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CLASS X · SCIENCE (086) · BIOLOGY · CBSE BOARD EXAMINATION 2027

CHAPTER 7

How do Organisms Reproduce?

DNA · Zygote 2n → n

Answer Booklet · CBSE marking-scheme answers with marks for every point

Every question of the chapter booklet | Marks shown point by point | MCQ keys with reasons

INSIDE THIS BOOKLET

✓	**Marking Guide** How value points and step marks are given	2
A	**NCERT Practice – Answers** 25 answers	2
B	**Exemplar Practice – Answers** 16 answers	6
C	**Board Pattern Practice – Answers** 32 answers	7
D	**Case-Based Questions – Answers** 3 case studies, every part and OR	12

HOW TO USE THE ANSWERS

1. Answer the question in your notebook **first**. Open this booklet only to check.
2. Each answer is written the way the CBSE marking scheme sets it out: **value points**, with the **mark for each point** in orange beside it.
3. Give yourself marks point by point. Use the same **key words** in your own answers.
4. Equations must be balanced; diagrams must be labelled; numericals need formula, substitution and unit.
5. Copy every wrong answer to the My Mistakes page of your booklet.

READ THIS FIRST

Marking Guide

Model answers to every question in the chapter booklet, set out the way a CBSE examiner marks them.

HOW MARKS ARE GIVEN IN SCIENCE ANSWERS

1. **MCQ and assertion–reason (1 mark):** only the correct option scores. The reason given here is for your understanding.
2. **2 and 3 marks:** one mark (or ½) for each correct **value point**. The examiner looks for the key word – a long answer without it scores less than a short answer with it.
3. **Equations:** a correct balanced equation earns its full mark; an unbalanced one, or one with wrong formulae, usually earns ½ or nothing.
4. **Numericals:** formula, substitution and the final answer **with unit** are marked separately.
5. **Diagrams:** marks for a correct drawing and for the labels asked for. An unlabelled diagram earns little.
6. **Case study (4 marks):** 1 + 1 + 2. **Long answer (5 marks):** the split is shown beside each point.

PART A · ANSWERS

A NCERT Practice – Answers

Marking-scheme answers for every question in Part A of the chapter booklet.

Why organisms reproduce

A1. What is the importance of DNA copying in reproduction? **[2]**

- DNA carries the information for making proteins, which decides the body design; copying it passes this design to the offspring. — 1
- Small changes during copying give variations, which help the species survive and evolve. — 1

A2. Why is variation useful for the survival of a species but not necessarily for an individual? **[2]**

- If the surroundings change (e.g. water warms up), some variants may be able to survive while others die. — 1
- So variation keeps the species alive over time; an individual's own variation may not help it, and may even harm it. — 1

A3. How does reproduction help in keeping the population of a species stable? **[2]**

- New individuals are born to replace those that die. — 1
- Copying of body design (with small variations) keeps the species suited to its niche, so its population stays stable. — 1

Asexual reproduction

A4. How does binary fission differ from multiple fission? Give one example of each. **[2]**

- Binary fission: one cell divides into two, e.g. Amoeba (or Leishmania). — 1
- Multiple fission: one cell divides into many daughter cells at once, e.g. Plasmodium. — 1

A5. How will an organism benefit if it reproduces through spores? [2]

A large number of spores is made, so many new individuals can form. 1

Spores have thick walls that protect them in bad conditions until they reach a moist surface and grow. 1

A6. Why can complex organisms not give rise to new individuals by regeneration? [2]

Their bodies are made of specialised tissues, organs and organ systems. 1

A piece of the body cannot form all these again, so the whole organism cannot regrow. 1

A7. Why is vegetative propagation used for growing some plants? Give two advantages. [2]

Plants that have lost the capacity to make seeds (banana, orange, rose, jasmine) can be grown this way. 1

The plants flower and fruit earlier, and all are like the parent, so useful characters are kept. 1

A8. How is binary fission in Leishmania different from that in Amoeba? [2]

Amoeba can split in any plane. 1

Leishmania has a whip-like structure at one end, so it splits in a definite plane (lengthwise). 1

A9. How does Spirogyra reproduce? Why can't all multicellular organisms reproduce this way? [2]

By fragmentation: the filament breaks into pieces and each grows into a new Spirogyra. 1

It works only for simple organisms; complex ones have specialised cells, so a piece cannot form the whole body. 1

A10. Describe budding in Hydra. [2]

