CBSE CLASS X

Science (086)

ANSWER KEY

AI-generated question paper

Code: XFBLYX	Questions: 31	Maximum Marks: 70	Generated: 2026-06-25 17:32

SELECTIONS USED

Subject	Science
Lessons	7 How do Organisms Reproduce?
Level of understanding	Exam-ready
Question selection	CBSE board paper, whole lesson (~80 marks across Sections A-E)
Model	claude-sonnet-4-6

Composition — Difficulty: 9 straightforward · 17 medium · 5 deep | Types: 9 MCQ · 7 Short · 5 Assertion–reason · 4 Very short · 3 Long · 3 Case-based | Sections: A 14Q/14m · B 4Q/8m · C 7Q/21m · D 3Q/15m · E 3Q/12m

Q1. straightforward exam-ready **[1]**

Asexual reproduction by budding occurs in which of the following organisms?
(A) Planaria
(B) Yeast
(C) Plasmodium
(D) Spirogyra

A Planaria
B Yeast
C Plasmodium
D Spirogyra

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

(B) Yeast

Yeast reproduces asexually by budding — it puts out small buds that separate and grow into new individuals.

Source: Chapter 7, Section 7.2.1 (Fission)

Explanation

The textbook explicitly states "Yeast, on the other hand, can put out small buds that separate and grow further." Planaria reproduces by regeneration, Plasmodium by multiple fission, and Spirogyra by fragmentation. This is a direct recall question — just identify the organism associated with budding.

Q2. straightforward exam-ready **[1]**

In Leishmania, binary fission occurs in a definite orientation. Which feature of the cell determines this orientation?
(A) The nucleus
(B) The cell wall
(C) The whip-like structure at one end
(D) The food vacuole

A The nucleus
B The cell wall
C The whip-like structure at one end
D The food vacuole

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

(C) The whip-like structure at one end

In *Leishmania*, binary fission occurs in a definite orientation in relation to the whip-like structure (flagellum) present at one end of the cell.

Explanation

The passage clearly states that *Leishmania* has "a whip-like structure at one end of the cell" and that "binary fission occurs in a definite orientation in relation to these structures." This contrasts with *Amoeba*, where splitting can occur in any plane. The examiner expects you to recall this specific detail linking the flagellum to oriented fission.

Q3. straightforward exam-ready **[1]**

The male germ-cells (sperms) in humans are produced in the testes, which are located outside the abdominal cavity. What is the primary reason for this?
(A) To allow easier transfer of sperms
(B) Sperm formation requires a temperature lower than normal body temperature
(C) To keep sperms away from digestive enzymes
(D) To increase blood supply to the testes

A To allow easier transfer of sperms
B Sperm formation requires a temperature lower than normal body temperature
C To keep sperms away from digestive enzymes
D To increase blood supply to the testes

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

(B) Sperm formation requires a temperature lower than normal body temperature

Explanation

The passage directly states: "testes are located outside the abdominal cavity in scrotum **because** sperm formation requires a lower temperature than the normal body temperature." This is the factual, textbook reason — memorise it word for word.
Source: Chapter 7, Section 7.3.3(a) — Male Reproductive System

Q4. medium exam-ready **[1]**

A contraceptive copper-T device is placed inside the uterus to prevent pregnancy. However, it does NOT protect against sexually transmitted infections (STIs). Which contraceptive method provides some protection against both pregnancy AND STIs?

(A) Oral contraceptive pills
(B) Condom
(C) Copper-T
(D) Surgical blockage of fallopian tubes

A Oral contraceptive pills
B Condom
C Copper-T
D Surgical blockage of fallopian tubes

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

(B) Condom

A condom acts as a mechanical barrier preventing sperm from reaching the egg, thus avoiding pregnancy. It also prevents direct contact between partners, thereby reducing transmission of STIs like HIV-AIDS, gonorrhoea, and syphilis.

Explanation

The passage explicitly states: "Using a covering, called a condom, for the penis during sex helps to prevent transmission of many of these infections to some extent" — making it the only option that addresses **both** pregnancy prevention and STI protection. Pills only alter hormones; Copper-T and surgical methods only prevent pregnancy. Examiners expect students to link both functions to the condom specifically.

Q5. straightforward exam-ready **[1]**

In tissue culture, cells from the growing tip of a plant are placed in an artificial medium where they first divide to form a callus. What does the callus develop into when transferred to a medium containing growth and differentiation hormones?

(A) Spores
(B) Pollen grains
(C) Plantlets
(D) Sporangia

A Spores
B Pollen grains
C Plantlets
D Sporangia

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

(C) Plantlets

When the callus is transferred to a medium containing hormones for growth and differentiation, it develops into **plantlets**, which are then placed in soil to grow into mature plants.

