SC10F Exam Review

Atoms and Elements

1. Match the words on the left with the definitions on the right.

_____	matter	(A)	Any two or more atoms bonded together.
_____	mass	(B)	A change in the form or appearance of a substance.
_____	weight	(C)	Anything that occupies space.
_____	atom	(D)	A pure substance that can be broken down by chemical changes.
_____	molecule	(E)	Two or more substances that are together and can be separated by physical changes.
_____	compound	(F)	A mixture that is the same throughout.
_____	mixture	(G)	A mixture with visible components.
_____	homogeneous mixture	(H)	The smallest particle of an element that has the properties of that element.
_____	heterogeneous mixture	(I)	When two or more substances join to form new substances with new chemical properties.
_____	physical property	(J)	The amount of matter in an object.
_____	chemical property	(K)	The ability (or inability) to change from one type of matter into another type.
_____	physical change	(L)	A characteristic of matter that is not associated with a change in its chemical composition.
_____	chemical change	(M)	The force of gravity acting on an object.

2. Indicate if each of the following is a homogeneous mixture, heterogeneous mixture, compound, or element.

   (a) Water _____

   (b) Coffee _____

   (c) Sugar _____

   (d) Nitrogen _____

   (e) Buttered popcorn _____

3. Indicate if each of these is a physical or chemical property.

   (a) Boiling point _____

   (b) Acidity _____

   (c) Color _____

   (d) Flammability _____

   (e) Hardness _____

4. Indicate if each of the following is a chemical change or a physical change.

   (a) Burning wood _____

   (b) Tearing a piece of paper in half _____

   (c) Adding sugar to a glass of water _____

   (d) Baking a cake _____

   (e) Boiling water _____

5. Complete the following table.

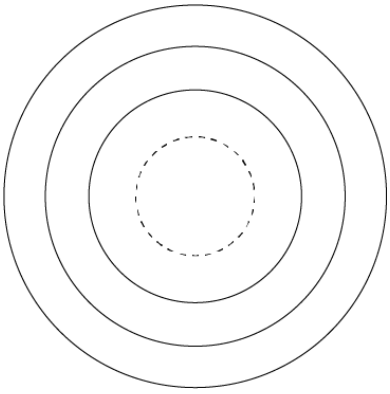
Particle	Symbol	Charge	Location
	p^+		
		neutral	
			clouds surrounding nucleus

6. Complete the following chart.

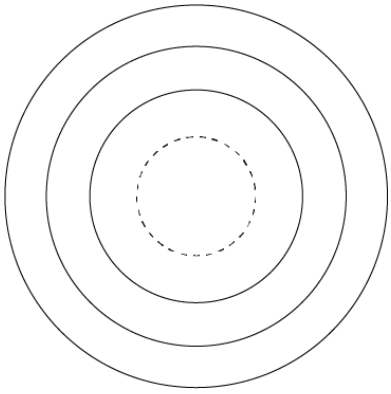
Element name	Element Symbol	Atomic number	Mass number	Number of protons	Number of electrons	Number of neutrons	Family name
Potassium				19			
		10					Noble gases
Fluorine							Halogens

7. Draw a Bohr diagram of each of the following elements.

(a) Sulfur



(b) Magnesium



8. List the properties of metals and non-metals.

Metals	Non-metals

9. List the name and quantity of each element in the following compounds.

(a) $NaNO_3$

(b) $Mg(OH)_2$

Reproduction

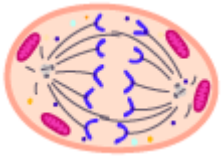
10. Compare and contrast mitosis and meiosis by completing this table. Use the word phrases below.

Mitosis	Same for Both	Meiosis

Creates 4 haploid cells	Creates genetic diversity
Creates 2 diploid cells	No genetic diversity
A type of cell division	Identical to parent cell
One stage of division	Different than parent cell
Two stages of division	Replicates DNA
Creates new cells	
Body cells divide	
Sex cells divide	

11. The following pictures represents cells in the various stages of mitosis.

Anaphase

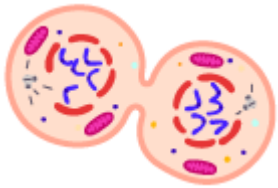


(A)

Prophase

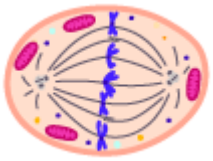
(B)

Telophase



(C)

Metaphase



(D)

Images: CK-12 (CC BY-NC 3.0)

Put the stages in the correct order. _____

12. Indicate if each statement describes sexual or asexual reproduction.

(a) Only one parent required _____

(b) Two parents required _____

(c) Offspring are genetically identical to the parent _____

(d) Offspring are never genetically identical to the parent _____

(e) Rapid population growth _____

(f) Minimal pest resistance _____

(g) Easier for a species to adapt to new environmental conditions _____

13. Indicate the type of asexual reproduction being described. A list is provided following the descriptions.

(a) _____ A parent organism is split into multiple parts, each of which grows to become a complete, independent, offspring organism.

