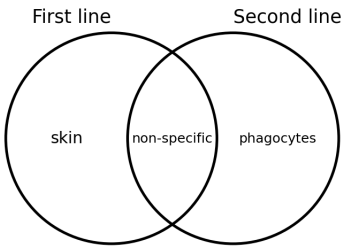
ALBERTA SCIENCE 30 · FINAL EXAM · 50 QUESTIONS

Final Exam — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **The diagram compares the first and second lines of defence. A feature shared by both lines is that they**



- **A** act against only one type of pathogen
- **B** are non-specific and act against many pathogens
- **C** produce antibodies against a pathogen
- **D** produce memory cells after an infection

Understand It with Pulse | Flag a mistake

2 **A sample of industrial effluent has a pH of 2.5. This sample would be classified as**

A strongly basic

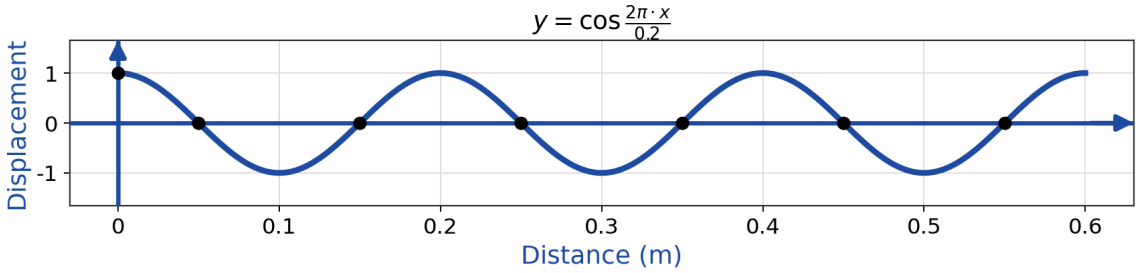
B weakly basic

C neutral

D acidic

Understand It with Pulse | Flag a mistake

3 **The graph below shows a wave. Using $c = 3.00 \times 10^8 \ \frac{m}{s}$, the frequency of this wave is**



A 1.50×10^9 Hz

B 6.00×10^8 Hz

C 3.00×10^9 Hz

D 7.50×10^8 Hz

Understand It with Pulse | Flag a mistake

4 **In a coal-fired generating station, the main sequence of energy conversions that produces electricity is**

- A thermal → chemical → kinetic → electrical
- B chemical → thermal → kinetic → electrical
- C chemical → kinetic → electrical → thermal
- D kinetic → chemical → thermal → electrical

Understand It with Pulse | Flag a mistake

5 **In a resting neuron, the inside of the cell membrane is**

- A positively charged compared with the outside
- B negatively charged compared with the outside
- C identical in charge to the outside
- D rapidly alternating in charge

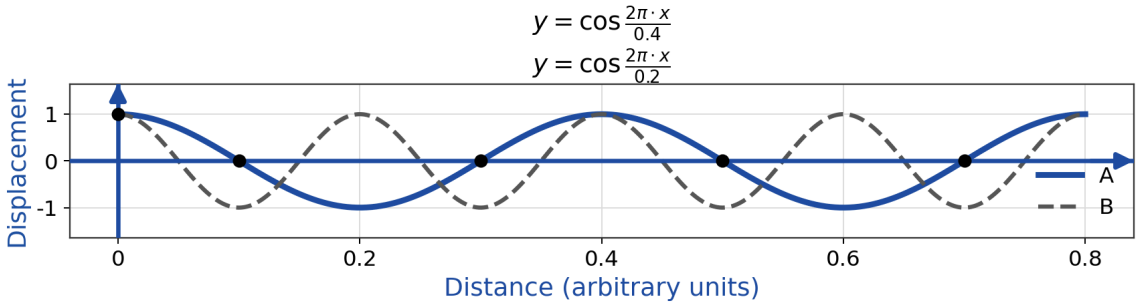
Understand It with Pulse | Flag a mistake