Explanation

The answer is directly from the "Tissue Culture" box in Chapter 7 (Vegetative Propagation section). The key sequence is: cells → callus (in artificial medium) → **plantlets** (after transfer to hormone-containing medium) → mature plants in soil. Spores and sporangia relate to Rhizopus/spore formation; pollen grains relate to sexual reproduction in flowers — none of these are products of tissue culture.

Q6. straightforward exam-ready **[1]**

Which of the following is an example of a bisexual (hermaphrodite) flower?
(A) Papaya
(B) Watermelon
(C) Mustard
(D) Corn (maize)

A Papaya
B Watermelon
C Mustard
D Both (A) and (B)

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

(C) Mustard

Mustard is a bisexual (hermaphrodite) flower as it contains **both** stamens and pistil. Papaya and watermelon are unisexual flowers.

Explanation

The passage explicitly states: *"the flower may be unisexual (papaya, watermelon)... or bisexual (Hibiscus, mustard)."* Bisexual = both male (stamen) and female (pistil) parts in the same flower. Corn/maize is also unisexual. Option C is the only correct answer.

Q7. medium exam-ready **[1]**

Spores of Rhizopus are covered by thick walls. What is the primary advantage of this thick covering?
(A) It helps in dispersal by wind
(B) It provides nutrition to the developing spore
(C) It protects the spore until it reaches a moist surface
(D) It allows the spore to attach to host organisms

A It helps in dispersal by wind
B It provides nutrition to the developing spore
C It protects the spore until it reaches a moist surface
D It allows the spore to attach to host organisms

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

(C) It protects the spore until it reaches a moist surface

The thick walls of spores protect them until they come into contact with a moist surface and can begin to grow.

Source: Chapter 7, Section 7.2.6 – Spore Formation

Explanation

The textbook explicitly states: *"The spores are covered by thick walls that protect them until they come into contact with another moist surface and can begin to grow."* This directly points to option (C). Options (A), (B), and (D) are not supported by the passage. For MCQs, always look for the option closest to the textbook's exact wording.

Q8. medium exam-ready **[1]**

Oral contraceptive pills prevent pregnancy primarily by:
(A) Creating a mechanical barrier to stop sperm reaching the egg
(B) Changing the hormonal balance so that eggs are not released
(C) Destroying sperms as soon as they enter the vagina
(D) Preventing implantation of the embryo by irritating the uterus

A Creating a mechanical barrier to stop sperm reaching the egg
B Changing the hormonal balance so that eggs are not released
C Destroying sperms as soon as they enter the vagina
D Preventing implantation of the embryo by irritating the uterus

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

(B) Changing the hormonal balance so that eggs are not released.

Oral contraceptive pills change the hormonal balance of the body so that eggs are not released and fertilisation cannot occur.

Explanation

The source passage clearly distinguishes between different contraceptive categories: condoms = mechanical barrier (A); oral pills = hormonal (B); copper-T = uterine irritation (D). Option C is not mentioned as a contraceptive mechanism at all. Examiners expect students to recall the specific mechanism linked to oral pills, which is hormonal, not mechanical or physical.

Q9. medium exam-ready **[1]**

Menstruation occurs approximately every month. Which of the following correctly describes why the uterine lining breaks down during menstruation?

(A) The ovary releases too many eggs at once

(B) Fertilisation has occurred and the embryo rejects the lining

(C) The egg has not been fertilised, so the thickened uterine lining is no longer needed

(D) Hormones from the placenta cause the lining to shed

A The ovary releases too many eggs at once

B Fertilisation has occurred and the embryo rejects the lining

C The egg has not been fertilised, so the thickened uterine lining is no longer needed

D Hormones from the placenta cause the lining to shed

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

(C) The egg has not been fertilised, so the thickened uterine lining is no longer needed and it breaks down, coming out as blood and mucus — this is menstruation.

Source: Chapter 7, Section 7.3.3(c)

Explanation

The passage clearly states that the uterine lining thickens each month to nourish a potential embryo. If fertilisation does not occur, the lining is "not needed any longer" and breaks down. Options A, B, and D are factually incorrect — the placenta only forms *after* fertilisation, and only one egg is released per month.

Q10. medium exam-ready **[1]**

Assertion (A): Variations are essential for the long-term survival of a species.
Reason (R): If all individuals in a population are identical and the environment changes drastically, the entire population could be wiped out.

A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
B Both Assertion (A) and Reason (R) are true, but Reason (R) is NOT the correct explanation of Assertion (A).
C Assertion (A) is true, but Reason (R) is false.
D Assertion (A) is false, but Reason (R) is true.

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

Answer: Option A

Both A and R are true, and R is the correct explanation of A. If all individuals are identical and the environment changes drastically, the entire population would be wiped out, proving variations are essential for long-term survival.

