

SECURED



January 2009



Science 30

*Part B: Machine Scored
Grade 12 Diploma Examination*

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Science 30

Part B: Machine Scored

Grade 12 Diploma Examination

Description

Time: 2 hours. This closed-book examination was developed to be completed in 2 h; however, you may take an additional 0.5 h to complete the examination.

Part B: Machine Scored consists of 40 multiple-choice and 12 numerical-response questions, of equal value, worth 65% of the total Science 30 Diploma Examination mark.

This examination contains sets of related questions. A set of questions may contain multiple-choice and/or numerical-response questions.

A science data booklet is provided for your reference.

Note: The perforated pages at the back of this booklet may be torn out and used for your rough work. No marks will be given for work done on the tear-out pages.

Instructions

- Turn to the last page of the examination booklet. Carefully fold and tear out the machine-scored answer sheet along the perforation.
- Use **only** an **HB** pencil for the answer sheet.
- Fill in the information on the back cover of the examination booklet and the answer sheet as directed by the presiding examiner.
- You are expected to provide your own calculator. You may use any scientific calculator or a graphing calculator approved by Alberta Education.
- You **must** have cleared your calculator of all information that is stored in the programmable or parametric memory.
- You may use a ruler and a protractor.
- Read each question carefully.
- Consider all numbers used in the examination to be the result of a measurement or an observation.
- When performing calculations, use the values of the constants provided in the data booklet.
- If you wish to change an answer, erase **all** traces of your first answer.
- Do **not** fold the answer sheet.
- The presiding examiner will collect your answer sheet and examination booklet and send them to Alberta Education.
- Now turn this page and read the detailed instructions for answering machine-scored questions.

Correct-Order Question and Solution

| Four Subjects | |
|---------------|-----------|
| 1 | Physics |
| 2 | Biology |
| 3 | Science |
| 4 | Chemistry |

When the subjects above are arranged in alphabetical order, their order is _____, _____, _____, and _____.

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

Answer: 2413

Record 2413 on the answer sheet

| | | | |
|---|---|---|---|
| 2 | 4 | 1 | 3 |
| • | • | | |
| 0 | 0 | 0 | 0 |
| 1 | 1 | ● | 1 |
| ● | 2 | 2 | 2 |
| 3 | 3 | 3 | ● |
| 4 | ● | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | 8 |
| 9 | 9 | 9 | 9 |

Scientific Notation Question and Solution

The speed of light is $a.bc \times 10^d$ m/s. The values of a , b , c , and d are _____, _____, _____, and _____.

a b c d

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

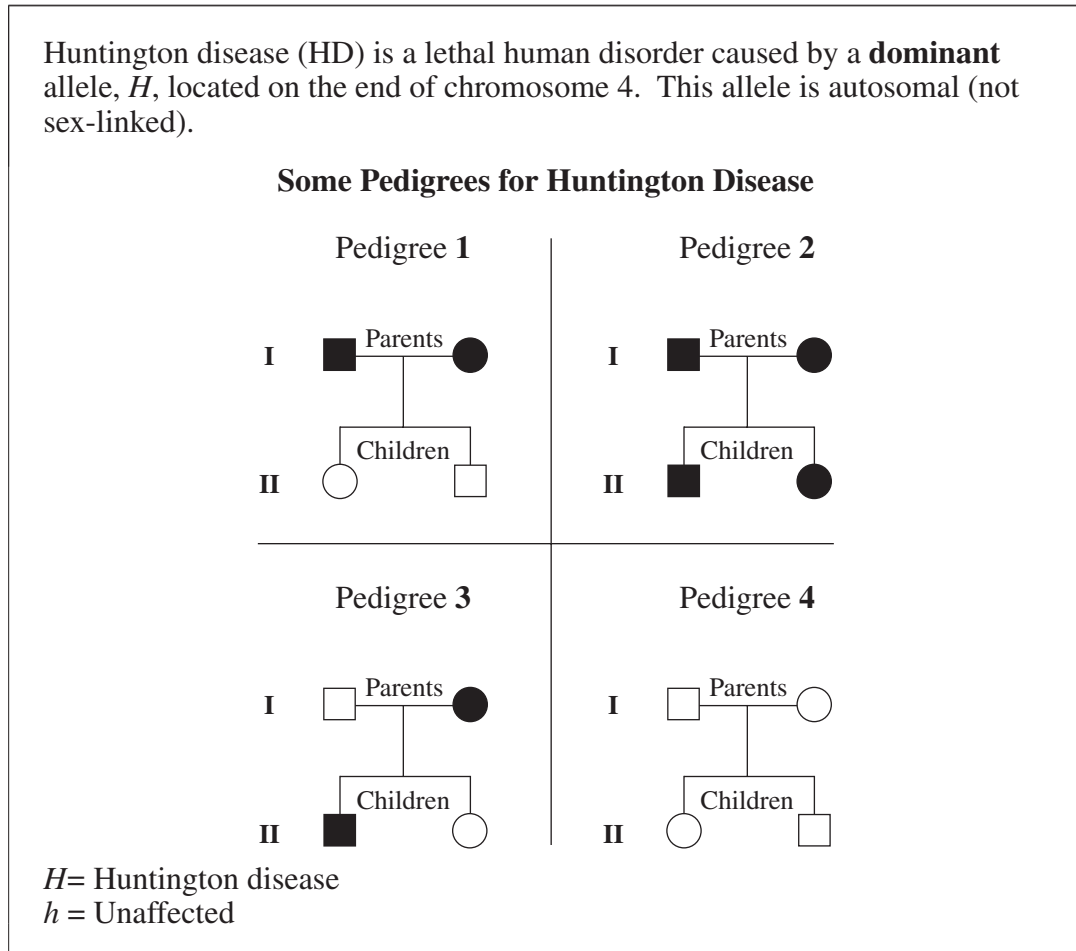
Answer: $c = 3.00 \times 10^8$ m/s

Record 3008 on the answer sheet

| | | | |
|---|---|---|---|
| 3 | 0 | 0 | 8 |
| • | • | | |
| 0 | ● | ● | 0 |
| 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 |
| ● | 3 | 3 | 3 |
| 4 | 4 | 4 | 4 |
| 5 | 5 | 5 | 5 |
| 6 | 6 | 6 | 6 |
| 7 | 7 | 7 | 7 |
| 8 | 8 | 8 | ● |
| 9 | 9 | 9 | 9 |

Technology has increased knowledge about diseases and their effects on the human body.

