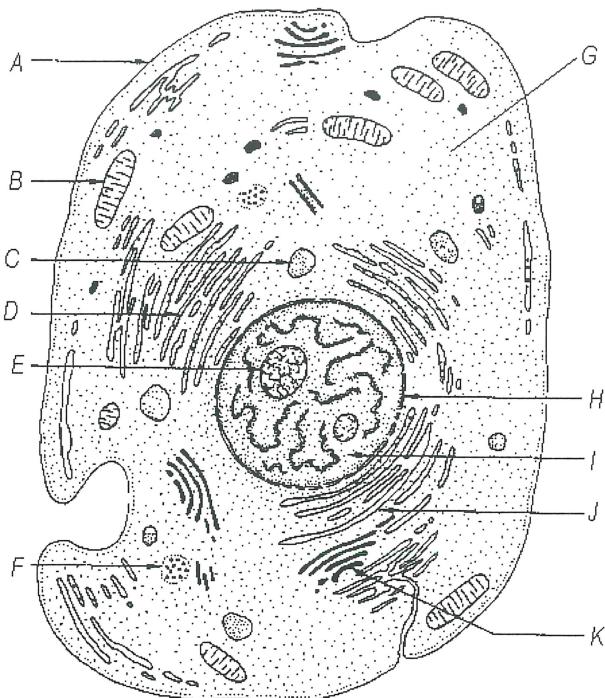


**SECTION 1: MULTIPLE CHOICE** (1 mark each)

Circle your answer on the multiple choice answer sheet.

1.

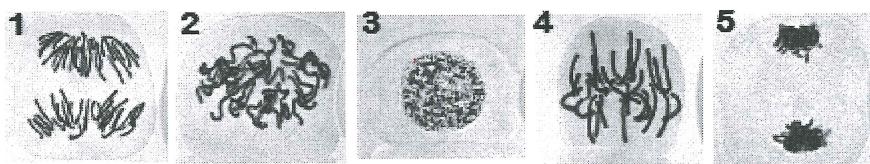


The part of the cell that is labelled I is the

- a) nucleolus
  - b)** nucleus
  - c) nuclear membrane
  - d) cytoplasm
2. Which of the following structures are made out of DNA?
- a)** chromosomes
  - b) chloroplasts
  - c) cell membranes
  - d) mitochondria
3. How many different bases make up the “genetic alphabet” of DNA?
- a) 2
  - b) 3
  - c)** 4
  - d) 5
4. What shape is a DNA molecule?
- a) X shaped
  - b)** Double helix, like a twisted ladder
  - c) Star shaped
  - d) Arch shaped, like a rainbow

5. Which of the following statements is incorrect about chromosomes?
- a) Chromosomes are made of DNA.
  - b) Chromosomes are found in the nucleus.
  - c) Chromosomes contain genes for inheritance.
  - d) Chromosomes are always visible under a microscope in stained cells.
6. Which of the following is correct about asexual reproduction?
- a) It results in greater diversity than sexual reproduction.
  - b) The offspring are all identical to their parents.
  - c) It involves two parents.
  - d) It only occurs in bacteria and single celled organisms.

*The next three questions refer to the diagrams below, which are microscopic photographs of a cell at various stages of mitosis.*