6 **Hexane is a straight-chain alkane that contains 6 carbon atoms. The number of hydrogen atoms in one molecule of hexane is _____ Record your answer as a whole number.**

ANSWER _____

Understand It with Pulse | Flag a mistake

7 **The graph below shows two waves, A and B. The frequency of wave B, compared with the frequency of wave A, is**



A higher

B lower

C the same

D zero

Understand It with Pulse | Flag a mistake

8 **Energy is released by the Sun mainly because, in its core,**

A gravity compresses helium nuclei into hydrogen nuclei

B hydrogen atoms are burned chemically in oxygen

C uranium nuclei undergo fission reactions

D extremely high temperature and pressure allow hydrogen nuclei to fuse into helium

Understand It with Pulse | Flag a mistake

9 **Some events that occur during a reflex arc are listed below. 1 Sensory neuron carries the impulse to the spinal cord 2 Receptor in the skin detects a stimulus 3 Motor neuron carries the impulse to a muscle 4 Interneuron in the spinal cord relays the impulse The order in which the events occur, from first to last, is _____ Record your answer as a four-digit number.**

ANSWER _____

Understand It with Pulse | Flag a mistake

10 **The products of the complete combustion of a hydrocarbon are**

- A carbon dioxide and water
- B carbon monoxide and water
- C carbon and hydrogen
- D carbon dioxide and hydrogen

Understand It with Pulse | Flag a mistake

11 **Overexposure to ultraviolet radiation from the Sun is most closely associated with**

- A hearing loss
- B skin damage and an increased risk of skin cancer
- C increased muscle growth
- D tooth decay

Understand It with Pulse | Flag a mistake

12 **Which of the following surfaces has the highest albedo, reflecting the greatest fraction of incoming solar radiation?**

- A Fresh snow
- B Ocean water
- C A coniferous forest
- D An asphalt parking lot

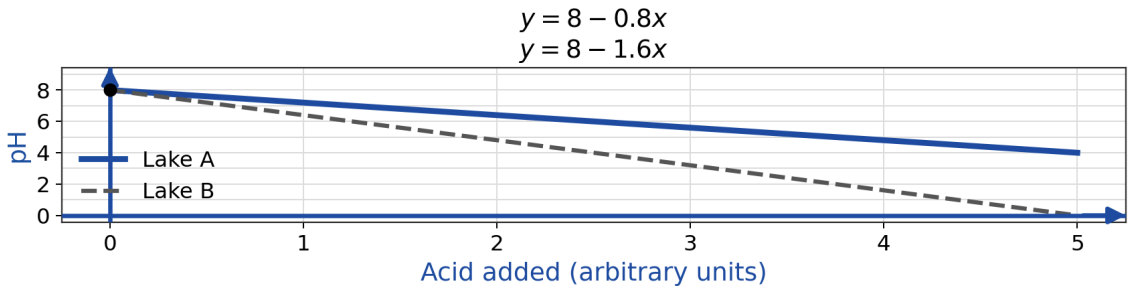
Understand It with Pulse | Flag a mistake

13 **When a nerve impulse reaches the end of an axon, it is carried across the synapse when**

- A the impulse jumps across the cleft as an electrical spark
- B neurotransmitter travels along the axon of the next neuron
- C vesicles release neurotransmitter into the cleft, and it binds to receptors on the next neuron
- D the membranes of the two neurons fuse together

Understand It with Pulse | Flag a mistake

14 **Lake A is surrounded by limestone bedrock and Lake B is surrounded by granite bedrock. The graph below shows pH as acid is added to each lake. After 5 units of acid are added, the lake with the smaller drop in pH, and the size of that drop, are**



A Lake A, drop of 4.0

B Lake A, drop of 8.0

C Lake B, drop of 4.0

D Lake B, drop of 8.0

Understand It with Pulse | Flag a mistake

15 **Total internal reflection can occur when light travels**

- **A** from a less optically dense medium to a more optically dense medium
- **B** from air into water at any angle of incidence
- **C** from a more optically dense medium to a less dense one, at an angle greater than the critical angle
- **D** along the normal to the surface