(b) _____ Offspring grows out of the body of the parent, then breaks off into a new individual.

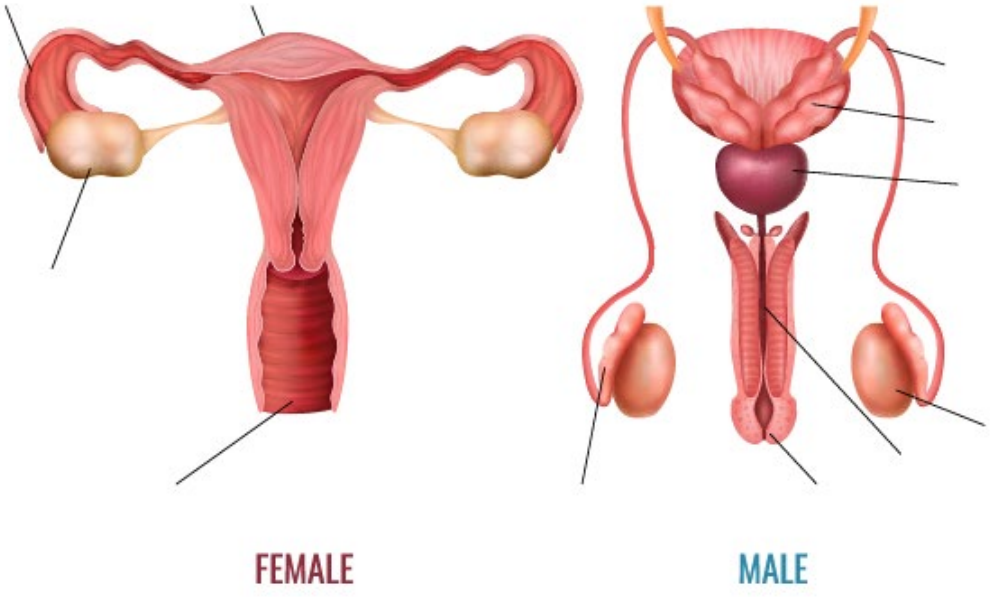
(c) _____ A stem attached to the plant is bent and covered with soil.

(d) _____ A plant grows a new shoot which can become a whole new organism.

(e) _____ A portion of the stem containing nodes and internodes is placed in moist soil and allowed to root.

Budding	Fragmentation	Spores	Vegetative propagation
Cuttings	Grafting	Layering	

14. Label the following diagrams of the human reproductive system.



Credit: macrovector (Adobe Stock Photo)

epididymis	penis	testicle	vagina
fallopian tube	prostate	urethra	vas deferens
ovary	seminal vesicle	uterus	

15. Match the parts of the female and male reproductive systems with the appropriate function.

A. epidiymus	_____	connect ovaries to the uterus
B. fallopian tubes	_____	produce eggs and secrete estrogen
C. ovaries	_____	produce sperm and secrete testosterone
D. penis	_____	passageway for a baby to leave the mother's body
E. prostate gland	_____	secrete substances that become part of semen
F. testes	_____	path for sperm to leave body through the urethra
G. uterus	_____	store sperm until they leave the body
H. vagina	_____	transport sperm from the epididymis to the urethra
I. vas defrens	_____	where a fetus grows and develops until birth

16. Indicate the hormone(s) that is responsible for the activity.

Hormone(s)	Activity
	released from the anterior pituitary
	stimulate sperm production and testosterone secretion by the testes
	regulate a female's ovarian and menstrual cycle
	responsible for the secondary sexual characteristics that develop in the male during adolescence
	responsible for the secondary sexual characteristics of females
	stimulates sperm production and operates as a feedback control to the hypothalamus

FSH	LH	Testosterone	Estrogen	Progesterone

17. Fill in the blanks with words from the word bank.

The male _____ cell and the female _____ fuse together to produce a _____ that travels down the fallopian tube to the _____. It grows as it travels and becomes a blastocyst. The blastocyst embeds in the lining of the uterus forming an _____. The embryo begins to grow and become more complex. After about eight weeks, it has developed specialized cells and most organs. At this stage it is now referred to as a _____.

egg	embryo	fetus	sperm	uterus	zygote

The Nature of Electricity

18. Fill in the blanks with words from the word bank below. (Some words will be used more than once and other words will not be used at all).