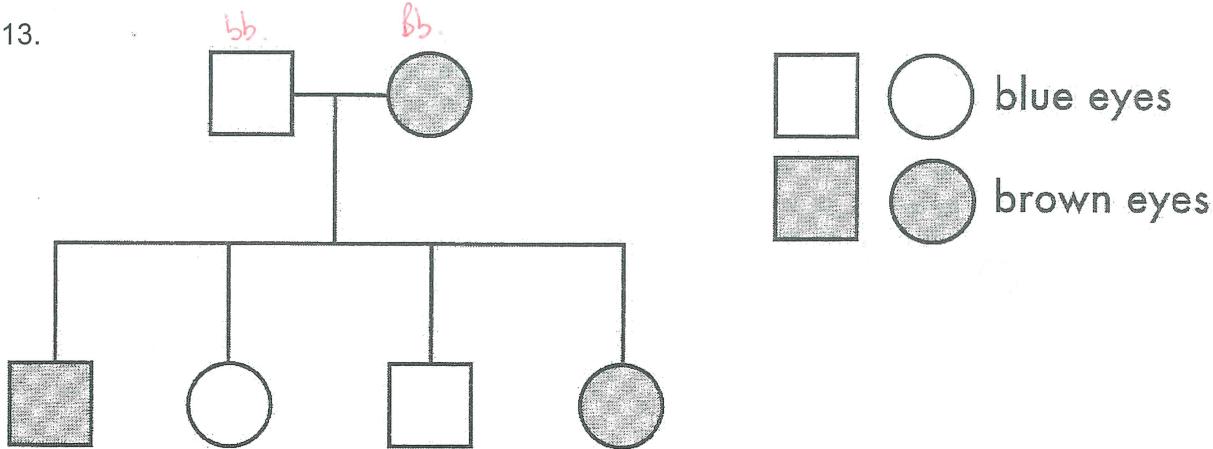


7. The correct sequence for these stages is
- a) 1,2,3,4,5
  - b) 3,2,5,4,1
  - c) 3,2,4,1,5
  - d) 2,5,4,1,3
8. Diagram "1" shows which phase of mitosis?
- a) Interphase
  - b) Prophase
  - c) Metaphase
  - d) Anaphase
9. During which phase does replication (copying) of DNA occur?
- a) Interphase
  - b) Prophase
  - c) Metaphase
  - d) Anaphase
10. The process that produces gametes (eggs, sperm and pollen) is called
- a) mitosis.
  - b) meiosis.
  - c) cloning.
  - d) fertilisation.
11. A sudden change in genetic make-up that results in a new characteristic which is inheritable is called a
- a) multiple allele.
  - b) lethal factor.
  - c) mutation.
  - d) chromosome.

12. Two black dogs may have black or brown pups, but two brown dogs will only have brown pups. This is because

- a) black colouring is dominant to brown colouring.
- b) black colouring is recessive to brown colouring.
- c) black and brown colouring are co-dominant.
- d) black colouring is more common in dogs.

13.



If brown is dominant to blue, which of the following is possible?

- a) the mother is homozygous and the father is heterozygous for eye colour
- b) the father is homozygous and the mother is heterozygous
- c) the father and mother are both homozygous
- d) the father and mother are both heterozygous

14. In humans, sex is determined by one pair of chromosomes out of the 23 pairs. Females are

- a) XX
- b) XY
- c) YX
- d) YY

15. Sex-linked recessive characteristics like red-green colour blindness and haemophilia are more common in

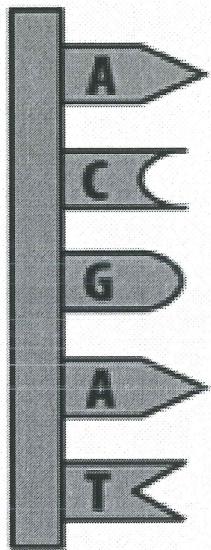
- a) males
- b) females
- c) homozygous individuals
- d) individuals with extra chromosomes

16. The genetic code for an individual for a particular trait is called

- a) allele
- b) genotype
- c) phenotype
- d) a punnet square

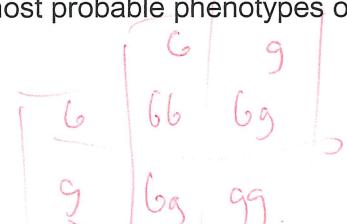
17. Mutations caused by insertion or deletion of one or more bases cause the information following it to be jumbled so that it cannot be read to make a protein. These types of mutations are called
- silent
  - missense
  - nonsense**
  - frameshift
18. In budgerigars, green feather colour (G) is dominant to blue feather colour (g). Two heterozygous green budgerigars are mated, what are the most probable phenotypes of the offspring?
- All the offspring will be green
  - All the offspring will be blue
  - The offspring would be 50% green and 50% blue
  - The offspring will be 75% green and 25% blue**
19. Cells present in new embryos for a few days after fertilisation, which are capable of becoming any type of cell in the body are called
- plasmids.
  - Modifiers.
  - stem cells.**
  - Carcinogens.

20. Which of the base sequences below would pair with the following DNA strand?



- a) 
- b)** 
- c) 
- d) 

*C G  
T A.*



## SECTION 2: WRITTEN

**Write your answers in the spaces provided. Show all working.**

1. In mice, black fur is dominant to brown fur. Predict the possible genotypes and phenotypes of the offspring if a homozygous black male was crossed with a homozygous brown female. (5)

Diagram illustrating a Punnett square for a black female parent (Bb) mated with a black male parent (Bb).

