutrients and other useful substances enter into fetus from mother's blood and waste products like urea and carbon dioxide are expelled by fetus into mother's blood.

4(i) P is pollen grain, Q is pollen tube, R is ovule and S is thalamus.

4(ii) Two male gametes are formed in pollen tube (Q) which appears due to germination of pollen grain.

4(iii) **(c) :** During post fertilisation changes, the ovary develops into fruit, ovary wall forms the pericarp (fruit wall), ovule (labelled structure R) develops into the seed and the wall of the ovule forms the protective seed coat called testa.

4(iv) **(d) :** Cells obtained from somatic tissue will grow into new plants that are genetically identical to the parent plant.

In the given figure P, Q and R represents pollen grain, pollen tube and ovule respectively. All the three are haploid in nature. S represents thalamus, a somatic tissue *i.e.*, diploid. So, it will grow into new plant which is genetically identical to plant X.

5(i) P could be copper T while S could be tubectomy.

5(ii) Mala – D, Saheli and i-pill

5(iii) **(d) :** Tubectomy involves cutting of fallopian tubes of female, and its reversibility is poor.

5(iv) **(b)**

6. **(c)**

7. **(a) :** In flowering plants, male and female reproductive organs *viz.*, stamen and carpel respectively produce gametes. One male gamete fuses with the female gamete (fertilisation) to form the diploid zygote which develops into embryo. The second male gamete fuses with two polar nuclei to form primary endosperm nucleus which gives rise to endosperm (a nutritive tissue). Hence, the act of fertilisation triggers the formation of seed from ovule and fruit from the ovary. The seeds on sowing germinate to form young plants (seedlings).

OR

(d) : Menarche is the starting phase of menstrual cycle and cessation or ending phase of menstrual cycle is menopause.

8. **(d) :** Flower is the brightly coloured reproductive part of a plant that takes part in sexual reproduction. Flowers are characteristic of angiosperms and are not found in any other group of plants. After fertilisation, ovary of a flower matures to form fruit.

9. **(c) :** Ovary is primary reproductive organ in human females. Ovulation takes place in ovary.

10. **(c)**

11. **(b) :** Regeneration in case of lizards is the regrowth in the injured region. *E.g.*, broken tail of wall lizard.

OR

(b) : In human beings, male and female gametes unite to form diploid zygote. Zygote undergoes cleavage (repeated mitotic divisions) to form 8-celled morula, followed by 16-celled blastocyst (blastula), which gets implanted in uterine wall.

12. **(c) :** Acrosome contains proteolytic enzymes (sperm lysins) that breaks outer membrane of the ovum, called the zona pellucida, allowing haploid nucleus of sperm to join with haploid nucleus of the ovum.

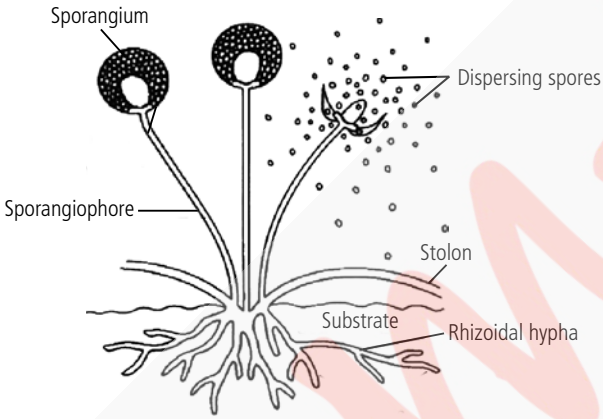
13. **(b) :** Surgical intervention blocks gamete transport and thereby prevents conception. Sterilisation procedure

in the male is called 'vasectomy' and in the female, 'tubectomy'. In vasectomy, a small part of the vas deferens is removed or tied up through a small incision on the scrotum whereas in tubectomy, a small part of the fallopian tube is removed or tied up through a small incision in the abdomen or through vagina.

14. **(a)**

15. **(a)** Spore formation is the process of formation of microscopic reproductive structures called spores. These spores when detach from the parent give rise to a new individual. Reproduction by the formation of spores is a common method of asexual reproduction in some bacteria and most of the fungi.

(b) Following figure shows the process of spore formation in *Rhizopus*:



(c) Two advantages to spore producing organism are:

(i) Some spores help organism to survive during harsh environmental conditions as spores are covered by thick walls which protect them until they come in contact with moist surface and germinate.