Use the following information to answer the first three questions.



Numerical Response

- Match each of the pedigrees numbered above with the genotypes of the **parents**, as listed below.

Genotypes of parents

hh × *hh* _____ (Record in the **first** column)

hh × *Hh* _____ (Record in the **second** column)

Hh × *Hh* _____ (Record in the **third** column)

HH × *Hh* _____ (Record in the **fourth** column)

(Record your answer in the numerical-response section on the answer sheet.)

Use the following additional information to answer the next two questions.

One parent is heterozygous and the other is homozygous dominant for the Huntington allele.

1. The possible genotypes of children born to the parents described above are
 - A. Hh and hh only
 - B. HH and Hh only
 - C. HH and hh only
 - D. HH , Hh , and hh

2. The probability that the first child of the parents described above will receive the dominant allele is
 - A. 25%
 - B. 50%
 - C. 75%
 - D. 100%

Use the following information to answer the next question.

A variety of cell processes occur during growth and reproduction.

Some Cell Processes

- 1 Meiosis
- 2 Mitosis
- 3 Fertilization

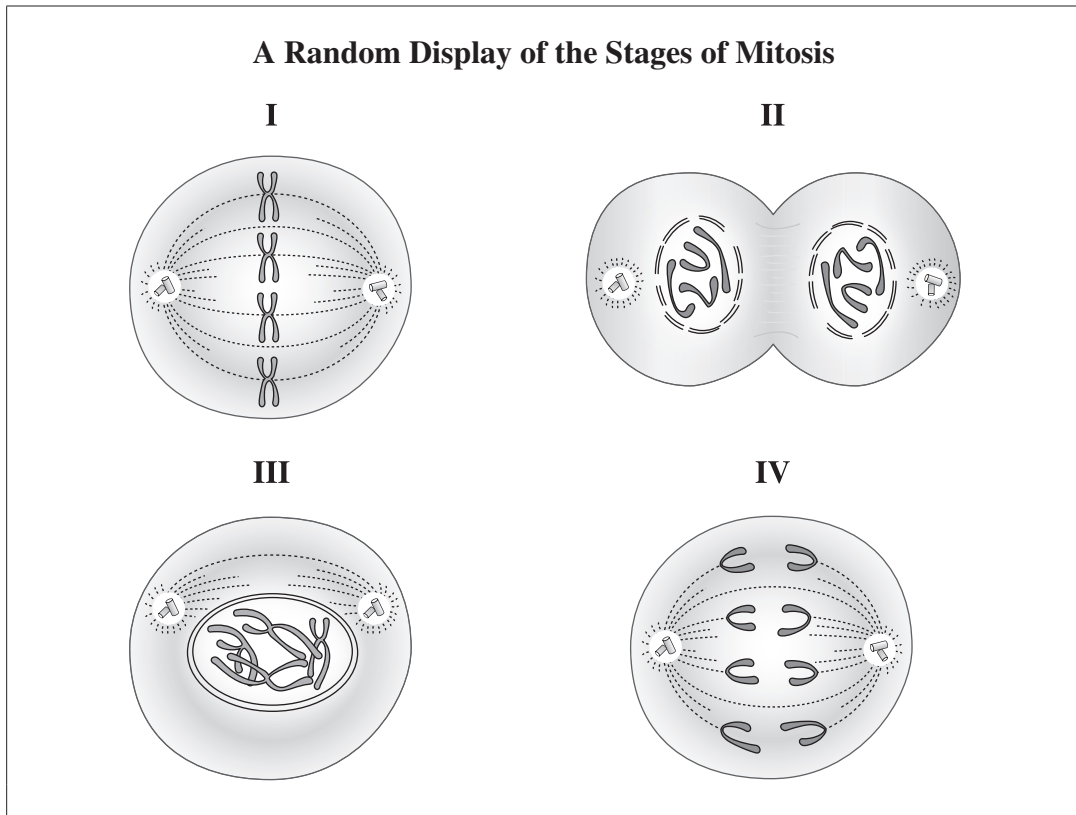
Numerical Response

2. Match the cell processes numbered above with the descriptions of processes given below. (Processes may be used more than once.)

| Process: | _____ | _____ | _____ | _____ |
|--------------|----------------------|--|---|--|
| Description: | Forms gametes | Combines genetic information from two parents | Responsible for growth and development | Divides genetic information into half the original amount |

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

Use the following information to answer the next question.



3. Cells in an implanted embryo undergo the process of mitosis as the embryo develops. The correct order for the stages of mitosis shown above is
- A. I, II, III, IV
 - B. I, III, IV, II
 - C. III, I, II, IV
 - D. III, I, IV, II
-
4. The symptoms of many lethal diseases appear before a person who has the disease reaches adulthood. A likely explanation for why dominant **lethal** alleles rarely occur in populations is that many individuals who have a dominant lethal allele
- A. pass on only the lethal allele to their offspring
 - B. pass on only the non-lethal allele to their offspring
 - C. do not survive to reproduce, so the lethal allele is not passed on
 - D. do not survive to reproduce, so the non-lethal allele is not passed on

Use the following information to answer the next two questions.