**Male Parent:** Bb (heterozygous black)

**Female Parent:** Bb (heterozygous black)

**Offspring Genotype Distribution:**

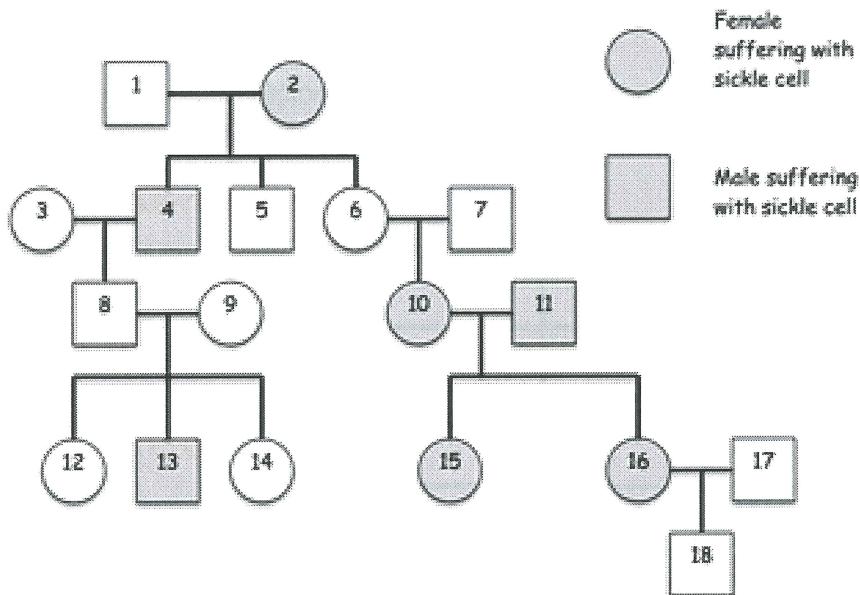
		♂	
		B	B
♀	b	Bb	Bb
	b	Bb	Bb

**Annotations:**

- ① male parent (top right)
- ① female parent (left)
- ① 100% Bb genotype (top right)
- ① 100% heterozygous black-phenotype (middle right)
- ① 1 (middle right)
- ① total (bottom right)
- ① for all 4 (bottom center)
- ① female parent (bottom left)

2. In *Drosophila* fruit flies the gene for red eyes is dominant, while the gene for white eyes is recessive and sex linked ( $X^r$ ). What possible phenotypes and genotypes would result from a cross between a red eyed male ( $X^R Y$ ) and a heterozygous red eyed female ( $X^R X^r$ )? (5)

3. Look at the pedigree chart and answer the questions below.



- a) What is the relationship between 2 and 4?  
b) How many children did 8 and 9 have?  
c) Is this condition dominant or recessive?  
d) What is the genotype of 2?  
e) What is the genotype of 6?  
f) What is the probability of 8 and 9 having another child with sickle cell?

mother and son (1)  
3 (1)  
recessive. (1)  
ss (lower case) (1)  
Ss (1 upper + 1 lower). (1)

$\text{♂}$  (1) for both parents

$S$	$s$	
$S$	$SS$ no	$Ss$ no
$s$	$Ss$ no	$ss$ yes

$\text{♀}$  (1) Punnett Square Filled out (1)

25% (1) (3)

4. State one argument for and one argument against the use of genetically modified crops

Any 1 "for" GM crops - (1) (2)

Any 1 "against" GM crops - (1)



# 2019 Biology 1 Genetics Test

## Multiple Choice Answer Sheet

Name: Solutions Year: 10  
(O. Johnson)

### Multiple Choice – 20 questions.

Circle your choice. If you change your mind, scrub your choice out and circle the one you want. If it is messy, clearly write your choice next to question.

- |     |                         |                         |                         |                         |
|-----|-------------------------|-------------------------|-------------------------|-------------------------|
| 1.  | A                       | <input type="radio"/> B | C                       | D                       |
| 2.  | <input type="radio"/> A | B                       | C                       | D                       |
| 3.  | A                       | B                       | <input type="radio"/> C | D                       |
| 4.  | A                       | <input type="radio"/> B | C                       | D                       |
| 5.  | A                       | B                       | C                       | <input type="radio"/> D |
| 6.  | A                       | <del>B</del>            | C                       | <input type="radio"/> D |
| 7.  | A                       | B                       | <input type="radio"/> C | D                       |
| 8.  | A                       | B                       | C                       | <input type="radio"/> D |
| 9.  | <input type="radio"/> A | <del>B</del>            | C                       | D                       |
| 10. | A                       | <del>B</del>            | C                       | D                       |
| 11. | A                       | B                       | <input type="radio"/> C | D                       |
| 12. | <input type="radio"/> A | B                       | C                       | D                       |
| 13. | A                       | <input type="radio"/> B | C                       | D                       |
| 14. | <input type="radio"/> A | B                       | C                       | D                       |
| 15. | <input type="radio"/> A | B                       | C                       | D                       |
| 16. | A                       | <input type="radio"/> B | C                       | D                       |
| 17. | A                       | B                       | <input type="radio"/> C | D                       |
| 18. | A                       | B                       | C                       | <input type="radio"/> D |
| 19. | A                       | B                       | <input type="radio"/> C | D                       |
| 20. | A                       | <input type="radio"/> B | C                       | D                       |

Correct answers: \_\_\_\_\_ / 20 questions