(ii) Spores are generally very small and light. Therefore, it ensures easy dispersal by wind, water and animal.

OR

Pollination is the process of transfer of pollen grains from the anther of a flower to the stigma of the same or another flower. Pollen grains bear male gametes which are carried to the ovary of a flower with the help of pollen tubes. Hence, pollination brings male gametes in close proximity to the female reproductive part. Hence, if there is absence of pollination, fertilisation will not occur on account of non-availability of male gamete.

16. Multiple fission is a type of division in which many individuals are formed from a single parent cell. This method of reproduction occurs in unfavourable conditions. The unicellular organism develops a protective covering called cyst, over the cell. The nucleus of the cell divides repeatedly producing many nuclei. Later on, each nucleus is surrounded by small amount of cytoplasm and many daughter cells are produced within the cyst.

17. HIV stands for Human Immunodeficiency Virus.

Yes, AIDS is an infectious disease. It is transmitted sexually or through exposure to contaminated blood.

Four modes of spreading AIDS are :

(i) Unprotected sex with an infected partner

(ii) Use of contaminated needle and syringes

(iii) Use of contaminated razors for shaving

(iv) Transfusion of infected blood or blood products.

18. The two reproductive parts of a bisexual flower which contain the germ cells are carpel (female reproductive part) and stamen (male reproductive part). Carpel is situated in the centre of the flower as a flask-shaped structure. A carpel is made up of three parts–stigma, style and ovary. The distal part of a carpel is called stigma. Stigma is responsible for receiving pollen during pollination.

Style is an elongated tubular structure which connects stigma with ovary. The basal swollen part of carpel is ovary. Ovary bears several ovules. After fertilisation ovules form seeds and ovary forms the fruit.

OR

(a) The infectious (communicable) diseases, which spread from an infected person to a healthy person by sexual contact, are called sexually transmitted diseases.

(i) Bacterial infection-gonorrhoea and syphilis.

(ii) Sexually transmitted diseases caused by virus are AIDS (Acquired Immunodeficiency Syndrome) and genital warts.

(b) Preventive measures for the diseases are:

(i) educating people in high risk groups

(ii) mutually faithful monogamous relationship

(iii) avoiding prostitution

(iv) using condoms.

19. Differences between gamete and zygote are:

S. No.	Gamete	Zygote
(i)	Gamete is the germ cell that takes part in fertilisation during sexual reproduction.	Zygote is the product of fertilisation, formed by fusion of male and female gametes.
(ii)	Gamete is haploid. There are two types of gametes - sperm in male and ovum in female.	Zygote is diploid.
(iii)	Gamete carries characteristic of one parent only.	Zygote contains characteristics of both the parents.

Gamete is a reproductive cell. It is of two types – sperm and ovum, each having one set of chromosomes obtained from respective parent. During sexual reproduction, haploid sperm and ovum fuse together to form diploid zygote. The latter grows by mitosis to develop into embryo and subsequently forms the new individual.

20. General process of growth refers to different types of developmental processes in the body like increase in height, weight, changes in shape and size of the body whereas sexual maturation involves specific changes which occur in the body of an organism at puberty like maturation of gonads, growth of body hairs, cracking of voice in males, development of breasts in females, etc.

OR

The uterus prepares itself every month to receive a fertilised egg. As a result, its lining becomes thick and spongy that would be required for nourishing the developing embryo. If fertilisation does not take place, the lining of uterus slowly breaks down and comes out through the vagina as blood and mucus, along with unfertilised egg which is known as menstruation.

21. The benefits of using mechanical barriers such as condoms and diaphragms during sexual act are:-

(i) They prevent the deposition and entry of sperms in the female genital tract during copulation thus they serve as an effective method to avoid pregnancy.

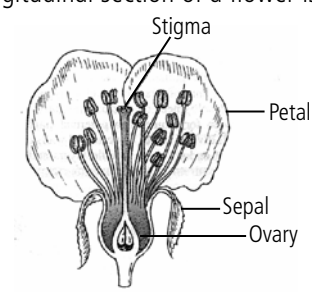
(ii) They also protect against various sexually transmitted diseases likes AIDS, syphilis, etc.

