

Science 30 Midterm KEY

1. B
2. D
3. D
4. C
5. C
6. C
7. C
8. A
9. A
10. A
11. C
12. C
13. C
14. C
15. D
16. A
17. A
18. A
19. A
20. D
21. C

- NR1 4312 OR 4322
NR2 1321
NR3 4231
NR4 3231
NR5 2314
NR6 2413 OR 2431

Science 30 Short Answer Section (45marks)

1. Complete the chart below by placing the applicable word for the provided definition:

Helper T Cells	a type of T cell that coordinates the actions of other cells involved in immune response
Antigen	a complex molecule on the surface of an invading pathogen that triggers an immune response
B cells	a type of white blood cell that produces antibody molecules when stimulated by helper T cells
Macrophage	a type of white blood cell that engulfs dead cells, debris and foreign cells
Killer T Cells	a type of T cell that recognizes and destroys body cells by releasing proteins that create large holes in the target cells membrane
Memory Cells	specialized white blood cells that persist in the bloodstream to provide future immunity to invaders bearing a specific antigen
Antibody	a protein molecule produced by a B cell designed to bind to a specific antigen to facilitate its destruction
Suppressor cells	a type of T cell that sends chemical messengers to stop the immune response to an antigen
T cell	A type of white blood cell that recognizes and destroys invaders or releases chemical messengers to coordinate immune response
Plasma	Water (92%) + dissolved gases + proteins (7% - fibrinogen, serum albumin and serum globulin) + sugars + vitamins (0.1%) + minerals (0.9%) + hormones
Erythrocyte (RBC)	<ol style="list-style-type: none"> 1. No nucleus 2. Disk shaped cells packed with about 280million iron containing hemoglobin 3. Life span of 120 days
Leukocyte (WBC)	<ol style="list-style-type: none"> 1. Contain a nucleus however appear to be colorless 2. Part of the body's response to infection
Platelets	<ol style="list-style-type: none"> 1. Fragments of cells formed from the breakdown of bone marrow 2. No nucleus 3. Break down quickly in the blood

2. a. Explain what a sex linked inherited trait is. (1mark)

Sex Linked is transferred on the X or Y chromosome (sex chromosomes)

b. Give 1 example of a sex linked trait and 1 example of a non-sex linked trait. Provide the phenotype and genotype for each trait. (4marks)

Regular Trait	Genotype	Phenotype	Sex-linked Trait	Genotype	Phenotype
Curly Hair	Cc CC cc	Curly or Straight	Color Blind	X^cY	Color Blind or not

c. Draw a punnett square for the sex linked trait for a carrier female and a carrier male. What is the probability the sons will have the inherited trait? (2marks)

	X^c	Y
X^c	X^cX^c	X^cY
X^C	X^CX^c	X^CY

50% chance the son will be color blind.

3. Describe the LUB-DUB of the heart (4marks)

LUB - Systole (Contract) - AV slams (blood out)

DUB - Diastole (Relax) - SL slams (heart fills)

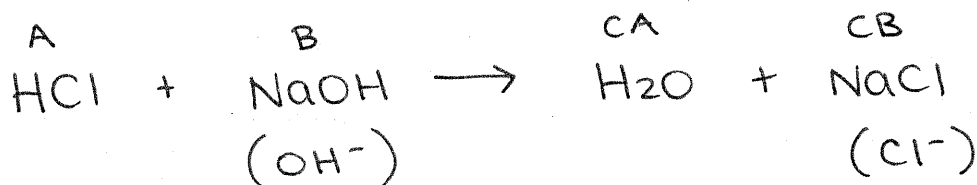
Use the following information to answer the next 4 questions

A student performed a titration of 10mL hydrochloric acid with 0.55mol/L sodium hydroxide. Sodium hydroxide was added drop by drop to the acid containing indicator, until an endpoint was reached. The data table below contains the results of the titration.

Titration of 10mL Hydrochloric Acid with 0.55M NaOH(aq)

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Initial Volume (mL)	0.00	12.47	22.93	33.38	1.29
Final Volume (mL)	12.47	22.93	33.38	43.84	11.77
Change in Volume (mL)	12.47	10.46	10.45	10.46	10.48

4. Determine the formula for the reaction occurring in the titration described. Label the acid, base, conjugate acid and conjugate base. (3marks)



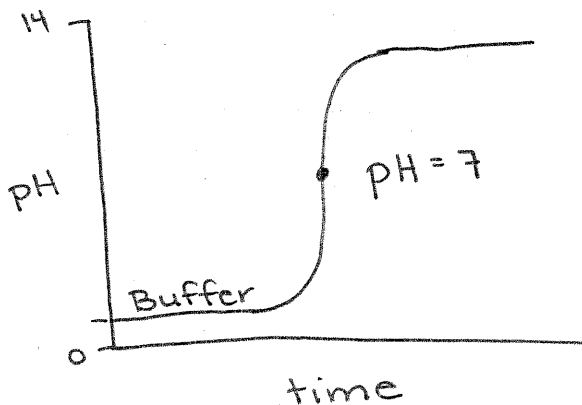
5. Calculate the change in volume for all 5 trials, and determine the appropriate average change in volume to be used in the calculations. (2marks)

$$\text{Avg. Volume} = 10.46 \text{ mL}$$

6. Determine the concentration of the hydrochloric acid used in the titration described. Show all your work and include all units. (3marks)

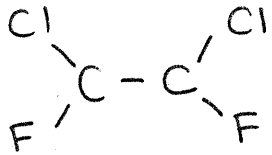
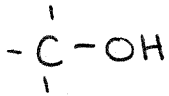
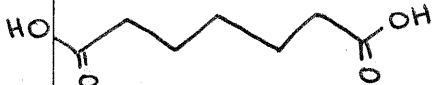
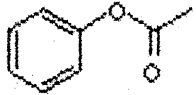
$$\frac{\text{mol}}{\text{L}} \text{ HCl} = \frac{0.55 \text{ mol}}{\text{L}} \times 0.01046 \text{ L} \times \frac{\text{HCl}}{\text{NaOH}} \times \frac{1}{0.010} = 0.576 \frac{\text{mol}}{\text{L}}$$

7. Draw the titration curve for this experiment, include labels on both axis, and the endpoint and buffering zones. Using your curve, determine an appropriate indicator for this titration (5marks)



phenolphthalein
(Bromo blue
Phenol Red
chlorophenol Red)

8. Complete the organics chart below. (5marks)

Diagram	Real Life Use	IUPAC Name
$C-C\equiv C$	Propyne is used in addition reactions for fluorinating hydrocarbons	Prop-1-yne
	CFCs were used as coolants in refrigerators in the past, before it was discovered they were creating holes in the ozone layer	1,1,2,2-tetrachloroethane
	Ethanol is used in beer, wine and spirits as drinking alcohol	methanol
	This large compound is used as a derivative for creating long fibrous organic strands or polymers	heptan-1,7-dioic acid
	This compound is used in organic chemistry for a process known as hydro-boration.	phenyl ethanoate XXXXXXXX

9. Explain one compound discussed in science 30 that is a hazard to the environment. This may include pesticides, persistent organic pollutants, fertilizers, nitrogen oxides, sulfur oxides or mercury.

Describe how the compound negatively influences the environment, where the compound comes from (or is used for in the world) and an optional technology used in place of the compound. (3marks)