A bud forms as an outgrowth at one site by repeated cell division. 1

It grows into a tiny Hydra and detaches from the parent when mature. 1

Sexual reproduction in flowering plants

A11. Name the male and female reproductive parts of a flower and state the function of each part of the pistil. [3]

Male: stamen (anther and filament), which makes pollen grains. Female: pistil (carpel). 1

Stigma receives pollen; style is the path for the pollen tube. 1

Ovary contains ovules, each with an egg cell; after fertilisation it forms the fruit. 1

A12. How is pollination different from fertilisation? [2]

Pollination: transfer of pollen grains from the anther to the stigma. 1

Fertilisation: fusion of the male germ cell with the female germ cell (egg) in the ovule to form a zygote. 1

A13. Describe the process of fertilisation in a flower and the changes that follow it. [3]

The pollen grain on the stigma grows a pollen tube that carries the male germ cell through the style to the ovule, where it fuses with the egg (zygote). 1

The zygote divides to form the embryo; the ovule forms a tough coat and becomes the seed. 1

The ovary grows and ripens into the fruit; petals, sepals, stamens, style and stigma fall off. 1

A14. Name the parts of the embryo in a seed and give the job of each. [2]

Plumule – future shoot; radicle – future root. 1

Cotyledons – store food for the growing embryo. 1

A15. Distinguish between unisexual and bisexual flowers, giving examples. [2]

Unisexual: only stamens or only pistil, e.g. papaya, watermelon. 1

Bisexual: both stamens and pistil, e.g. hibiscus, mustard. 1

Reproduction in human beings

A16. List the changes seen in boys and in girls at puberty. [3]

Both: thick hair in armpits and genital area; oily skin and pimples. 1

Girls: breasts grow; menstruation begins. 1

Boys: facial hair (beard, moustache); voice deepens. 1

A17. What are the functions of the testes? Why are they located outside the abdominal cavity? [2]

They make sperms and the hormone testosterone. 1

Sperm formation needs a temperature lower than normal body temperature; the scrotum keeps them cooler. 1

A18. What is the role of the seminal vesicles and the prostate gland? [2]

They add their secretions (fluid) to the sperms. 1

The fluid makes the transport of sperms easier and gives them nutrition. 1

A19. Name the parts of the female reproductive system and state the function of the ovary, oviduct and uterus. [3]

Ovaries, oviducts (fallopian tubes), uterus, cervix, vagina; ovary – makes eggs and hormones. 1

Oviduct – carries the egg to the uterus; fertilisation takes place here. 1

Uterus – the embryo is implanted and develops here. 1

A20. How does the embryo get nourishment inside the mother's body? [3]

Through the placenta, a disc embedded in the uterine wall. 1

It has villi on the embryo's side and blood spaces on the mother's side, giving a large surface area. 1

Glucose and oxygen pass from the mother's blood to the embryo; wastes pass the other way. 1

A21. What happens when the egg is not fertilised? [2]

The egg lives for about one day. 1

The thick, spongy lining of the uterus breaks down and comes out through the vagina as blood and mucus – menstruation. 1

Reproductive health

A22. If a woman is using a Copper-T, will it protect her from sexually transmitted diseases? Explain. [2]

No. 1

A Copper-T only prevents pregnancy; it does not stop contact with body fluids, so STD germs can still pass. 1

A23. What are the different methods of contraception? Give one example of each. [3]

Barrier methods – condoms; hormonal – oral pills. 1

Devices in the uterus – Copper-T / loop. 1

Surgical – vasectomy in males, tubectomy in females. 1

A24. Give two reasons for adopting contraceptive methods. [2]

To avoid frequent pregnancies, which harm the mother's health; to plan and space children. 1

To prevent STDs (condoms) and to control population. 1

A25. Why is prenatal sex determination banned by law? [2]

It is misused for female foeticide, which is reducing the number of girls. 1

A healthy society needs a balanced male–female sex ratio. 1

B

PART B · ANSWERS

Exemplar Practice – Answers

Marking-scheme answers for every question in Part B of the chapter booklet.