22. The full form of DNA is deoxyribonucleic acid. It is located in the nucleus of a cell in the form of chromosomes. It contains information for the inheritance of characteristics from the parents to the next generation. Copying of DNA is an essential part of the process of reproduction because it makes possible the transmission of parental characteristics to its offspring in the next generation. At the time of replication two copies of DNA are formed. DNA copying is accompanied by creation of additional cellular apparatus and then DNA copies separate, each with its own cellular apparatus. Thus, a cell divides to form two daughter cells.

23. Reproduction is the only process to ensure the continuity of a species. During reproduction, DNA passes from one generation to the next. Copying of DNA takes place with consistency but with minor variations. This consistency leads to stability of species. Hence, reproduction is linked to stability of a species population. By reproduction, organisms produce large number of new individuals of their own kind out of which several get perished and only some survive. These surviving organisms replace the naturally dying members of the population. Hence, the population as a whole is not affected and remains stable.

24. Sperms formed in testes are passed into the vas deferens (pl. vasa deferentia). The vasa deferentia loop over the urinary bladder where they are joined by ducts from seminal vesicles to form ejaculatory ducts. Seminal vesicles are one pair of sac like structures which produce mucus and watery alkaline fluid containing nutrients (fructose). Ejaculatory ducts join urethra and receive secretions of prostate gland and Cowper's gland. Prostate gland is a single large gland that pours its secretion into urethra, through small ducts. It secretes milky fluid which helps in the mobility of sperms. Cowper's glands secrete an alkaline fluid into the urethra that neutralises acids from urine. Urethra is about 20 cm long in males which runs through penis and opens to outside through male genital pore. At the time of sexual excitement, the erectile tissue of penis gets filled with blood causing penis to become erect. It is inserted into the vagina of the female where sperms are ejaculated.

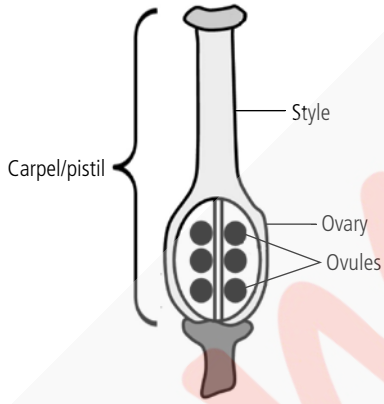
25. **(a)** The longitudinal section of a flower is as follows :



(b) The reproductive organs of an angiosperm are stamen (male reproductive part) and carpel/pistil (female reproductive part).

A carpel is made of three parts : stigma, style and ovary. The top part of carpel is called stigma. Stigma is for receiving the pollen grains during pollination. Stigma is sticky so that pollen can stick to it. The middle part of carpel is called style. Style is a tube which connects stigma to the ovary. The swollen part at the bottom of a carpel is called ovary. The ovary contains ovules. Ovules contain the female gametes or female sex cells (egg) of the plant. There are usually many ovules in the ovary. Each ovule contains only one female gamete of the plant. Swollen, bilobed stamen consists of anther and stalk called filament. Anther produces pollen grains.

(c) The diagram of the structure of female reproductive part of a flower:



26. (i) Testes : The two testes in male are the sites where male gametes, *i.e.*, sperms are formed. Testes also produce the male sex hormone called testosterone.

(ii) Seminal vesicles : Paired sac-like structures present near the base of bladder. Seminal fluid is a watery alkaline fluid that contains nutrients (fructose) which serve as a source of energy for the sperm. Each seminal vesicle releases its contents into the ejaculatory duct during ejaculation.

(iii) Vas deferens : This is a straight tube, about 40 cm long, which carries the sperms to the seminal vesicles, where mucus and a watery alkaline fluid containing fructose, mix with the sperms.

(iv) Ureter : From hilum of each kidney emerges out a slender, whitish tube called ureter. Ureter of each kidney leaves from the renal pelvis. Each ureter is about 30 cm long, 3 - 4 mm in diameter and opens into urinary bladder by slit-like aperture. The ureters carry urine from kidneys to urinary bladder.

(v) Prostate gland : It is a single large gland that surrounds the urethra and produces a milky, slightly acidic secretion. Secretion of prostate gland nourishes and activates the sperm to swim.