Carbon monoxide prevents oxygen from binding to the molecule that is responsible for transporting oxygen in the bloodstream.

5. Which of the following molecules is responsible for transporting oxygen in the bloodstream?
- A. Adenine
 - B. An antibody
 - C. Hemoglobin
 - D. Deoxyribose
6. A person suffering from carbon monoxide poisoning experiences
- A. a decrease in the rate of oxygen exchange in the arteries of the brain
 - B. an increase in the rate of oxygen exchange in the arteries of the brain
 - C. a decrease in the rate of oxygen exchange in the capillaries of the brain
 - D. an increase in the rate of oxygen exchange in the capillaries of the brain

Use the following information to answer the next question.

Some Structures of the Circulatory System

- 1 Vein
- 2 Artery
- 3 Lung capillary
- 4 Right ventricle

Numerical Response

3. Blood containing carbon monoxide exits the right atrium of the heart. The order in which this blood passes through the structures of the circulatory system numbered above is _____, _____, _____, and _____.

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

7. A person has a blood pressure of 145/95. The number 145 represents the
- A. systolic pressure, which occurs when the ventricles relax
 - B. diastolic pressure, which occurs when the ventricles relax
 - C. systolic pressure, which occurs when the ventricles contract
 - D. diastolic pressure, which occurs when the ventricles contract
8. Which of the following blood components is involved in stopping a nosebleed?
- A. Platelets
 - B. Antibodies
 - C. Red blood cells
 - D. White blood cells

Use the following information to answer the next question.

The drug erythropoietin (EPO) is an artificial version of a protein that is naturally produced by the kidneys. EPO is administered to individuals to increase their production of cells that carry oxygen in the blood. Two of the consecutive amino acids in the EPO protein are serine and phenylalanine.

9. The sequence of DNA base triplets that code for the amino acid sequence described above is
- A. AGC TTC
 - B. TCT CCC
 - C. TCG CCG
 - D. AGC CGT

10. Biotechnologists use a variety of genetic procedures. Which of the following rows describes the procedures of cloning, gene splicing, and gene mapping?

| Row | Cloning | Gene Splicing | Gene Mapping |
|-----|---|---|---|
| A. | Nucleus of a body cell implanted into an egg | DNA sequence added to the cells of an organism | Identification of genes on the chromosomes of an organism |
| B. | Section of foreign DNA inserted into the DNA of an organism | Identification of genes on the chromosomes of an organism | Picture of chromosomes |
| C. | Identification of genes on the chromosomes of an organism | Picture of chromosomes | Nucleus of a body cell implanted into an egg |
| D. | Picture of chromosomes | Nucleus of a body cell implanted into an egg | DNA sequence added to the cells of an organism |

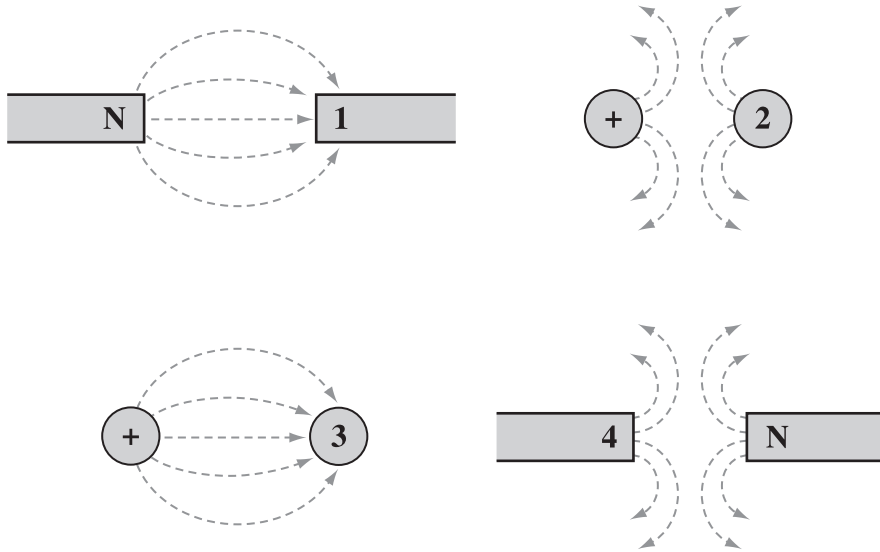
11. In the search for a cure for cystic fibrosis, researchers use viruses to carry normal genes into the airway of an individual who has cystic fibrosis. This technique is referred to as

- A. mitosis
- B. trisomy
- C. gene therapy
- D. nondisjunction

Use the following information to answer the next question.

X-ray machines and magnetic resonance imaging (MRI) machines produce electric and magnetic fields.

Some Electric and Magnetic Fields



Numerical Response

4. Match each of the numbers in the diagrams above with the corresponding descriptor listed below.

South pole _____ (Record in the **first** column)

Negatively charged particle _____ (Record in the **second** column)

North pole _____ (Record in the **third** column)

Positively charged particle _____ (Record in the **fourth** column)

(Record your answer in the numerical-response section on the answer sheet.)

Use the following information to answer the next question.