Multiple choice

Q	Answer	Working / reason
B1	**(b)** hyphae	Hyphae are the threads of the mould.
B2	**(b)** stem, roots and leaves	Vegetative parts are roots, stems and leaves.
B3	**(c)** Vas deferens	The vas deferens is in the male system.
B4	**(d)** pollen grains	Anthers make pollen.
B5	**(c)** (iii) and (iv)	The placenta and oestrogen belong to the female.
B6	**(c)** anther and ovary	Pollen forms in the anther; eggs in ovules inside the ovary.
B7	**(b)** chromosomes are halved when gametes form	Each gamete carries half; fusion restores the full number.
B8	**(b)** Plasmodium	The malarial parasite divides into many cells.
B9	**(c)** HIV-AIDS	Gonorrhoea and syphilis are bacterial; malaria is not an STD.
B10	**(a)** (i) and (ii)	No mixing of DNA from two parents.

Short answer

B11. Why do offspring of sexual reproduction show more variation than those of asexual reproduction? [2]

In sexual reproduction, DNA from two different parents combines in the zygote. 1

This gives new combinations of characters; in asexual reproduction there is only one parent, so variation comes only from copying errors. 1

B12. What is the ratio of the number of chromosomes in a human egg to that in a zygote? How is the full number restored? [2]

Egg 23 : zygote 46, i.e. 1 : 2. 1

When the sperm (23) fuses with the egg (23) at fertilisation, the zygote gets 46 again. 1

B13. A flower has a pistil but its stamens have been removed. Can it still form seeds? Explain. [2]

Yes, if pollen from another flower reaches its stigma (cross-pollination) by wind, insects, etc. 1

The pollen tube then carries the male germ cell to the ovule; after fertilisation, seeds form. If the flower is covered with a bag, no seeds form. 1

B14. Why does bread mould grow well on a moist slice of bread but not on a dry slice? [2]

Spores of the mould need moisture to germinate and grow. 1

A moist slice gives moisture and nutrients, so hyphae spread fast; a dry slice does not. 1

B15. Match each organism with its mode of reproduction: Amoeba, yeast, Plasmodium, Leishmania, Bryophyllum, Rhizopus. [3]

Amoeba – binary fission; yeast – budding. 1

Plasmodium – multiple fission; Leishmania – binary fission in a definite plane. 1

Bryophyllum – vegetative propagation (leaf buds); Rhizopus – spore formation. 1

B16. Give three differences between asexual and sexual reproduction. [3]

Asexual: one parent; sexual: usually two parents. 1

Asexual: no gametes; sexual: gametes fuse. 1

Asexual: offspring nearly identical; sexual: offspring show variation. 1

PART C · ANSWERS

C Board Pattern Practice – Answers

Marking-scheme answers for every question in Part C of the chapter booklet.

Asexual reproduction

Q	Answer	Working / reason
C1	**(a)** Leishmania and Spirogyra	Leishmania is single-celled; Spirogyra is a filament of cells.
C2	**(a)** Banana, orange, rose	They are grown from suckers, cuttings or grafting.
C3	**(b)** budding	The outgrowth is a bud.
C4	**(a)**	Both true; R explains A.
C5	**(a)**	Both true; R explains A.

C6. What is regeneration? How does it take place in Planaria? [2]

The ability of a fully differentiated organism to form a whole new organism from a body part. 1

When Planaria is cut into pieces, specialised cells in each piece divide to form many cells, which develop into all tissues – each piece becomes a new Planaria. 1

C7. What is vegetative propagation? Explain how a Bryophyllum leaf or a banana plant gives new plants. Give two advantages. [3]

Formation of new plants from vegetative parts – root, stem or leaf. 1

Bryophyllum: buds in the leaf notches fall on moist soil and grow into plants (banana: suckers growing from the underground stem). 1

Advantages: seedless plants can be grown; earlier flowering/fruiting; offspring like the parent. 1

C8. Describe spore formation in Rhizopus. Why do spores survive bad conditions? [3]

- Thread-like hyphae grow on bread; round sporangia form on upright hyphae. 1
- Each sporangium has many spores; when it bursts, spores spread and grow into new moulds on moist surfaces. 1
- Spores have thick walls that protect them until they find a suitable moist place. 1

DNA copying, variation and chromosome number

Q	Answer	Working / reason
C9	**(a)** 23 and 46	Gametes have half; the zygote gets the full number.
C10	**(a)**	Both true; R explains A.

C11. Why must germ cells have only half the number of chromosomes of body cells? [2]

- At fertilisation two germ cells fuse; if each had the full number, the zygote would have double the chromosomes. 1
- Halving keeps the chromosome number (and amount of DNA) constant from one generation to the next. 1

Sexual reproduction in flowering plants

Q	Answer	Working / reason
C12	**(a)** No seeds will form, as no pollen can reach the stigma	Pollination is needed before fertilisation.
C13	**(b)** fruit	The ovule becomes the seed.
C14	**(a)**	Both true; R explains A.