Explanation

- **A is true**: Variations help species survive changing environmental conditions.
- **R is true**: As stated in the passage — "if a population of reproducing organisms were suited to a particular niche and if the niche were drastically altered, the population could be wiped out" unless some variants exist.
- **R correctly explains A**: The reason *why* variation is essential is precisely because identical populations have no survivors when the environment changes drastically. The heat-resistant bacteria example from the textbook directly supports this link.
- Do not choose (B) — R is not just a true statement; it directly and logically explains A.

Source: Chapter 7, Section 7.1.1 — The Importance of Variation

Q11. medium exam-ready **[1]**

Assertion (A): Regeneration in organisms such as Hydra and Planaria is not considered a primary mode of reproduction.
Reason (R): Regeneration requires the organism to be cut or broken up into pieces, and most organisms would not normally depend on this to reproduce.

A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
B Both Assertion (A) and Reason (R) are true, but Reason (R) is NOT the correct explanation of Assertion (A).
C Assertion (A) is true, but Reason (R) is false.
D Assertion (A) is false, but Reason (R) is true.

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

Option A — Both A and R are true, and R is the correct explanation of A. Regeneration is not primary reproduction because organisms don't normally depend on being cut up to reproduce.

Explanation

The textbook explicitly states: *"regeneration is not the same as reproduction, since most organisms would not normally depend on being cut up to be able to reproduce."* This directly supports both A and R, and R correctly explains why regeneration is not a primary mode of reproduction.

Q12. deep exam-ready **[1]**

Assertion (A): Plants raised by vegetative propagation bear flowers and fruits earlier than plants grown from seeds.
Reason (R): Vegetatively propagated plants are genetically identical to the parent and do not need to undergo the juvenile phase associated with seed germination and early seedling development.

A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
B Both Assertion (A) and Reason (R) are true, but Reason (R) is NOT the correct explanation of Assertion (A).
C Assertion (A) is true, but Reason (R) is false.
D Assertion (A) is false, but Reason (R) is true.

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:00 · grounding rag

Model Answer

Option A — Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

Explanation

The textbook states that plants raised by vegetative propagation bear flowers and fruits earlier than those from seeds. The reason is correct: vegetatively propagated plants are genetically identical to the parent and bypass the juvenile/seedling phase, directly continuing from a mature parent's stage. Hence R correctly explains A.

Q13. deep exam-ready **[1]**

Assertion (A): In sexual reproduction, each new generation does not end up with twice the DNA content of the previous generation.
Reason (R): Germ-cells are produced by a specialised division that halves the chromosome number, so that when two germ-cells fuse, the original chromosome number is restored.

A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
B Both Assertion (A) and Reason (R) are true, but Reason (R) is NOT the correct explanation of Assertion (A).
C Assertion (A) is true, but Reason (R) is false.
D Assertion (A) is false, but Reason (R) is true.

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

Option A is correct. Both A and R are true, and R is the correct explanation of A. Germ-cells formed by meiosis carry half the chromosome number; fusion of two germ-cells restores the original number, preventing DNA doubling each generation.

Source: Chapter 7, Section 7.3.1

Explanation

- The passage explicitly states the problem (doubling of DNA) and its solution (meiosis halving chromosomes in germ-cells, restored at fertilisation).
- Assertion is true — new generation does NOT double in DNA content.
- Reason correctly explains the mechanism (meiosis → half chromosomes → fusion restores full number), making it the **correct explanation** of the Assertion → Option **A**.

Q14. straightforward exam-ready **[1]**

Assertion (A): Reproduction is not essential for the survival of an individual organism.
Reason (R): Processes like nutrition, respiration and excretion are essential for an individual's life, but reproduction only helps to increase the population of the species.

A Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
B Both Assertion (A) and Reason (R) are true, but Reason (R) is NOT the correct explanation of Assertion (A).
C Assertion (A) is true, but Reason (R) is false.
D Assertion (A) is false, but Reason (R) is true.

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

Option A is correct. Both A and R are true, and R is the correct explanation of A. Reproduction is not needed for an individual's survival; only nutrition, respiration, and excretion are essential life processes. Reproduction merely increases population size.

Explanation

The textbook explicitly states: *"reproduction is not necessary to maintain the life of an individual organism, unlike the essential life processes such as nutrition, respiration, or excretion."* The Reason directly and correctly explains why the Assertion is true — it contrasts essential individual life processes with reproduction, which serves the species, not the individual. So Option A is the right choice.

Q15. straightforward exam-ready **[2]**

Distinguish between cross-pollination and self-pollination on the basis of: (i) the source of pollen, and (ii) the genetic variation produced in offspring.

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

(i) Source of pollen:

- **Self-pollination:** Pollen is transferred from the anther to the stigma of the **same flower**.
- **Cross-pollination:** Pollen is transferred from the anther of one flower to the stigma of a **different flower**, carried by agents like wind, water, or animals.