Electromagnetic radiation (EMR) is often used in the diagnosis and treatment of disease. Understanding the properties of EMR is important to ensure that it is used properly.

| Technology | | Type of EMR | Medical Application |
|------------|-------------------------------------|-----------------|--|
| 1 | Fibre optics | 5 Gamma | 11 Tracking blood flow |
| 2 | Magnetic resonance imaging (MRI) | 6 Infrared | 12 Performing endoscopic surgery |
| 3 | Emission tomography (PET and SPECT) | 7 Radio | 13 Soft tissue imaging |
| 4 | Thermogram | 8 Visible light | 14 Showing temperature distribution in tissues |

Numerical Response

5. Match the number of **one** technology from the table above with the number of the type of EMR associated with that technology and with the number of the medical application associated with that technology. (There is more than one correct combination of numbers.)

Technology _____ (Record in the **first** column)

Type of EMR _____ (Record in the **second** column)

Medical application _____ (Record in the **third** and **fourth** columns)

(Record your answer in the numerical-response section on the answer sheet.)

12. If the following types of EMR have equal intensities, then the type of EMR with the greatest energy is
- A. radio
 - B. gamma
 - C. infrared
 - D. visible light

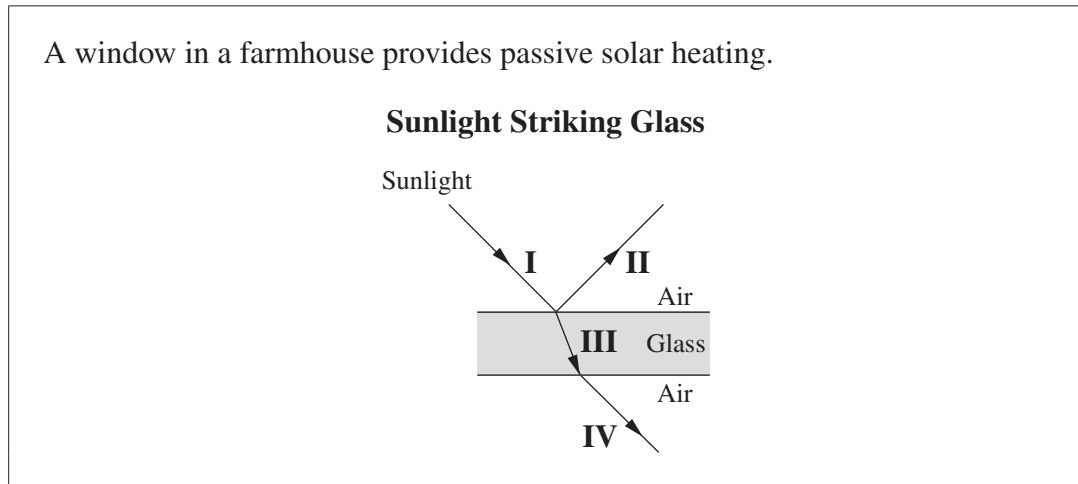
Use the following information to answer the next question.

In ultrasound technology, sound waves with a frequency of 3.02×10^6 Hz and a wavelength of 5.13×10^{-4} m pass through the body. Reflected waves are analyzed by a computer to produce an image.

13. The speed of the **sound** waves passing through the body is
- A. 1.70×10^{-10} m/s
 - B. 1.55×10^3 m/s
 - C. 3.00×10^8 m/s
 - D. 5.89×10^9 m/s

Many farmers use practices designed to minimize negative environmental impact.

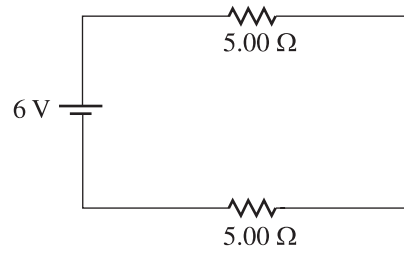
Use the following information to answer the next question.



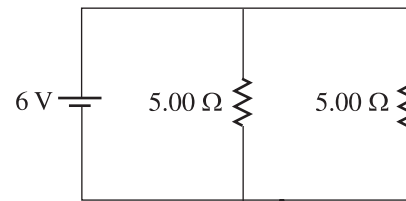
14. In the diagram above, the light ray that has been reflected is
- A. I
 - B. II
 - C. III
 - D. IV

15. Which of the following diagrams represents the circuit with the least total resistance?

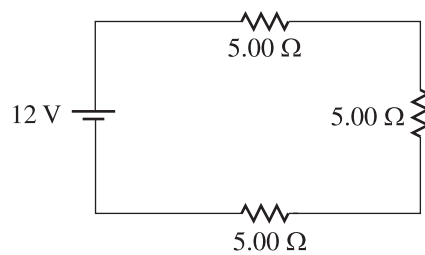
A.



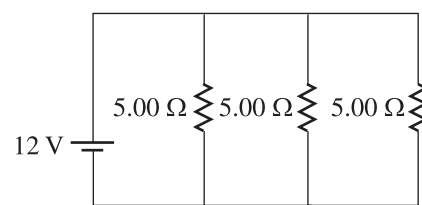
B.