(a) There are two types of charges: _____ and _____. Objects with the same charge _____ each other and objects with opposite charges _____ each other. An object becomes positively charged when _____ are _____. An object becomes negatively charged when _____ are _____.

(b) When a positively charged rod is brought near a neutral plastic ball. The charges inside the ball separate. This is called _____. If the charged rod touches the ball, _____ will move from the _____ to the _____ and the ball will have a _____ charge. This process is known as charging by _____.

(c)

(A) (B)

A negatively charged balloon is brough near a soda can as shown in picture (A). The _____ move away from the balloon to the far end of the can. The can is then touched by a hand as shown in picture (B). Some _____ move from the _____ to the _____. If the hand is removed while the balloon is still present, the can will have a _____ charge.

added	can	hand	polarization	removed
attract	conduction	induction	positive	repel
ball	electrons	negative	protons	rod

19. Label each of the following as a conductor or an insulator.

    (a) copper _____

    (b) plastic _____

    (c) rubber _____

    (d) aluminum _____

20. Match the words on the left with the definitions on the right.

_____ conductor	(A) The rate at which charge flows through a circuit.
_____ insulator	(B) Energy per unit charge.
_____ current	(C) Rate at which energy is transformed.
_____ voltage	(D) A material in which electrons can move freely.
_____ power	(E) A material in which electrons cannot move freely.

21. 100 C of charge flows past a point in a circuit in 2 s. Calculate the current in the wire?

22. 2.5 A of current flow through a wire each second. How much charge flows in the same amount of time?

23. 6 C of electric charge flows through a resistor which uses 12 J of energy. What is the potential difference across the resistor?

24. How much energy does each electron ($Q = 1.6 \times 10^{-19}$ C) have in a 9 V battery?

25. Draw a circuit diagram of an electric circuit with

    (a) 1 battery, 2 light bulbs and a switch in series.

    (b) 1 battery and two light bulbs in parallel.

26. An electric lamp uses a current of 2.5 A when connected to 120 V. Calculate the power the lamp uses?

27. Why would it be dangerous to use an extension cord rated for 10 A with a toaster oven that uses 13 A?

28. A TV uses 120 W of power.

    (a) How much energy in kWh does the TV use if you watch it for 4 hours?

    (b) Electricity costs $0.10 per kWh. How much would it cost to watch TV 4 hours a day, every day, for the whole year?

Genetics

29. Indicate if the following genotypes are homozygous dominant, homozygous recessive or heterozygous.

    (a) Dd _____

    (b) DD _____

    (c) dd _____

30. In pea plants, purple flowers (P) are dominant to white flowers (p). State the phenotypes for each of the following genotypes.

    (a) PP _____

    (b) Pp _____

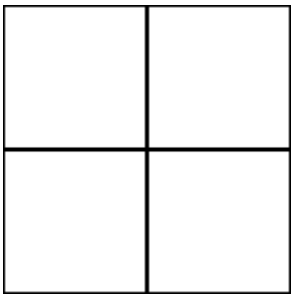
    (c) pp _____

31. In horses, black coat color (B) is dominant to chestnut coat color (b). A heterozygous black coat male is mated with a chestnut coat female.

    (a) Indicate the genotype of the male and the female horses.

    Male: _____ Female: _____

    (b) Complete a Punnett square showing the cross between these two horses.