(ii) Genetic variation in offspring:

- **Self-pollination:** Produces **little or no genetic variation**; offspring are similar to the parent.
- **Cross-pollination:** Produces **greater genetic variation** in offspring, as it combines genetic material from two different plants.

Source: Chapter 7, Section 7.3.2 — Sexual Reproduction in Flowering Plants

---

Explanation

- The textbook directly states: "If the transfer of pollen occurs in the same flower, it is referred to as self-pollination. On the other hand, if the pollen is transferred from one flower to another, it is known as cross-pollination."
- For variation, the textbook notes that "modes of sexual reproduction allow for greater variation to be generated." Cross-pollination involves two individuals, hence more variation; self-pollination is more like a single-parent process, producing less variation.
- Each point (i) and (ii) carries 1 mark. Keep each distinction crisp and paired — examiner looks for a clear contrast between the two types.

Q16. straightforward exam-ready **[2]**

Name the structures that produce spores in bread mould (Rhizopus). Why can these spores survive harsh conditions?

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

The tiny blob-on-a-stick structures in bread mould are called **sporangia** (singular: sporangium). They contain cells called **spores**.

The spores can survive harsh conditions because they are covered by **thick protective walls**. These walls shield them until they come in contact with a moist surface, allowing them to germinate and grow into new individuals.

Source: Chapter 7, Section 7.2.6 — Spore Formation

Explanation

- Two marks = two clear points: (1) name the structure (sporangia/spores), and (2) reason for survival (thick walls).
- Examiners want the word **sporangia** specifically — "blobs" alone won't score.
- The reason must mention **thick walls** as protection against harsh/dry conditions; vague answers like "special covering" may lose the mark.
- Keep it concise; no need to explain the full life cycle of Rhizopus.

Q17. straightforward exam-ready **[2]**

What are the two functions of the ovaries in the human female reproductive system?

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

The two functions of the ovaries in the human female reproductive system are:

1. **Production of female germ-cells (eggs):** The ovaries produce and mature eggs. One egg is released every month by one of the ovaries.
2. **Production of hormones:** The ovaries are also responsible for the production of certain hormones.

Source: Chapter 7, Section 7.3.3(b) — Female Reproductive System

---

Explanation

This is a direct 2-mark question — one mark per function. The passage explicitly states both functions: egg production and hormone production. Do **not** name specific hormones (e.g., oestrogen) unless asked, as the textbook does not specify them here. Keep it brief and to the point — examiners award one mark per correctly stated function.

Q18. medium exam-ready **[2]**

Why do multicellular organisms with specialised tissues and organs need more complex methods of reproduction than simple organisms like Spirogyra?

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

In simple organisms like Spirogyra, cells are not highly specialised, so the organism can simply break into fragments that grow into new individuals.

In multicellular organisms with specialised tissues and organs, cells are organised in a specific pattern. Simple cell-by-cell division would disturb this organisation, making it impractical. Therefore, more complex reproductive methods involving specific reproductive cell types are needed.

Source: Chapter 7, Section 7.2.2

Explanation

- The key contrast examiners look for: **Spirogyra** has no specialised tissues (Activity 7.4 confirms this), so fragmentation works.
- For complex multicellular organisms, the textbook explicitly states: *"specialised cells are organised as tissues, and tissues into organs placed at definite positions — cell-by-cell division would be impractical."*
- Always mention **both** sides: why simple organisms can use simple methods AND why complex organisms cannot.
- For 2 marks, one point each for the simple and the complex organism is the safest structure.

Q19. medium exam-ready **[3]**

Explain the role of DNA copying in reproduction. Why is it important that DNA copies are similar but allowable to be slightly different?

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

Role of DNA copying in reproduction:
DNA contains the blueprint for body design. During reproduction, a copy of DNA is made so that the new cell receives the same genetic information. This allows offspring to resemble their parents and maintain the body design suited to their environment.

Why copies should be similar but slightly different:

- **Similar copies** ensure that body design features are maintained, allowing the organism to survive in its niche and keeping the species stable.
- **Slight differences** (variations) arise because no biochemical copying reaction is perfectly accurate. These variations are important because if environmental conditions change drastically, individuals with useful variations can survive, ensuring the survival of the species over time.

Source: Chapter 7, Section 7.1 and 7.1.1

Explanation

- The examiner expects **two parts** clearly addressed: (1) why DNA copying is essential in reproduction, and (2) why similarity with slight variation is important.
- Key phrases to use: *blueprint for body design*, *cellular apparatus*, *niche*, *survival of species*, *variation*.
- Don't confuse "individual survival" with "species survival" — variations help the **species**, not necessarily every individual.
- Always link variation to **evolution/survival** — that's the scoring point for the second part.

Q20. medium exam-ready **[3]**

Describe the journey of a pollen grain from the anther to the formation of a zygote inside the ovule of a flower.

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

Pollen grains are produced in the **anther** (male part) of the stamen. They are transferred to the **stigma** (top of pistil) by agents like wind, water, or animals — this is called **pollination**.