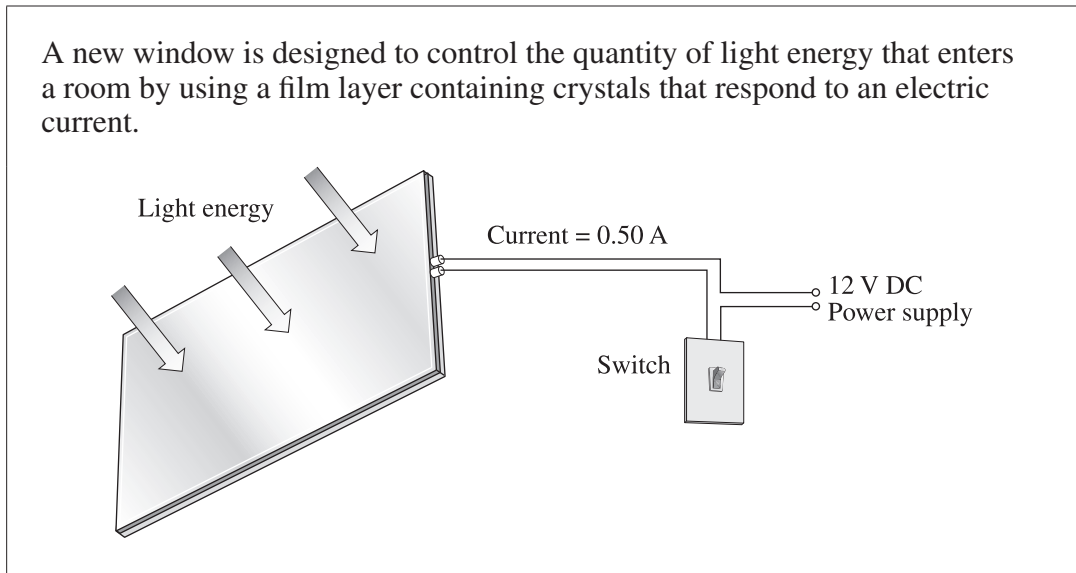
C.



D.



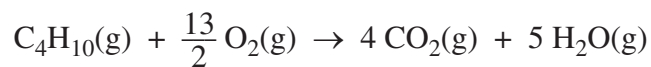
Use the following information to answer the next question.



16. The magnitude of the resistance in the electric circuit that is used to control the quantity of light energy that passes through the window is
- A. 24Ω
 - B. 12Ω
 - C. 0.50Ω
 - D. 0.42Ω

Use the following information to answer the next question.

Combustion of Butane



Numerical Response

6. Farmers sometimes use butane torches to solder electric circuits. For each mole of butane combusted, the energy released by the torch is _____ $\times 10^3$ kJ.

(Record your **three-digit answer** in the numerical-response section on the answer sheet.)

17. The current flowing through a 1 875 W water pump that is plugged into a 110 V electrical outlet is
- A. 5.87×10^{-2} A
 - B. 4.13 A
 - C. 17.0 A
 - D. 2.06×10^5 A

Numerical Response

7. Backup power for a farm is provided by a 24 000 V distribution line. The primary coil of the transformer has 11 500 turns. The number of turns that the secondary coil must have in order to deliver 240 V to the farm is _____ turns.

(Record your **three-digit answer** in the numerical-response section on the answer sheet.)

18. Traditionally, barns have been painted with a red paint that gets its pigment from rusted scrap metal. Which of the following wavelengths of light is reflected by this pigment?
- A. 700 nm
 - B. 600 nm
 - C. 500 nm
 - D. 400 nm
19. To better manage resources, farmers often recycle water. The pH of a particular farmer's water changes from 6.6 to 5.6 after it has been recycled, which means that the hydronium ion concentration, $[\text{H}_3\text{O}^+(\text{aq})]$, increases
- A. 0.1 times
 - B. 1.0 times
 - C. 10 times
 - D. 100 times

Use the following information to answer the next question.

A different indicator is added to each of four different samples of recycled water with a pH of 5.6.

Colours of Resulting Solutions

- 1 Colourless
- 2 Yellow
- 3 Blue

Numerical Response

8. Match the colours of the resulting solutions listed above with the indicators listed below. (You may use a number more than once.)

Methyl violet _____ (Record in the **first** column)

Bromothymol blue _____ (Record in the **second** column)

Bromocresol green _____ (Record in the **third** column)

Phenolphthalein _____ (Record in the **fourth** column)

(Record your answer in the numerical-response section on the answer sheet.)

Use the following information to answer the next question.

A titration is performed in order to find the hydronium ion concentration $[\text{H}_3\text{O}^+(\text{aq})]$ of an acidic sample solution.

Titration Steps

- 1 Record the total volume of $\text{NaOH}(\text{aq})$ solution used to turn the sample solution green.
- 2 Place 10.0 mL of the acidic sample solution into a flask and add three drops of bromothymol blue.
- 3 Slowly drip the 0.10 mol/L $\text{NaOH}(\text{aq})$ solution from a burette into the flask.
- 4 Calculate the concentration of the acid.

Numerical Response

9. When the titration steps given above are listed in the order in which they are performed, their order is _____, _____, _____, and _____.
first **last**

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

Use the following information to answer the next question.

To determine the effect of acid rain on corn plants, a solution of $\text{H}_2\text{SO}_4(\text{aq})$ with a pH of 4.3 was used to water a plot of two-month-old corn plants. More corn plants were grown on another plot under similar conditions but were watered with distilled water that had a pH of 7.

Experimental Variables

- 1 Type of soil
- 2 Substance used to water plants
- 3 Amount of light
- 4 Growth of plant

Numerical Response

10. Match each of the experimental conditions numbered above with one of the variables given below.

Conditions: _____
Variables: Manipulated Responding Controlled Controlled
 variable variable variable variable

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

Use the following information to answer the next question.

A farmer's well water has a pH between 7.6 and 8.4, depending on the season.

20. The pH of the farmer's well water is best described as
- A. very basic
 - B. very acidic
 - C. slightly basic
 - D. slightly acidic

Use the following information to answer the next question.

A farmer adds a borax solution with a pH of 9.50 to his laundry to improve the performance of the detergent he uses.