Understand It with Pulse | Flag a mistake

16 **In a nuclear reaction, 0.050 kg of mass is converted completely into energy. Using $E = mc^2$ and $c = 3.00 \times 10^8 \ \frac{m}{s}$, the energy released is a $\times 10^{15}$ J. The value of a is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

17 **A vaccine protects a person against a disease because the vaccine**

A injects ready-made antibodies that last for life

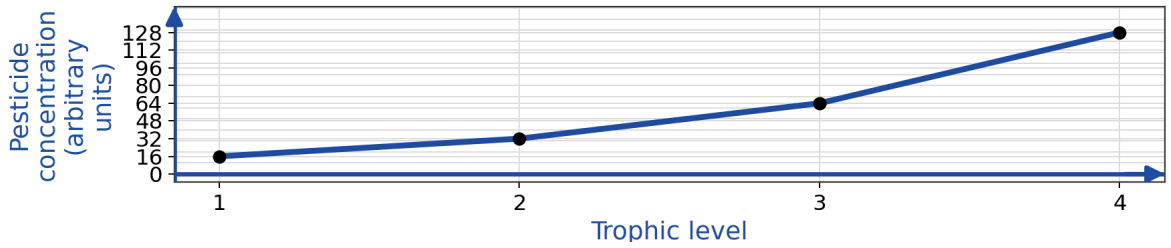
B destroys all pathogens in the body immediately

C causes the body to produce extra antigens

D stimulates the body to produce its own antibodies and memory cells

Understand It with Pulse | Flag a mistake

18 **The graph below shows pesticide concentration at four trophic levels, in arbitrary units. The concentration at trophic level 4 is how many times the concentration at trophic level 1?**



A 2

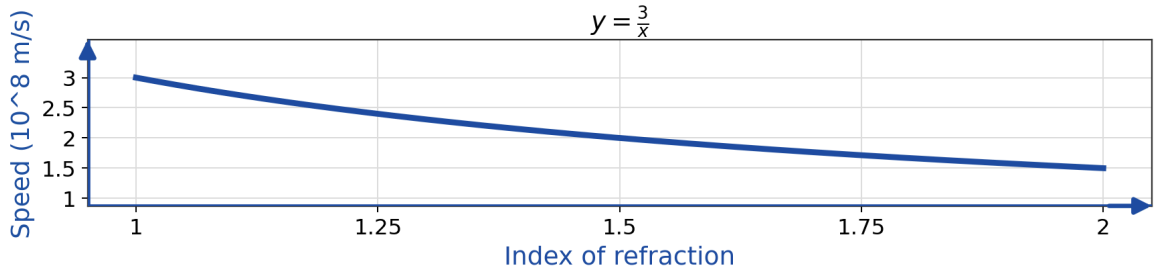
B 4

C 8

D 16

Understand It with Pulse | Flag a mistake

19 **The graph below shows the speed of light in a material against its index of refraction. For a material with an index of refraction of 1.50, the speed of light, in units of $10^8 \frac{m}{s}$, is**



A 1.50

B 2.00

C 2.50

D 3.00

Understand It with Pulse | Flag a mistake

20 **A major limitation of both wind power and solar power is that they**

- **A** are intermittent and depend on local weather and time of day
- **B** produce large amounts of radioactive waste
- **C** emit carbon dioxide while they are operating
- **D** permanently use up the wind and sunlight in an area

Understand It with Pulse | Flag a mistake

21 **The hormone that lowers blood glucose levels by promoting glucose uptake and glycogen formation is**

- **A** glucagon
- **B** epinephrine
- **C** insulin
- **D** thyroxine

Understand It with Pulse | Flag a mistake

22 **The unbalanced equation for the complete combustion of ethane is**

__C_2H_6 + __O_2 → __CO_2 + __H_2O

When the equation is balanced with the lowest whole-number coefficients, the sum of all four coefficients is _____ Record your answer as a whole number.