After landing on the stigma, a pollen tube grows out of the pollen grain and travels through the **style** to reach the **ovary**. Here, the male germ-cell fuses with the **egg cell** present in the ovule. This fusion is called **fertilisation**, and it results in the formation of a **zygote**.

Source: Chapter 7, Section 7.3.2 – Sexual Reproduction in Flowering Plants

---

Explanation

Examiners look for these key steps in sequence: pollen production in anther → pollination (transfer to stigma) → pollen tube growth through style → fertilisation in ovule → zygote. Use the correct terms — **anther, stigma, style, ovary, ovule, fertilisation, zygote** — as they carry marks. Don't confuse ovary with ovule; the ovule is *inside* the ovary and contains the egg cell.

Q21. medium exam-ready **[3]**

Compare binary fission in Amoeba with multiple fission in Plasmodium. How are these two methods different in process and outcome?

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

Binary Fission in Amoeba:
The cell splits into **two equal daughter cells**. Division can occur in **any plane**. This happens under normal, favourable conditions and produces 2 new individuals each time.

Multiple Fission in Plasmodium:
The nucleus divides **repeatedly**, forming many nuclei. Each nucleus then gets surrounded by cytoplasm, producing **many daughter cells simultaneously** from a single parent cell.

Difference in Outcome:
Binary fission → 2 daughter cells; Multiple fission → many daughter cells at once. Multiple fission is more efficient for rapid multiplication, especially under favourable conditions after dormancy.

Source: Chapter 7, Section 7.2.1 – Fission

Explanation

- Examiners expect a **clear comparison** — mention both organisms, not just one.
- Key terms to use: "any plane," "simultaneously," "many daughter cells."
- The textbook specifically states Amoeba splits in **any plane** and Plasmodium divides into **many daughter cells simultaneously** — use these exact ideas.
- For 3 marks: ~1 mark each for Amoeba description, Plasmodium description, and the difference in outcome.

Q22. medium exam-ready **[3]**

What happens to the ovule, ovary, and the other floral parts (petals, sepals, stamens, style, stigma) after fertilisation in a flowering plant?

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

After fertilisation in a flowering plant:

- **Ovule:** The zygote divides repeatedly to form an embryo inside the ovule. The ovule develops a tough coat and is converted into a **seed**.
- **Ovary:** It grows rapidly and ripens to form a **fruit**.
- **Other floral parts** (petals, sepals, stamens, style, and stigma): These are no longer needed and **shrivel and fall off**.

Source: Chapter 7, Section 7.3.2 – Sexual Reproduction in Flowering Plants

---

Explanation

Examiners look for three distinct points — one for each part asked about — which maps neatly to the 3 marks:

1. Ovule → seed (with mention of embryo formation and tough coat)
2. Ovary → fruit
3. Remaining floral parts → shrivel and fall off

Use the exact textbook verbs: *"ripens," "shrivels and falls off," "tough coat."* Avoid writing vague sentences like "the flower changes" — be specific about each structure. This question is a favourite for 3-mark short answers.

Q23. deep exam-ready **[3]**

Explain why sexual reproduction generates more variation in offspring than asexual reproduction. Why is this increased variation considered advantageous for a species?

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

In asexual reproduction, offspring are produced from a single parent, so they are nearly identical copies with only minor DNA-copying errors as a source of variation. In sexual reproduction, DNA from **two different individuals** combines, creating **new combinations of variants** in each offspring. Since each parent already carries different accumulated variations, their combination produces novel genetic patterns in every new individual.

This increased variation is advantageous because if environmental conditions change drastically (e.g., global warming, disease), at least some variants in the population are likely to survive, ensuring **survival of the species over time**.

Source: Chapter 7, Sections 7.1.1 and 7.3.1

Explanation

- Examiners want two clear parts: **why** sexual reproduction gives more variation (combining DNA from two individuals with different accumulated variants) and **why** this is advantageous (survival during environmental change).
- Use the textbook's own example (bacteria and heat resistance) if space allows — it shows understanding.
- Avoid vague phrases like "more diverse"; say "new combinations of variants" to match textbook language.
- For 3 marks: ~1 mark for limitation of asexual reproduction, ~1 mark for mechanism of sexual reproduction, ~1 mark for the survival advantage.

Q24. medium exam-ready **[3]**

Describe the path taken by a sperm from the site of its formation until it meets the egg in the human female body. Name all the structures it passes through in order.

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

Path of sperm from formation to fertilisation:

Sperms are formed in the **testes** (inside the scrotum). They then travel through the **vas deferens**, where secretions from the **seminal vesicles** and **prostate gland** are added, forming semen. The vas deferens joins the tube from the urinary bladder, and sperms pass through the **urethra** and exit the **penis**.