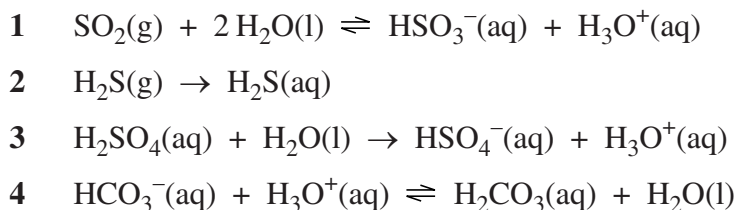
21. Borax is *i* solution with a hydronium ion concentration $[\text{H}_3\text{O}^+\text{aq}]$ of *ii* mol/L.

The statement above is completed by the information in row

| Row | <i>i</i> | <i>ii</i> |
|-----|-----------|-----------------------|
| A. | a basic | 0.98 |
| B. | an acidic | 0.98 |
| C. | a basic | 3.2×10^{-10} |
| D. | an acidic | 3.2×10^{-10} |

Use the following information to answer the next question.

Some of the substances shown in the equations below are present in the water that a farmer has recycled.



22. Which of the following pairs of substances from the equations above represents a proton donor and a proton acceptor, respectively?
- A. $\text{H}_2\text{O}(\text{l})$ and $\text{SO}_2(\text{g})$
B. $\text{H}_2\text{S}(\text{g})$ and $\text{H}_2\text{S}(\text{aq})$
C. $\text{H}_2\text{SO}_4(\text{aq})$ and $\text{H}_3\text{O}^+(\text{aq})$
D. $\text{H}_2\text{CO}_3(\text{aq})$ and $\text{HCO}_3^-(\text{aq})$

23. The major environmental issue associated with nitrogen compounds produced by hot internal-combustion engines is
- A. acid deposition
 - B. global warming
 - C. ultraviolet ray blockage
 - D. biomagnification in food chains

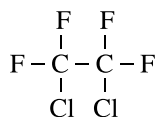
Use the following information to answer the next question.

A farmer takes old transformers to a recycling facility to prevent wastes such as PCBs from leaching into waterways.

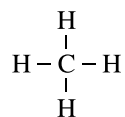
24. PCBs tend to become more concentrated in the tissue of predators such as hawks than in the hawks' environment because of
- A. biomagnification
 - B. biodegradation
 - C. bioreplication
 - D. biodeposition

25. Which of the following structural formulas represents a compound that is responsible for the depletion of the ozone layer?

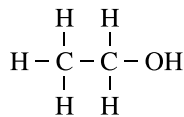
A.



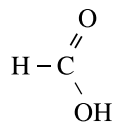
B.



C.

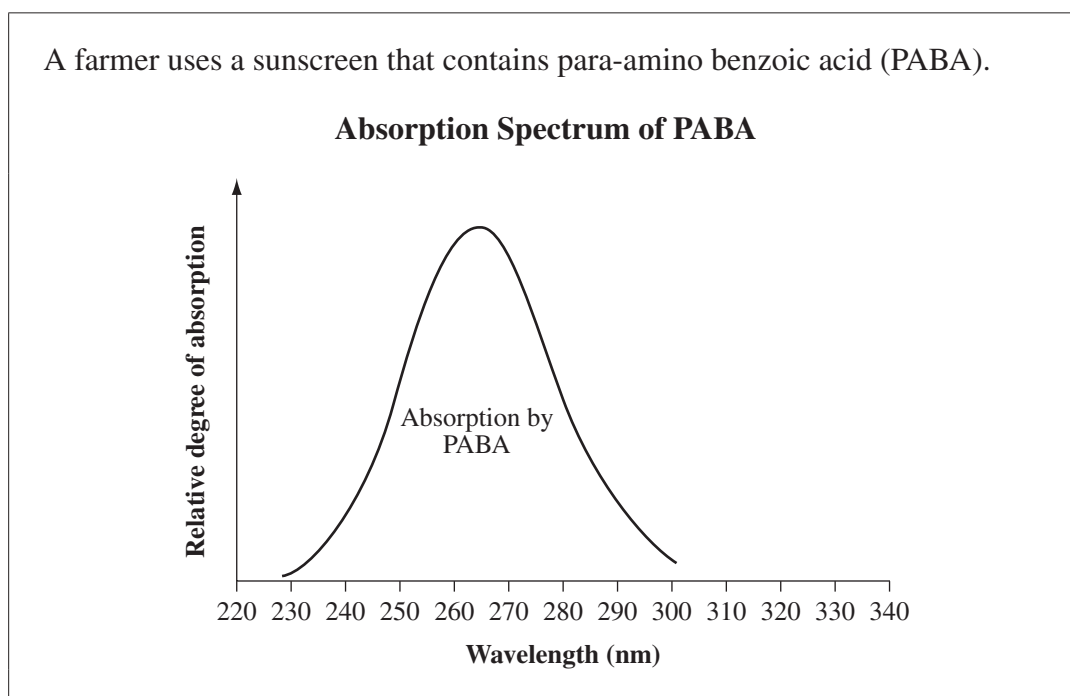


D.



26. To ease the pain in sore muscles, a farmer uses a wintergreen-scented balm. Scents such as wintergreen are composed of organic compounds that are classified as
- A. esters
 - B. halides
 - C. carboxylic acids
 - D. halogenated hydrocarbons

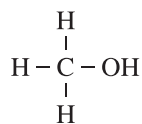
Use the following information to answer the next question.



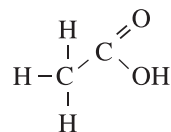
27. The PABA in the sunscreen absorbs radiation that has a frequency of approximately
- A. 8.8×10^{-16} Hz
 - B. 80 Hz
 - C. 8.0×10^{12} Hz
 - D. 1.1×10^{15} Hz

28. A bee stings a farmer, injecting methanoic acid into the farmer's skin. Which of the following structural formulas represents methanoic acid?