ANSWER _____

Understand It with Pulse | Flag a mistake

23 **A circuit breaker protects the wiring in a house by**

A increasing the current in the circuit

B storing electrical charge for later use

C opening the circuit when the current becomes too large

D changing alternating current into direct current

Understand It with Pulse | Flag a mistake

24 **A photovoltaic cell in a solar panel converts**

A chemical energy directly into electrical energy

B thermal energy directly into electrical energy

C kinetic energy directly into electrical energy

D radiant energy directly into electrical energy

Understand It with Pulse | Flag a mistake

25 **When the level of thyroxine in the blood rises above normal, the pituitary gland responds by**

A releasing more TSH to stimulate the thyroid further

B releasing less TSH, which reduces stimulation of the thyroid

C releasing thyroxine into the blood itself

D permanently shutting down the thyroid gland

Understand It with Pulse | Flag a mistake

26 **The layer of ozone in the stratosphere is essential for life on Earth because it**

- **A** keeps the surface of the Earth warm at night
- **B** produces the oxygen needed for cellular respiration
- **C** traps pollutants so that they cannot reach the ground
- **D** absorbs most of the harmful ultraviolet radiation from the Sun

Understand It with Pulse | Flag a mistake

27 **Fibre-optic cables are able to carry light signals over long distances because the light undergoes repeated**

- **A** refraction out of the cable
- **B** absorption by the glass
- **C** scattering in all directions
- **D** total internal reflection

Understand It with Pulse | Flag a mistake

28 **An advantage of using nuclear fusion, rather than nuclear fission, as an energy source for generating electricity is that**

A fusion fuel is abundant, and its products are not highly radioactive

B fusion already supplies most of the electricity used in the world

C fusion reactions operate at room temperature

D fusion reactors require no containment structure

Understand It with Pulse | Flag a mistake

29 **An allergic reaction occurs when the immune system**

A fails to recognize a dangerous pathogen

B is weakened by a course of antibiotics

C overreacts to a normally harmless substance and releases histamine

D produces too few white blood cells

Understand It with Pulse | Flag a mistake

30 **A 2.0 kg sample of fish tissue is found to contain 3.6 mg of mercury. One part per million is equal to 1 mg of a substance per kilogram of sample. The concentration of mercury in the fish tissue is _____ ppm Record your answer to the nearest tenth.**

ANSWER _____

Understand It with Pulse | Flag a mistake

31 **In a vacuum, all types of electromagnetic radiation travel at**

A speeds that depend on their frequency

B the speed of sound

C $3.00 \times 10^8 \ \frac{m}{s}$

D speeds that depend on their wavelength

Understand It with Pulse | Flag a mistake

32 **Which of the following energy sources is non-renewable?**

- A Wind
- B Natural gas
- C Tidal energy
- D Geothermal energy

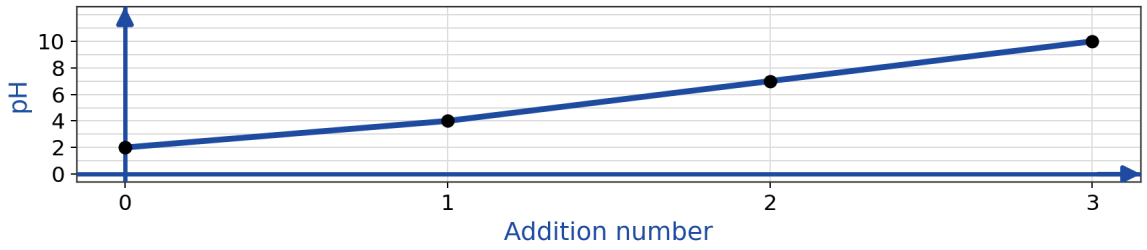
Understand It with Pulse | Flag a mistake