During sexual intercourse, sperms enter the female body through the **vagina**, travel up through the **cervix** into the **uterus**, and finally reach the **oviduct (fallopian tube)**, where they may meet the egg and fertilisation occurs.

Order of structures: Testes → Vas deferens → Urethra → Penis → Vagina → Cervix → Uterus → Oviduct (Fallopian tube)

Source: Chapter 7, Sections 7.3.3(a) and 7.3.3(b)

Explanation

- Examiners expect the **complete pathway** listed in correct order — missing any organ loses marks.
- Name both male and female structures; the question asks from formation to meeting the egg.
- Key terms to spell correctly: **vas deferens**, **seminal vesicles**, **oviduct/fallopian tube**, **cervix**.
- Mentioning secretions from prostate/seminal vesicles adds quality but is not always compulsory for 3 marks — include it briefly to show understanding.
- The fertilisation site (oviduct) must be stated explicitly.

Q25. deep exam-ready **[3]**

Surgical contraception involves blocking either the vas deferens in males or the fallopian tubes in females. Explain why blocking each of these structures prevents fertilisation, and state one concern associated with surgical contraceptive methods.

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

Blocking vas deferens: The vas deferens carries sperms from the testes to the urethra. If it is blocked, sperm transfer is prevented, so sperms cannot reach the egg and fertilisation does not occur.

Blocking fallopian tube: The fallopian tube carries the egg from the ovary to the uterus. If it is blocked, the egg cannot travel to the site of fertilisation, so sperm and egg cannot meet.

One concern: Although surgical methods are safe in the long run, surgery itself can cause infections and other complications if not performed properly.

Source: Reproductive Health, Chapter 7, Section 7.3.3(d)

Explanation

- The examiner expects one clear mechanical reason for each structure (1 mark each) — focus on *what the structure carries* and *what blocking it prevents*.
- The concern must come from the textbook: "infections and other problems if not performed properly." Do not invent side-effects not mentioned in the passage.
- Keep each point concise; this is a 3-mark answer, so ~25–30 words per point is enough.

Q26. deep exam-ready **[5]**

(a) Distinguish between a male gamete and a female gamete in terms of size, motility, and food reserves.
(b) Why is the difference in size and structure between the two types of gametes an advantage in complex organisms that reproduce sexually?
(c) Name the cell formed by the fusion of the two gametes and state the significance of this fusion in maintaining the chromosome number across generations.

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

(a) Male and female gametes differ as follows:

Feature	Male Gamete (Sperm)	Female Gamete (Egg/Ovum)
Size	Very small	Much larger
Motility	Motile (has a tail/flagellum)	Non-motile
Food reserves	Very little	Abundant (yolk/cytoplasm)

(b) The difference in size and structure is advantageous because division of labour is achieved — the male gamete is specialised for movement to reach the female gamete, while the female gamete stores food reserves to nourish the developing embryo after fertilisation. This ensures both efficient delivery of genetic material and adequate nutrition for early development.

(c) The cell formed by fusion of two gametes is called a **zygote**. Each gamete contains half the number of chromosomes (haploid). When they fuse, the zygote restores the full chromosome number (diploid) of the species. This ensures that chromosome number remains constant from one generation to the next.

Source: Chapter 7 – How do Organisms Reproduce?, Sections 7.1 and related reproductive biology content

---

Explanation

- **(a)** Examiners expect all three features compared clearly; a table format is efficient and earns full credit.
- **(b)** Key phrase: "division of labour" — motility vs. stored nutrition. Link both to survival advantage.
- **(c)** Must name "zygote" and use the terms **haploid → diploid** to score full marks. The chromosome-number maintenance point is the core of this sub-question.
- The source passages do not detail gamete biology explicitly, so standard NCERT Class 10 Biology content (Chapter 8 context of fertilisation) underpins parts (a)–(c); the chapter's fertilisation references confirm the zygote concept.

Q27. medium exam-ready **[5]**

(a) Draw a neat labelled diagram of the longitudinal section of a flower, labelling any four reproductive parts.
(b) Define pollination and fertilisation. State one difference between them.
(c) Trace the fate of the ovule and the ovary after fertilisation in a flowering plant.

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:01 · grounding rag

Model Answer

(a) Labelled Diagram – Longitudinal Section of a Flower:

(Draw a bisexual flower showing the following labelled parts)

Four reproductive parts to label:

1. **Anther** (produces pollen grains)
2. **Filament** (together with anther = stamen)
3. **Stigma** (receives pollen)
4. **Style**
5. **Ovary** (contains ovules)
6. **Ovule** (contains egg cell)

(Label any four of the above reproductive parts on your diagram.)

(b) Definitions and Difference:

Pollination: Transfer of pollen grains from the anther to the stigma of a flower.

Fertilisation: The fusion of the male germ-cell (from pollen) with the female germ-cell (egg) present in the ovule to form a zygote.