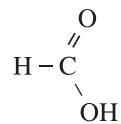
A.



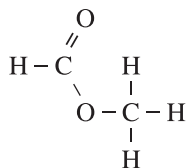
B.



C.



D.



Space science may have an increasing role in shaping future societies, including the development of technologies to produce energy.

Use the following information to answer the next three questions.

One futuristic scheme to produce power on a large scale proposes placing giant solar panels into Earth's orbit, where energy generated from sunlight would be converted to microwaves and beamed to antennas on Earth for reconversion to electric power. To produce as much power as five large nuclear power plants (5.00×10^9 W total), several square kilometres of solar panels would have to be assembled in orbit. An Earth-based antenna that is eight kilometres in diameter would be required to receive microwaves from the solar modules, which would be positioned 7.52×10^6 m away from Earth's centre.

Numerical Response

11. The magnitude of Earth's gravitational field at the location of the orbiting solar panels is _____ N/kg.

(Record your **three-digit answer** in the numerical-response section on the answer sheet.)

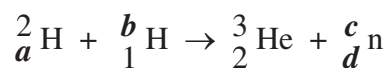
29. The energy that the solar panels could produce in one day is
- A. 1.39×10^6 J
 - B. 7.20×10^{12} J
 - C. 1.80×10^{13} J
 - D. 4.32×10^{14} J
30. The direction of Earth's gravitational field at the position of the orbiting solar panels would be
- A. toward Earth, because the Sun repels Earth
 - B. away from Earth, because the Sun attracts Earth
 - C. toward Earth, because a gravitational field is always directed toward its source
 - D. away from Earth, because a gravitational field is always directed away from its source

31. A main difference between gravitational fields and electric fields is that
- A. gravitational field strength depends on mass, but electric field strength does not
 - B. gravitational fields are both repulsive and attractive, but electric fields are neither
 - C. the constant for gravitational fields is very large compared with the constant for electric fields
 - D. gravitational field strength depends on the distance between objects but electric field strength does not

Use the following information to answer the next question.

Solar energy is produced by reactions occurring in stars.

A Reaction Occurring in a Star



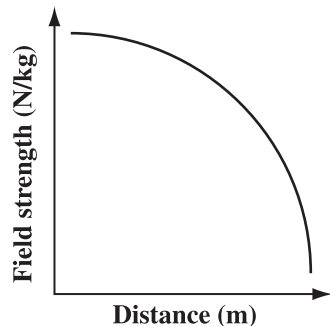
Numerical Response

12. In order to balance the equation above, the values of a , b , c , and d are _____, _____, _____, and _____.

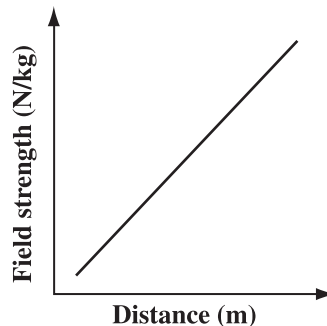
(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

32. Which of the following graphs depicts the relationship between gravitational field strength and the distance between an orbiting telescope and Earth?

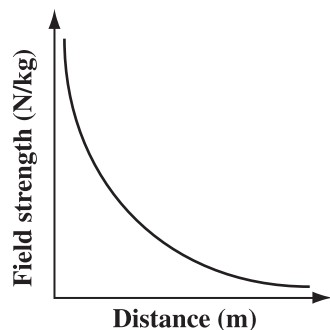
A.



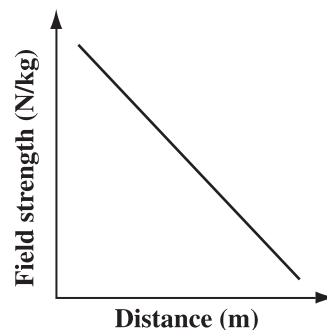
B.



C.



D.



Use the following information to answer the next question.

Polonium is used as an energy source in some satellites when it undergoes the reaction shown below.



33. The type of radioactive decay that results when ${}_{84}^{210}\text{Po}$ decays to form ${}_{82}^{206}\text{Pb}$ is

- A. gamma
- B. fusion
- C. alpha
- D. beta

34. Which of the following sequences of colours represents the increasing temperature of stars?
- A. Red, orange, yellow, blue
 - B. Red, yellow, orange, blue
 - C. Yellow, red, orange, blue
 - D. Yellow, orange, red, blue
35. When electromagnetic radiation from a star passes through a *i* after passing through a relatively cool gas, a *ii* spectrum can be observed.