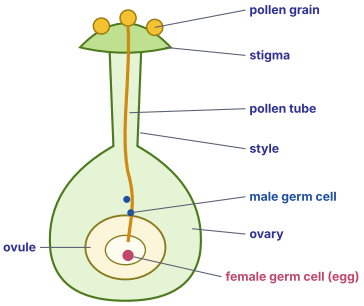
C15. Distinguish between self-pollination and cross-pollination. Name two agents of cross-pollination. [2]

- Self: pollen reaches the stigma of the same flower (or plant); cross: pollen reaches a flower of another plant. 1
- Agents: wind, water, insects, birds (any two). 1

C16. Draw a labelled diagram to show the germination of a pollen grain on the stigma. [2]

Diagram: pollen grain on the stigma, pollen tube through the style to the ovule. 1

Labels: stigma, pollen tube, style, ovary, male germ cell, female germ cell (any four, ½ each). 1



C17. List the changes that take place in a flower after fertilisation. [3]

The zygote divides many times to form the embryo inside the ovule. 1

The ovule develops a tough coat and becomes the seed. 1

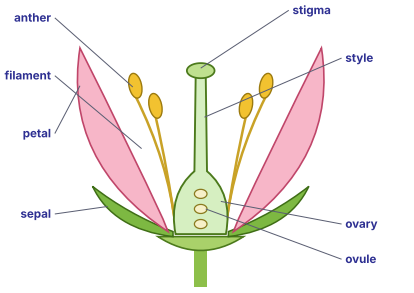
The ovary grows and ripens into a fruit; petals, sepals, stamens, style and stigma shrivel and fall off. 1

C18. Draw a longitudinal section of a flower and label the male and female parts. [3]

Correct diagram. 1

Male part: stamen – anther and filament. 1

Female part: pistil – stigma, style, ovary with ovules. 1



Male part: stamen (anther + filament) · Female part: pistil (stigma + style + ovary)

Reproduction in human beings

Q	Answer	Working / reason
C19	**(c)** oviduct (fallopian tube)	The zygote then moves to the uterus.
C20	**(a)** develops a placenta to nourish the embryo	The placenta links mother and embryo.
C21	**(a)**	Both true; R explains A.
C22	**(a)**	Both true; R explains A.

C23. Trace the path of sperms from where they are formed until they leave the body. Name the glands that add fluid to them. [2]

Testis → vas deferens → urethra → out through the penis. 1

Seminal vesicles and the prostate gland. 1

C24. What is the placenta? Describe its structure and function. [3]

A special disc-like tissue embedded in the uterine wall, linking mother and embryo. 1

Villi on the embryo's side and blood spaces on the mother's side give a large surface area. 1

Glucose and oxygen pass from mother to embryo; wastes pass from embryo to the mother's blood. 1

C25. What is menstruation? Why does it occur, and how long does the flow last? [3]

The monthly breakdown and removal of the uterus lining as blood and mucus through the vagina. 1

The lining thickens every month to receive a zygote; if the egg is not fertilised, the lining is not needed and breaks down. 1

The cycle is about a month; the flow lasts about 2 to 8 days. 1

Reproductive health

Q	Answer	Working / reason
C26	**(a)** vas deferens; fallopian tube	Sperm or egg transport is blocked.
C27	**(a)**	Both true; R explains A.

C28. Name three methods of contraception and give one limitation of each. [3]

Oral pills – change hormone balance; may have side effects. 1

Copper-T – may irritate the uterus; no protection against STDs. 1

Surgery (vasectomy/tubectomy) – can cause infection if not done properly (condoms: must be used correctly every time). 1

C29. Name two bacterial and two viral sexually transmitted diseases. How can their spread be reduced? [2]

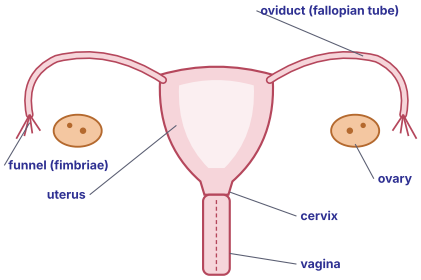
Bacterial: gonorrhoea, syphilis. Viral: warts, HIV-AIDS. 1

By using condoms (and avoiding unsafe contact). 1

Long answer

C30. (a) Draw a labelled diagram of the human female reproductive system. (b) State the function of the ovary, oviduct and uterus. (c) How does the embryo get its nourishment? **[5]**