OR

When the ovum (or egg) is fertilised in the oviduct, then a zygote is formed. The zygote divides rapidly by mitosis as it moves down slowly in the oviduct and forms a ball of cells. This hollow ball of cells, called an embryo sinks into the soft and thick lining of the uterus and gets embedded in it. The embedding of embryo in the thick lining of the uterus is called implantation.

After implantation, a disc-like special tissue develops between the uterus wall (called uterine wall) and the embryo (or fetus), which is called placenta. The fetus is connected to placenta in mother's body through umbilical cord. It is through the placenta that all the requirements of the developing fetus like nutrition, respiration and excretion, etc., are met from the mother's body.

The time period from the fertilisation upto the birth of the baby is called gestation. The average gestation period in humans (or the average duration of human pregnancy) is about nine months. During the gestation period, the fetus grows to become a baby. Birth initiates when the strong muscles in the walls of the uterus start to contract rhythmically. The rhythmic contraction of uterus muscles gradually pushes the baby out of the mother's body through vagina and a baby is born.

If a sperm is not available at the time of ovulation, then fertilisation of ovum (or egg) does not take place. Since the ovum (or egg) is not fertilised, so the thick and soft uterus lining having lot of blood capillaries in it is not required. The unfertilised ovum dies within a day and the uterus lining also breaks down. The breakdown and removal of the inner, thick and soft lining of the uterus alongwith its blood vessels is called menstrual flow or menstruation.

27. Contraception literally means prevention of pregnancy. Different methods for the prevention of pregnancy are as follow:

(i) Barrier methods in which a mechanical barrier such as condom, cervical cap or diaphragm used for preventing the entry of sperms in the female genital tract or vagina. Thus, sperms and egg do not meet and fertilisation is prevented from taking place.

(ii) Chemical methods of contraception are those in which release of eggs from the ovary can be prevented by the intake of pills by the female. The oral pills are hormonal preparations and are also termed as oral contraceptives.

(iii) Intra-Uterine Contraceptive Devices (IUCDs) are placed in the uterus to prevent pregnancy. These devices are very effective and popularly used by females. Copper-T and Lippes Loop are examples of IUCDs. These devices are placed in the uterus by skilled personnel.

(iv) Surgical method : Contraception can also be brought about by surgically removing or tying a part of vas deferens (vasectomy) in the male and removing or tying a part of fallopian tube (tubectomy) in the female. Surgery should be performed by well trained doctors under sterile conditions.

OR

(a) Some disadvantages of vegetative propagation are:

(i) Plants produced by this technique possess less vigour.

(ii) They are more prone to diseases.

(iii) They show no genetic variations.

(b) Placenta is a specialised tissue between fetus and uterine wall of mother. It develops finger-like processes called villi, which grows into tissue of the uterus.

Functions of placenta are listed below :

(i) Provides nutrition

(ii) Helps in the exchange or gases such as oxygen and carbon dioxide

(iii) Helps in the excretion, that is the removal of nitrogenous waste material from the fetal blood to that of the mother.

(iv) It secretes hormones such as estrogen and progesterone.

(v) Placenta provides protection by partitioning the blood of the fetus and the mother. Thus, unwanted materials such as germs cannot contaminate the blood of the fetus.

(vi) Acts as a storage of glycogen. This glycogen gets converted to glucose and fulfils the energy requirement of the fetus.

28. **(a)** Reproduction is the process in which the parent organism of a particular species is able to produce offspring of its own type.

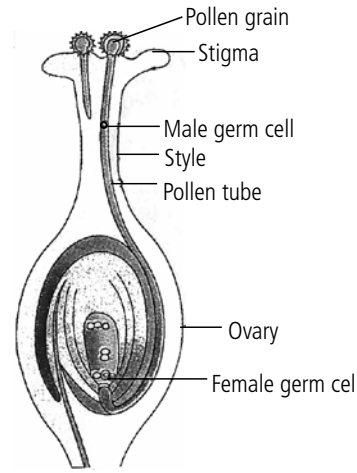
(b) In the reproducing cell more copies of DNA are made by the replication of DNA molecule. The two copies of DNA formed in the nucleus of a cell separate and each copy moves into the new cellular apparatus formed by the division of the cell. In this manner, the daughter cell receives the same blue print for the body design as that of the parent.