33 **Which of the following is an example of a negative feedback loop?**

- A Blood clotting chemicals trigger the release of more clotting chemicals
- B Contractions during childbirth cause the release of oxytocin, which increases contractions
- C A rise in blood glucose triggers insulin release, which lowers blood glucose back toward normal
- D A small increase in body temperature causes changes that raise temperature further

Understand It with Pulse | Flag a mistake

34 **The graph below shows the pH of a solution as equal amounts of a base are added, one at a time. After the second addition, the solution is**



A strongly acidic

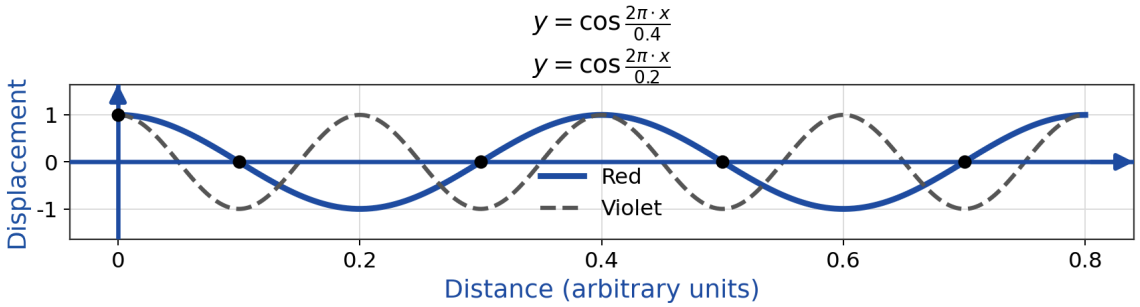
B weakly acidic

C neutral

D basic

Understand It with Pulse | Flag a mistake

35 **The graph below shows two visible light waves. The wave with the longer wavelength is**



A Red

B Violet

C Both waves have the same wavelength

D Neither wave has a wavelength

Understand It with Pulse | Flag a mistake

36 **A self-sustaining chain reaction occurs in a fission reactor because**

- **A** each fission absorbs all of the neutrons around it
- **B** the fuel becomes hotter with every fission
- **C** neutrons released by one fission can trigger further fissions
- **D** the control rods continuously emit neutrons

Understand It with Pulse | Flag a mistake

37 **Some events in the control of thyroxine release are listed below. 1 The thyroid gland releases thyroxine 2 The hypothalamus detects a need and signals the pituitary gland 3 The pituitary gland releases thyroid stimulating hormone (TSH) 4 Thyroxine increases the metabolic rate of body cells The order in which the events occur, from first to last, is _____ Record your answer as a four-digit number.**

ANSWER _____

Understand It with Pulse | Flag a mistake

38 **A solution of hydrochloric acid has a hydrogen ion concentration of $[H^+] = 1.0 \times 10^{-3}$ mol/L. The pH of the solution is _____ Record your answer to the nearest hundredth.**

ANSWER _____

Understand It with Pulse | Flag a mistake

39 **The rate at which a device converts electrical energy, its power, is measured in**

A volts

B amperes

C joules

D watts

Understand It with Pulse | Flag a mistake

40 **Which of the following gases is a greenhouse gas that absorbs infrared radiation emitted by the Earth?**

A Methane

B Oxygen

C Nitrogen

D Argon

Understand It with Pulse | Flag a mistake

41 **The role of cytotoxic (killer) T cells in an immune response is to**

A produce antibodies that tag pathogens

B destroy body cells that have been infected by a pathogen

C engulf bacteria in damaged tissue

D release histamine during inflammation

Understand It with Pulse | Flag a mistake

42 **High counts of coliform bacteria in a sample of lake water are used as an indicator of**