	Pollination	Fertilisation
Nature	Transfer of pollen	Fusion of gametes

Difference: Pollination is a physical transfer process; fertilisation is the actual fusion of male and female gametes forming a zygote.

(c) Fate after Fertilisation:

- The **ovule** develops a tough coat and is converted into a **seed**, which contains the embryo.
- The **ovary** grows, ripens, and develops into a **fruit**.
- Petals, sepals, stamens, style and stigma shrivel and fall off.

Source: How do Organisms Reproduce, Section 7.3.2

Explanation

- The diagram is worth marks; draw clearly and label neatly — examiners award marks for each correct label.
- Define pollination and fertilisation in one sentence each; the difference must be explicit.
- For part (c), remember the two key conversions: **ovule → seed** and **ovary → fruit**. These are direct, frequently tested facts from the textbook.

Q28. medium exam-ready **[5]**

(a) List the components of the human male reproductive system and state the function of each.
(b) Testosterone is produced by the testes. State any two effects of testosterone on the male body.
(c) Differentiate between the role of the vas deferens and the urethra in the male reproductive system.

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:02 · grounding rag

Model Answer

(a) Components and Functions of Male Reproductive System:

Component	Function
Testes	Produce sperms (germ-cells); secrete testosterone
Vas deferens	Carries sperms from testes towards the urethra
Seminal vesicles & Prostate gland	Add secretions to sperms, forming semen; provide nutrition and ease transport
Urethra	Common passage for sperms and urine to exit the body
Penis	Delivers sperms into the female reproductive tract

(b) Two effects of testosterone:

1. Regulates the formation of sperms in the testes.
2. Brings about changes in appearance at puberty in boys (e.g., new facial hair, deeper voice).

(c) Difference between vas deferens and urethra:
The **vas deferens** carries sperms from the testes and unites with the tube from the urinary bladder — it transports sperms only. The **urethra** is the final common passage that carries both sperms and urine out of the body.

Source: Chapter 7, Section 7.3.3(a) — Male Reproductive System

---

Explanation

- **(a)** Examiners expect all major parts listed with a distinct function for each. The table format saves space and is perfectly acceptable in CBSE boards.
- **(b)** Both effects are directly stated in the passage — "regulating the formation of sperms" and "changes in appearance seen in boys at puberty." Never add effects not in the source.
- **(c)** The key distinction is **sperms only (vas deferens)** vs. **sperms + urine (urethra)**. This one-line difference is all that is needed for a differentiation question of this weight.
- Stay within ~120 words for the full answer to match the 5-mark budget.

Q29. medium exam-ready **[4]**

Read the following passage and answer the questions that follow:

A biology student observes two different organisms under a microscope. In the first organism, the single cell simply splits into two equal halves, with the division occurring in any plane. In the second organism, the cell develops multiple nuclei, and then each nucleus is surrounded by a small amount of cytoplasm to produce many daughter cells simultaneously. The student notes that the first organism has no specific body orientation, whereas a third organism similar to the first shows division only along a specific axis due to a structural feature at one end of its body.

(i) Identify the type of reproduction shown by the first organism and name one example of such an organism. (1 mark)
(ii) What is the mode of reproduction shown by the second organism? Name one example of this organism and state one situation in nature when this mode is particularly advantageous. (1 mark)
(iii) Name the 'structural feature' that causes the third organism to divide along a specific axis and name one organism that shows this. (1 mark)
(iv) All the above are forms of asexual reproduction. State one key difference between asexual and sexual reproduction in terms of the number of parents and genetic variation in offspring. (1 mark)

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:02 · grounding rag

Model Answer

(i) The first organism shows **binary fission**. Example: **Amoeba** (splits into two equal halves in any plane).

(ii) The second organism shows **multiple fission**. Example: **Plasmodium** (malarial parasite). It is advantageous during **unfavourable conditions** (e.g., scarcity of food/water), as many daughter cells are produced at once, improving survival chances.

(iii) The structural feature is the **whip-like structure (flagellum)** at one end of the cell, which causes division along a definite axis. Organism: **Leishmania** (causes kala-azar).

(iv) Asexual reproduction requires **one parent** and produces offspring with **no genetic variation** (genetically identical). Sexual reproduction requires **two parents** and produces offspring with **greater genetic variation** due to combination of DNA from both parents.

Source: Chapter 7, Section 7.2.1 Fission; Section 7.3 Sexual Reproduction

---

Explanation

- **Binary vs Multiple fission**: The key distinction is two daughter cells (any plane) vs many daughter cells simultaneously — examiners expect both features stated clearly.
- **Leishmania's flagellum**: This is the specific term; "whip-like structure" is also acceptable but naming it as flagellum shows stronger understanding.
- For **(iv)**, examiners award the mark for **both** contrasting points — number of parents AND genetic variation. Stating only one may lose the mark.
- Always name the organism when asked; a description alone is insufficient for full credit.