(c) This problem of doubling DNA in daughter organism is solved by the process of meiosis or reductional division in which the daughter cell (gametes) receives only half of the number of chromosomes compared to the germ cells. The two gametes fuse to restore original number of chromosomes.

29. **(a)** After landing on stigma, the pollen grain does not pass down the stigma. Only its pollen tube does so. The pollen tube eats its way through the solid part of the stigma and style by secreting pectinases and hydrolytic enzymes. It travels chemotropically along the concentration gradient of calcium - boron - inositol sugar complex.

The contents of the pollen grains shift into pollen tube with the tube or vegetative nucleus moving to its tip followed by the two gametes. Further, growth of the pollen tube occurs only towards its tip.

In this way, pollen tube helps the male germ cell to reach the female germ cell.

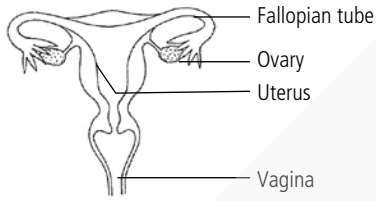


(b) The process of transfer of pollen grains from anther of a flower to the stigma of the same flower or another flower of the same species is known as pollination. The two modes of pollination are self pollination and cross pollination.

Differences between self pollination and cross pollination are as follows:

S.No.	Character	Self pollination	Cross pollination
(i)	Occurrence	Occurs within a flower or between two flowers of the same plant.	Occurs between two flowers of two different plants of the same species.
(ii)	Agent of pollination	Usually no external agent of pollination is required.	External agents such as wind, water, insects and birds are required.
(iii)	Production of pollen grains	Produced in small numbers, thus no wastage of pollen grains occurs.	Produced in large numbers thus, wastage of pollen grains occurs.
(iv)	Appearance of flowers	Flowers are generally not attractive.	Flowers are attractive with coloured petals.
(v)	Fragrance and nectar	Commonly flowers do not produce scent or nectar.	Flowers generally produce scent and nectar.
(vi)	Nature of offspring produced	Offspring produced have genetic makeup identical to the parent plant, no variation occurs.	Offspring produced may differ in genetic make-up and variations occur.

30. **(a)** (i) Ovary, (ii) Fallopian tube, (iii) Uterus, (iv) Vagina



(b) After implantation of young embryo, circulation of blood around the uterus is increased. Soon embryo derives its nutrition from the mother's blood with the help of a special tissue called placenta. This contains villi like structure embedded in the wall of uterus. Tissue and blood capillaries of uterus surround villi. Through the villi, nutrients and oxygen from mother's blood pass on to the embryo. The wastes produced by the embryo is passed on to mother's blood through the placenta.

OR

Vegetative propagation is a method of reproduction followed in some flowering plants such as potato, onion, ginger, garlic and in a number of ornamental plants. In this process, new individuals or daughter organisms are produced from the vegetative parts of the plant body such as stem, root and leaf under appropriate conditions. The buds present on the stem, root or leaves give rise to new plants. Common lawn grass, doob grass, canna, lilly, fern and sweet potato reproduce vegetatively.

Advantages of vegetative propagation:

(i) Plants produced by vegetative propagation can bear flowers and fruits earlier than those produced from seeds.

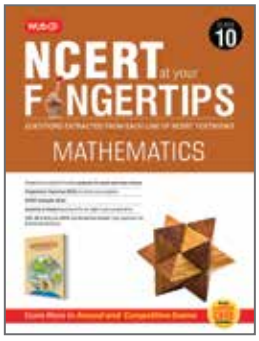
(ii) Plants which produce non-viable seeds or few seeds or have lost the ability to produce seeds can be made to reproduce vegetatively.

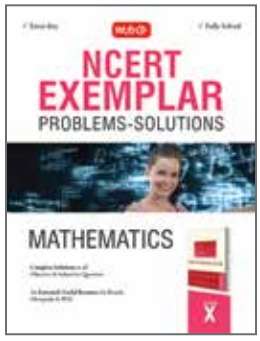
(iii) Plants produced by vegetative propagation are genetically similar to the parent plant and show all the characteristics of the parent.

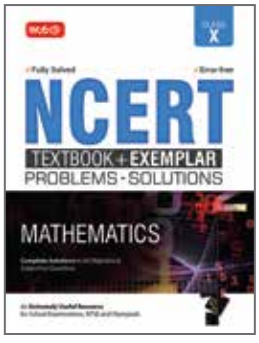
(iv) Healthy, disease free plants are produced by vegetative propagation.

