Leaving Cert Biology – Genetics Practice Test (Sample)

Study Guide

BY EXAMZIFY

Everything you need from our exam experts!

Table of Contents

Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- **Practice answering questions under realistic conditions,**
- **Improve accuracy and speed,**
- **Review explanations to strengthen weak areas, and**
- **Approach the exam with greater confidence.**

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

Questions

1. **How long is the blending step in the kiwi DNA isolation protocol?**

   A. 1 second

   B. 2 seconds

   C. 5 seconds

   D. 3 seconds

2. **During DNA replication, which enzyme unwinds the double helix?**

   A. Ligase

   B. Primase

   C. DNA polymerase

   D. Helicase

3. **What does heterozygous mean?**

   A. A mix of several genes

   B. Two different alleles

   C. One allele present

   D. Two identical alleles

4. **How can natural selection alter allele frequencies in a population?**

   A. By favoring advantageous alleles, increasing their frequency over generations.

   B. By randomly converting alleles without fitness consequences.

   C. By ensuring all individuals have identical genotypes.

   D. By removing all mutations from the gene pool.

5. **Meiosis yields haploid gametes.**

   A. Mitosis yields haploid cells

   B. Meiosis yields diploid cells

   C. Meiosis yields haploid gametes

   D. Mitosis yields diploid cells

6. In autosomal recessive inheritance, if two unaffected parents have an affected child, what does this indicate about their genotypes?

A. Both are carriers (Aa)

B. Both are homozygous dominant (AA)

C. Both are homozygous recessive (aa)

D. One is AA and the other Aa

7. If two genes are located on the same chromosome and very close together, their inheritance tends to be

A. They always assort independently.

B. Inherited together more often.

C. They are never inherited.

D. They produce a 9:3:3:1 ratio.

8. When neither allele masks the expression of the other

A. Complete dominance

B. Incomplete dominance

C. Codominance

D. Polygenic inheritance

9. Which statement about sex-linked inheritance is commonly observed in human families?

A. Sex-linked traits are more common in females

B. Sex-linked traits are carried on autosomes

C. Sex-linked traits are more common in males

D. Sex-linked traits are inherited only from the mother

10. Which genotype produces O phenotype?

A. IAIA

B. ii

C. IAi

D. IBIB

Answers

1. D
2. D
3. B
4. A
5. C
6. A
7. B
8. B
9. C
10. B

Explanations

1. How long is the blending step in the kiwi DNA isolation protocol?

A. 1 second

B. 2 seconds

C. 5 seconds

D. 3 seconds

Blending time tests how much mechanical disruption you apply to release DNA from the kiwi cells while trying not to damage the DNA itself. The idea is to break open enough cells so the DNA is in the solution, but not to yank on the strands so hard that they get cut into small pieces. In this kiwi protocol, about 3 seconds of blending provides a balance: it's long enough to disrupt cell walls and membranes and release DNA, but short enough to avoid excessive shear that would break the DNA strands. If you blend for only 1–2 seconds, you may not release enough DNA. If you blend for about 5 seconds, the DNA can be sheared into fragments, making it harder to see and obtain a good yield. So the 3-second duration is chosen to maximize release while preserving DNA integrity.

2. During DNA replication, which enzyme unwinds the double helix?

A. Ligase

B. Primase

C. DNA polymerase

D. Helicase

When DNA is copied, the two strands must be separated so each can act as a template. The enzyme that does this unwinding is helicase. It binds to the DNA at the replication fork and uses energy from ATP to break the hydrogen bonds between bases, effectively unzipping the helix and exposing the single strands for copying. This unwinding is the crucial first step that allows DNA polymerase and the other enzymes to synthesize new DNA. Ligase's job is to seal breaks in the sugar-phosphate backbone after synthesis. Primase lays down an RNA primer so DNA polymerase can start adding nucleotides. DNA polymerase actually builds the new DNA but cannot unwind the helix on its own. So helicase is the enzyme responsible for opening up the DNA, enabling replication to proceed.

3. What does heterozygous mean?

A. A mix of several genes

B. Two different alleles

C. One allele present

D. Two identical alleles

Heterozygous means having two different alleles at the same gene locus. In a diploid organism, you inherit one allele from each parent for every gene. If those two alleles are different, you're heterozygous for that gene (for example, Aa). This contrasts with homozygous, where the two alleles are the same (AA or aa). The idea is about the pair of alleles at a single gene, not about multiple genes or a single copy. So having two different alleles directly describes heterozygosity.