Q30. medium exam-ready **[4]**

Read the following passage and answer the questions that follow:

After a flower is successfully pollinated, a pollen tube grows from the pollen grain through the style and reaches the ovary. Fertilisation occurs, producing a zygote. The zygote divides repeatedly to form an embryo. Meanwhile, a tough coat forms around the ovule. The ovary wall begins to thicken and ripen. The seed, containing the embryo, eventually ends up inside this ripened structure. Under suitable conditions of moisture, warmth and oxygen, the seed can develop into a new plant.

(i) What is the name of the ripened ovary? What is the name given to the process by which the seed develops into a new plant? (1 mark)
(ii) What does the tough coat around the ovule eventually become, and what is its function? (1 mark)
(iii) A flower that contains only the pistil (no stamens) cannot undergo self-pollination. Explain one way in which pollen can still reach the stigma of such a flower. (1 mark)
(iv) State one advantage of seed formation for the dispersal and survival of the plant species. (1 mark)

♦ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:02 · grounding rag

Model Answer

(i) The ripened ovary is called a **fruit**. The process by which a seed develops into a new plant is called **germination**.

(ii) The tough coat around the ovule becomes the **seed coat**. Its function is to **protect the embryo** inside the seed from damage and unfavourable conditions.

(iii) Pollen can reach the stigma of such a flower through **cross-pollination**, where agents like **wind, water, or animals** transfer pollen from the stamen of another flower to the stigma of this flower.

(iv) Seeds can be **dispersed over long distances** by wind, water, or animals. This helps the species spread to new areas and survive even if the parent plant dies.

Source: Chapter 7, Section 7.3.2 – Sexual Reproduction in Flowering Plants

---

Explanation

- **(i)** The passage explicitly states: "The ovary grows rapidly and ripens to form a **fruit**" and "This process is known as **germination**." Both terms must be written.
- **(ii)** "The ovule develops a tough coat and is gradually converted into a **seed**" — so the coat = seed coat. Examiners expect the function: protection of the embryo.
- **(iii)** The passage defines cross-pollination and lists agents (wind, water, animals). Since the flower has no stamens, self-pollination is impossible; cross-pollination is the only route.
- **(iv)** Keep this to one clear, complete advantage. Dispersal + survival is the standard expected answer from the chapter's discussion of seed formation.

Q31. medium exam-ready **[4]**

Read the following passage and answer the questions that follow:

During the development of an embryo inside the mother's uterus, the embryo requires a constant supply of glucose and oxygen, and must also get rid of metabolic waste products. A specialised disc-like structure embedded in the uterine wall accomplishes this. On the embryo's side, this structure has finger-like projections that increase the surface area for exchange, while on the mother's side, there are spaces filled with blood that surround these projections. The entire development of the child inside the mother's body takes approximately nine months.

(i) Name the specialised disc-like structure described above and name the finger-like projections on the embryo's side. (1 mark)
(ii) How does the embryo receive glucose and oxygen through this structure, and how are waste products removed? (1 mark)
(iii) What is the term for the stage of development when the embryo attaches to the uterine wall? Describe one change the uterine lining undergoes to prepare for this. (1 mark)
(iv) If the egg is not fertilised, what event occurs approximately every month in the uterus? What does this event involve, and approximately how long does the complete cycle take? (1 mark)

◆ How do Organisms Reproduce?

Generated by claude-sonnet-4-6 · 2026-06-26 01:02 · grounding rag

Model Answer

(i) The specialised disc-like structure is the **placenta**. The finger-like projections on the embryo's side are called **villi**.

(ii) Glucose and oxygen pass from the mother's blood (in the blood spaces surrounding the villi) into the embryo's blood through the placenta's large surface area. Waste substances generated by the embryo are transferred back into the mother's blood through the placenta for removal.

(iii) The stage when the embryo attaches to the uterine wall is called **implantation**. The uterine lining becomes thick and spongy, and is richly supplied with blood to nourish the growing embryo.

(iv) Menstruation occurs. The thickened uterine lining breaks down and comes out through the vagina as blood and mucus. This cycle takes roughly **one month** (the bleeding itself lasts about two to eight days).

Source: Chapter 7, Sections 7.3.3(b) and 7.3.3(c)

Explanation

- **Villi** is the key term examiners expect for the finger-like projections; do not write "finger-like projections" as the answer.
- For (ii), make it clear that exchange happens *across* the placenta — direction matters (mother → embryo for nutrients; embryo → mother for waste).
- "Implantation" is the expected term for (iii); the lining change detail earns the mark.
- For (iv), name the event (**menstruation**), briefly describe what it involves (breakdown of lining as blood + mucus), and state the cycle duration — all three elements are needed for the mark.

Available for free from:
https://cbsegrade10studyguide.com
https://github.com/orgs/cbse-free-resources/repositories