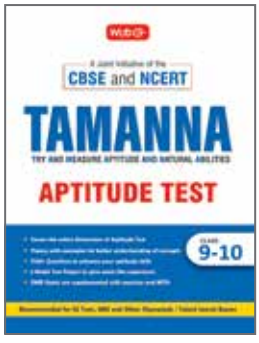
(v) It is cheap, easier and more rapid method of propagation.

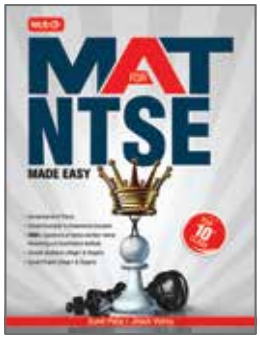
mtG BEST SELLING BOOKS FOR CLASS 10

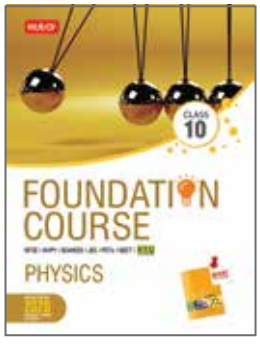


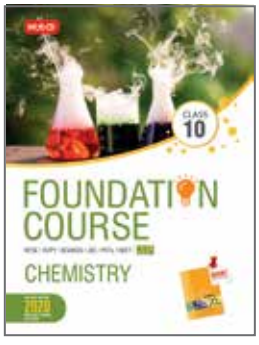


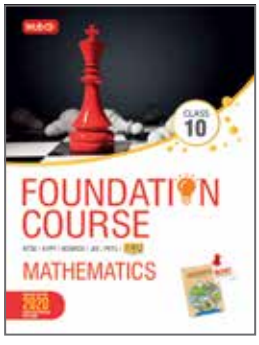


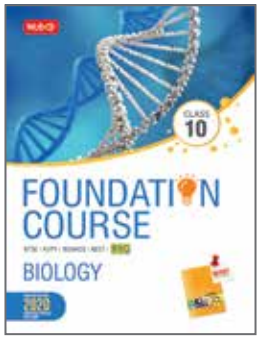


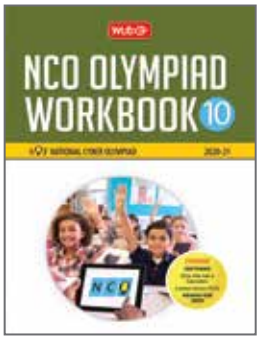


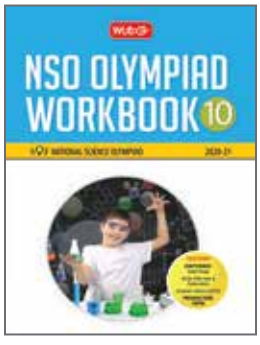


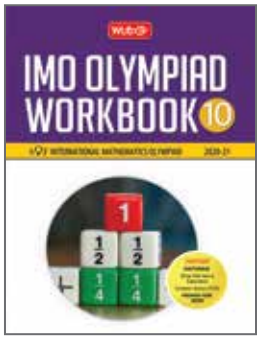


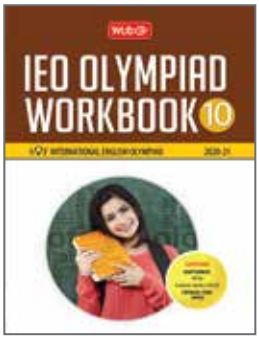


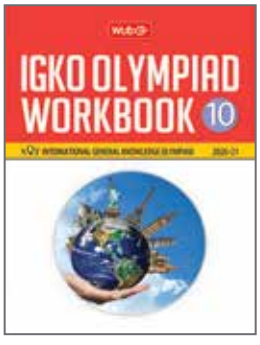


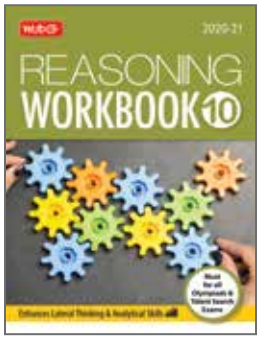












Visit www.mtg.in for complete information