4. How can natural selection alter allele frequencies in a population?

A. By favoring advantageous alleles, increasing their frequency over generations.

B. By randomly converting alleles without fitness consequences.

C. By ensuring all individuals have identical genotypes.

D. By removing all mutations from the gene pool.

Natural selection changes allele frequencies by favoring variants that increase fitness, so those alleles become more common in the population over generations. When individuals with advantageous traits survive and reproduce more, their alleles are passed on more often, gradually increasing in frequency. This relies on variation that is heritable and on differences in fitness shaped by the environment. The idea that allele frequencies change randomly without fitness consequences isn't how evolution is guided; natural selection isn't a random process. Also, natural selection doesn't produce identical genotypes across all individuals, and it cannot remove all mutations from the gene pool—new mutations keep arising, and selection acts on them over time.

5. Meiosis yields haploid gametes.

A. Mitosis yields haploid cells

B. Meiosis yields diploid cells

C. Meiosis yields haploid gametes

D. Mitosis yields diploid cells

Meiosis is the process that halves the chromosome number, producing four haploid cells that become gametes. Haploid means each cell has one complete set of chromosomes, which is essential so that when the sperm and egg unite, the zygote restores the normal diploid number. Mitosis, by contrast, keeps the chromosome number and makes two diploid, genetically similar cells for growth and tissue repair. So the statement that meiosis yields haploid gametes correctly describes the outcome of this division: it creates reproductive cells with a single chromosome set, ready to fuse during fertilization.

6. In autosomal recessive inheritance, if two unaffected parents have an affected child, what does this indicate about their genotypes?

A. Both are carriers (Aa)

B. Both are homozygous dominant (AA)

C. Both are homozygous recessive (aa)

D. One is AA and the other Aa

This situation shows how an autosomal recessive trait is expressed only when two recessive alleles come together. If both parents are unaffected but have an affected child, each parent must pass on a recessive allele. That means both parents carry one recessive and one dominant allele, giving them the genotype Aa. They can pass the recessive allele to their child, resulting in an affected aa child when both contribute it. Carriers (Aa) don't show the disease themselves, but they can produce affected offspring when they mate with another carrier. If both parents were AA, they could not produce an affected child; if both were aa, they would be affected themselves; and a cross of AA and Aa would also not yield an affected child. The only compatible parental genotypes here are both Aa.

7. If two genes are located on the same chromosome and very close together, their inheritance tends to be

A. They always assort independently.

B. Inherited together more often.

C. They are never inherited.

D. They produce a 9:3:3:1 ratio.

Two genes that are very close on the same chromosome are linked. Because they're so near each other, crossing over between them during meiosis is unlikely, so they tend to be passed on to the next generation as a unit. That means their alleles are inherited together more often than not. Only rarely does recombination separate them, which is why the parental allele combinations appear most frequently. If the genes were far apart or on different chromosomes, independent assortment would dominate and you'd see many more recombined (mixed) allele combinations.

8. When neither allele masks the expression of the other

A. Complete dominance

B. Incomplete dominance

C. Codominance

D. Polygenic inheritance

In this idea, neither allele is fully dominant over the other. The heterozygous genotype produces a phenotype that is intermediate between the two homozygous phenotypes because both alleles contribute to the trait. A classic example is a flower color cross where red and white alleles blend to pink in the offspring: red homozygotes are red, white homozygotes are white, and heterozygotes are pink. This differs from complete dominance, where one allele fully masks the other, and from codominance, where both alleles are expressed distinctly rather than blending. Polygenic inheritance involves many genes influencing a trait, not just a single pair of alleles.

9. Which statement about sex-linked inheritance is commonly observed in human families?

A. Sex-linked traits are more common in females

B. Sex-linked traits are carried on autosomes

C. Sex-linked traits are more common in males

D. Sex-linked traits are inherited only from the mother

Sex-linked inheritance involves genes on the X chromosome. In humans, males have one X and one Y, while females have two Xs. If a gene on the X is recessive, males will express that trait with just one copy because there's no second X to mask it. Females would need two copies of the recessive allele to show the trait, so X-linked recessive conditions appear much more often in males. This is the reason we commonly observe these traits in males in families, with examples like red-green color blindness or hemophilia. These traits are not autosomal and aren't inherited only from the mother: fathers pass their X chromosome to daughters, but not to sons, while mothers pass Xs to both sons and daughters.

10. Which genotype produces O phenotype?

A. IAIA

B. ii

C. IAi

D. IBIB

In the ABO system, the presence of A or B antigens on red blood cells determines the phenotype. A and B alleles code for enzymes that modify the surface H antigen to become A or B antigens. The i allele is nonfunctional, so it doesn't add any sugar to the H antigen. Therefore, only when both alleles are i do you end up with no A or B antigens on the cell surface, which gives the O phenotype. The other genotypes produce A or B antigens: two IA alleles make A, IA with i makes A, and two IB alleles make B.

Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

https://leavingcertbiogenetics.examzify.com

We wish you the very best on your exam journey. You've got this!