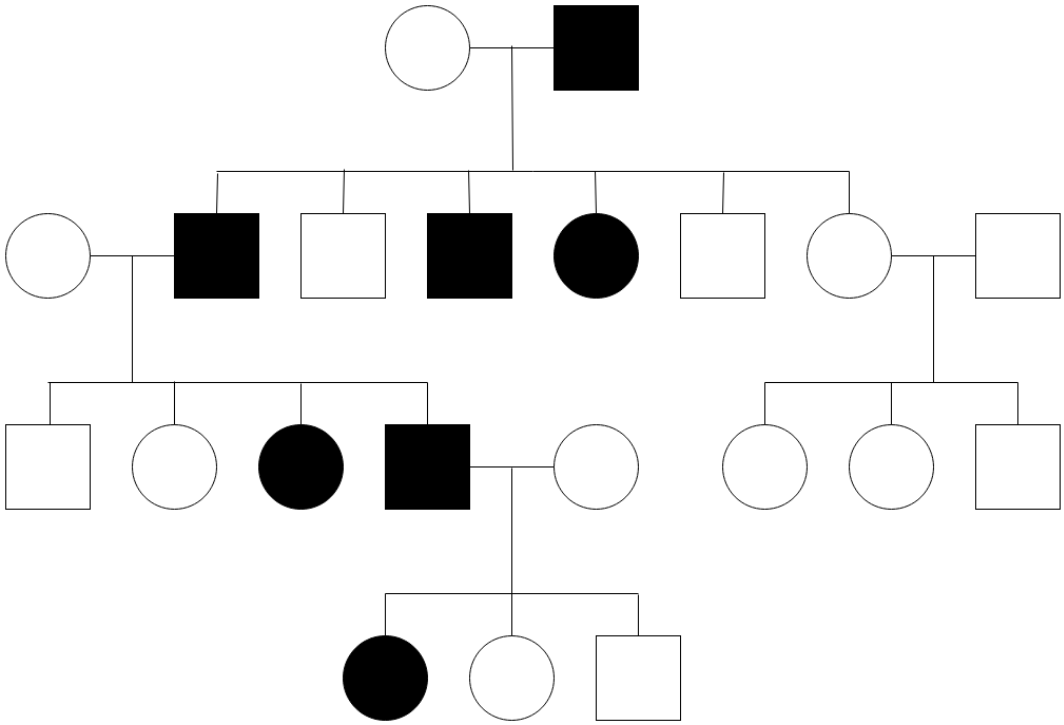


    (c) What percentage of the offspring will have black coats?

32. Traits controlled by genes located on sex chromosomes are called _____ traits.

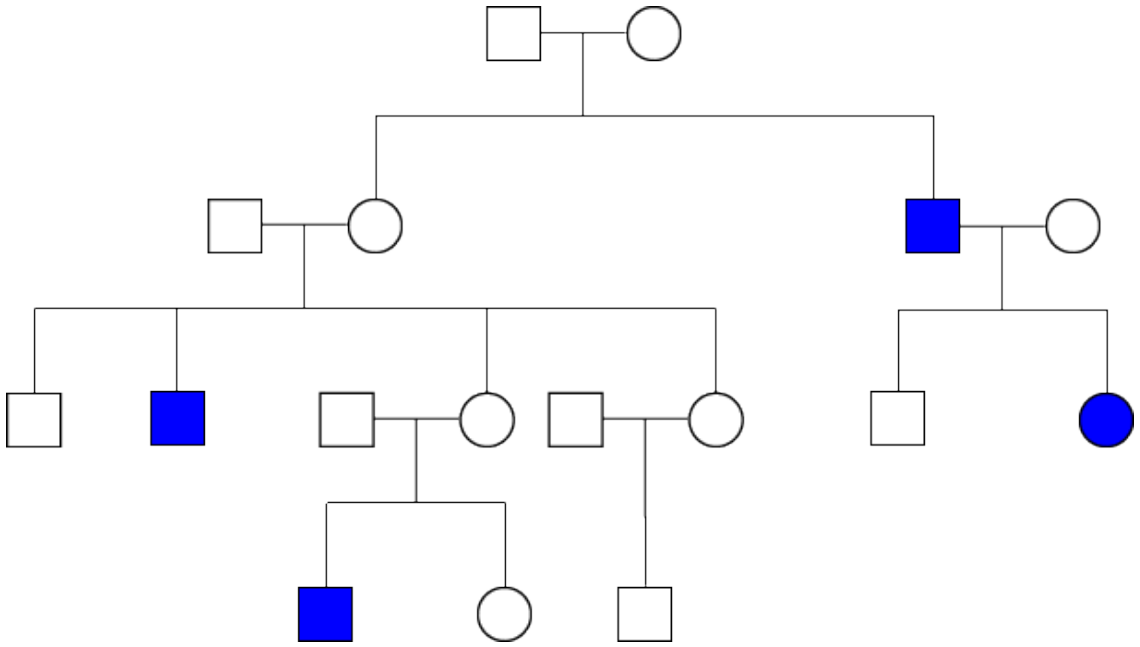
33. Red-green color blindness is a recessive x-linked disorder. Show how it is possible for a normal father to have children that are color blind.

34. The following pedigree tracks an autosomal recessive disorder.



Indicate the genotype of each person in the pedigree. Use "A" for dominant and "a" for recessive.

35. The following pedigree tracks an x-linked recessive disorder.



Indicate the genotype of each person in the pedigree. Use "R" for dominant and "r" for recessive.