A possible contamination of the water by sewage

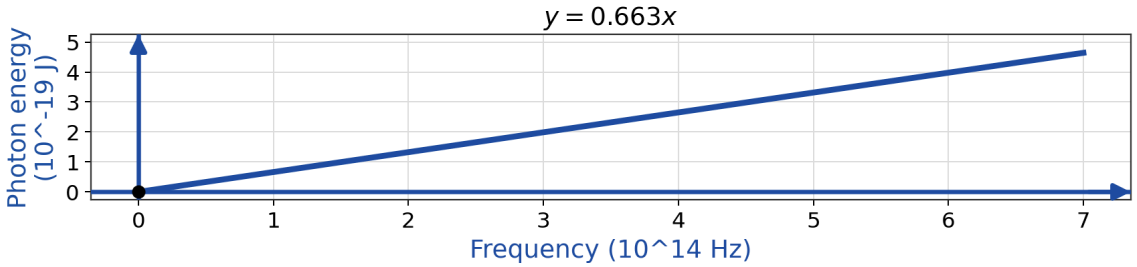
B high levels of dissolved oxygen in the water

C low turbidity of the water

D excessive hardness of the water

Understand It with Pulse | Flag a mistake

43 **The graph below shows photon energy against frequency. When the frequency doubles from 2.00 to 4.00, in units of 10^{14} Hz, the photon energy**



A doubles

B is halved

C quadruples

D remains the same

Understand It with Pulse | Flag a mistake

44 **A solar thermal collector differs from a photovoltaic panel because a solar thermal collector**

A converts light directly into electricity

B uses sunlight to generate a magnetic field

C operates only at night

D uses sunlight to heat a fluid such as water

Understand It with Pulse | Flag a mistake

45 **Antibiotics are effective treatments for infections caused by**

A viruses

B cancer cells

C allergens

D bacteria

Understand It with Pulse | Flag a mistake

46 **The region of greatest stratospheric ozone depletion, often called the ozone hole, develops**

A over Antarctica during the polar spring

B over the Arctic during the polar summer

C over the equator throughout the year

D over industrial cities during the winter

Understand It with Pulse | Flag a mistake

47 **Two identical bulbs are connected in series with a battery. A third identical bulb is then added in series. The bulbs will**

A become brighter

B stay the same brightness

C burn out immediately

D become dimmer

Understand It with Pulse | Flag a mistake

48 **Adding insulation to the walls of a house reduces the energy needed to heat the house mainly by**

A generating additional thermal energy

B reducing the rate at which thermal energy escapes to the surroundings

C raising the temperature of the furnace

D reflecting sunlight away from the house

Understand It with Pulse | Flag a mistake

49 **A moderate fever during an infection is considered part of the second line of defence because it**

A kills every pathogen in the body within minutes

B can slow the reproduction of many pathogens and speed up body responses

C prevents pathogens from entering through the skin

D is produced directly by antibodies

Understand It with Pulse | Flag a mistake

50 **Cyclopentane is a cycloalkane that contains 5 carbon atoms arranged in a ring. The number of hydrogen atoms in one molecule of cyclopentane is _____ Record your answer as a whole number.**

ANSWER

Understand It with Pulse | Flag a mistake

ANSWER KEY

1.	B	**18.**	C	**35.**	A
2.	D	**19.**	B	**36.**	C
3.	A	**20.**	A	**37.**	2314
4.	B	**21.**	C	**38.**	3
5.	B	**22.**	19	**39.**	D
6.	14	**23.**	C	**40.**	A
7.	A	**24.**	D	**41.**	B
8.	D	**25.**	B	**42.**	A
9.	2143	**26.**	D	**43.**	A
10.	A	**27.**	D	**44.**	D
11.	B	**28.**	A	**45.**	D
12.	A	**29.**	C	**46.**	A
13.	C	**30.**	1.8	**47.**	D
14.	A	**31.**	C	**48.**	B
15.	C	**32.**	B	**49.**	B
16.	4.5	**33.**	C	**50.**	10
17.	D	**34.**	C		

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