(a) Diagram with ovaries, oviducts, uterus, cervix, vagina labelled. **2**

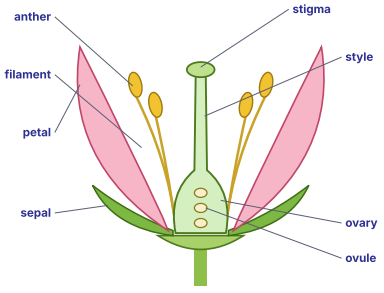


(b) Ovary – makes eggs (and hormones); oviduct – carries the egg, site of fertilisation; uterus – implantation and growth of the embryo. **1½**

(c) Through the placenta: villi give a large surface for glucose and oxygen to pass from mother to embryo; wastes pass back. **1½**

C31. (a) Draw the longitudinal section of a flower and label its reproductive parts. (b) What is pollination? Name its two types. (c) What happens after fertilisation? **[5]**

(a) Diagram with anther, filament, stigma, style, ovary, ovule labelled. **2**



Male part: stamen (anther + filament) · Female part: pistil (stigma + style + ovary)

(b) Transfer of pollen from anther to stigma. **1**

Self-pollination and cross-pollination. **½**

(c) Zygote → embryo; ovule → seed; ovary → fruit; other parts fall off. **1½**

C32. Explain what will happen when: (i) a sperm fails to reach the egg in the oviduct; (ii) a flower that has only a pistil gets no pollen; (iii) an egg is fertilised and implanted; (iv) a seed is sown in moist, warm soil; (v) a Bryophyllum leaf falls on wet soil. **[5]**

(i) No fertilisation; the egg dies in about a day and the uterus lining breaks down – menstruation. **1**

(ii) No pollination, so no fertilisation – no seeds or fruit form. **1**

(iii) The embryo grows in the uterus, nourished through the placenta, for about nine months. **1**

(iv) It germinates; the radicle forms the root and the plumule the shoot. **1**

(v) Buds in the notches grow into new plants – vegetative propagation. **1**

PART D · ANSWERS

D Case-Based Questions – Answers

Marking-scheme answers for every question in Part D of the chapter booklet.

D1. Case Study · The Kitchen Garden [4]

(i) Name the method used by the grandmother to grow these plants. **[1]**

Vegetative propagation. 1

(ii) Name two plants that have lost the capacity to produce seeds. **[1]**

Banana, orange, rose, jasmine (any two). 1

(iii) Give two advantages of this method. **[2]**

Plants that cannot make seeds can be grown. 1

Plants flower and fruit earlier; all plants keep the parent's useful characters. 1

OR

(iii) How did new plants form on the Bryophyllum leaf? Why are these plants exactly like the parent? **[2]**

Buds in the notches of the leaf margin grew into new plants on the moist soil. 1

Only one parent is involved and no gametes fuse, so the DNA is copied from one plant. 1

D2. Case Study · Pollination Watch [4]

(i) What is the transfer of the yellow dust from anther to stigma called? **[1]**

Pollination. 1

(ii) Why did the covered flowers not form seeds? **[1]**

No pollen could reach their stigmas, so there was no pollination and no fertilisation. 1

(iii) Describe the events from the landing of a pollen grain on the stigma to the formation of a seed. **[2]**

The pollen grain grows a pollen tube through the style; the male germ cell fuses with the egg in the ovule (fertilisation). 1

The zygote forms the embryo and the ovule develops into a seed. 1

OR

(iii) Distinguish between self- and cross-pollination. Which one did the bees bring about here? **[2]**

Self: pollen to the stigma of the same flower or plant; cross: pollen to a flower of another plant. 1

Cross-pollination (bees carry pollen between flowers of different plants). 1

D3. Case Study · The Health Talk [4]

(i) Name one viral sexually transmitted disease. **[1]**

HIV-AIDS (or warts). 1

(ii) Name the surgical method of contraception for women. **[1]**

Tubectomy (the fallopian tubes are blocked). 1

(iii) Which contraceptive method also protects against STDs? Explain how. **[2]**

Condom. 1

It is a barrier that prevents contact with body fluids, so sperms and germs cannot pass. 1

OR

(iii) Why is prenatal sex determination banned, and why is family planning good for women's health? **[2]**

It is misused for female foeticide, upsetting the sex ratio. 1

Frequent pregnancies weaken the mother's health; spacing children protects it. 1