The statements above are completed by the information in row

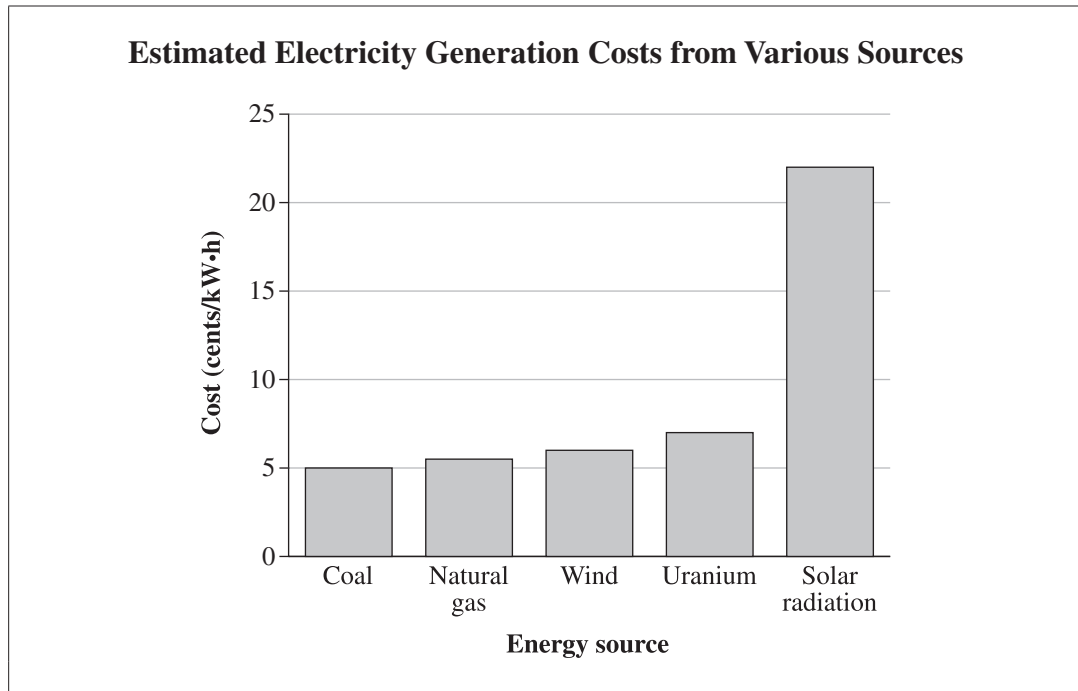
| Row | <i>i</i> | <i>ii</i> |
|-----|--------------|----------------------|
| A. | telescope | bright-line emission |
| B. | telescope | dark-line absorption |
| C. | spectroscope | bright-line emission |
| D. | spectroscope | dark-line absorption |

Use the following information to answer the next question.

An environmental risk associated with burning coal is the production of acid rain.

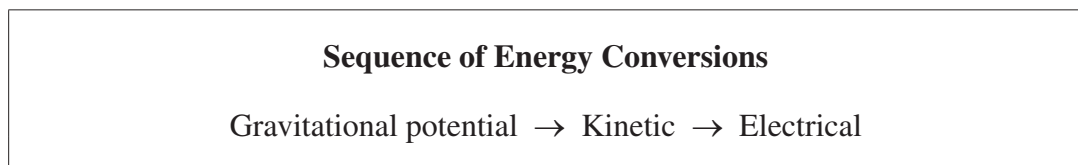
36. A concern associated with acid rain is that it results in an increase in
- A. ozone depletion
 - B. global temperatures
 - C. ultraviolet radiation
 - D. heavy-metal leaching

Use the following information to answer the next question.



37. Coal is used to generate electricity to operate a 1.20 kW heater. Use the above graph to calculate the cost of running the heater continuously for one day.
- A. \$0.25
 - B. \$1.00
 - C. \$1.44
 - D. \$5.76
-

Use the following information to answer the next question.



38. Which of the following types of power plant produces electricity using the sequence of energy conversions shown above?
- A. Photovoltaic
 - B. Geothermal
 - C. Nuclear
 - D. Tidal

39. Which of the following fuels provides the **greatest** quantity of energy per gram?
- A. Low-sulfur coal
 - B. Distilled ethanol
 - C. Enriched uranium
 - D. Sweetened natural gas
40. In a CANDU nuclear reactor, energy is provided by a *i* reaction in which *ii* .

The statements above are completed by the information in row

| Row | <i>i</i> | <i>ii</i> |
|-----|----------|-------------------------|
| A. | fusion | small nuclei are joined |
| B. | fusion | large nuclei are split |
| C. | fission | small nuclei are joined |
| D. | fission | large nuclei are split |

*You have now completed the examination.
If you have time, you may wish to check your answers.*

No marks will be given for work done on this page.

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Name

Apply Label With Student's Name

GRADE 12 DIPLOMA EXAMINATION SCIENCE 30 January 2009

LAST NAME (please print)

FIRST NAME

ALBERTA STUDENT NUMBER

SCHOOL NAME

SCHOOL CODE

BIRTH DATE (Year/Month/Day)

SEX: M F

ACCOMMODATIONS USED (mark all applicable)

TO BE FILLED OUT BY CHIEF PRESIDING EXAMINER/EXAM SUPERVISOR

- | | | | |
|---|-----------------------|----|-----------------------|
| 1 | <input type="radio"/> | 6 | <input type="radio"/> |
| 2 | <input type="radio"/> | 7 | <input type="radio"/> |
| 3 | <input type="radio"/> | 8 | <input type="radio"/> |
| 4 | <input type="radio"/> | 9 | <input type="radio"/> |
| 5 | <input type="radio"/> | 10 | <input type="radio"/> |

INITIALS OF CHIEF PRESIDING EXAMINER/EXAM SUPERVISOR
(if any used)

IMPORTANT DIRECTIONS

1. USE HB PENCIL ONLY.
2. MAKE HEAVY BLACK MARKS THAT FILL IN THE RESPONSE CIRCLES.
3. DO NOT MAKE ANY STRAY MARKS ON THIS PAPER.
4. COMPLETELY ERASE ANY ANSWER YOU WISH TO CHANGE.



SCN3270001 M.01

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Science 30: Part B

January 2009

Name

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Science 30: Part B

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|-----------------------------------|--|--|--|--|--|--|--|--|--|-----------------------------|--|--|--|--|--|--|--|--|--|---------------------|--|--|--|--|--|--|--|--|--|------------------------|--|------------------------|--|------------------------|--|-------------------------------|--|
| Name: <input type="text"/> | | | | | | | | | | (Last Name) | | | | | | | | | | (Legal First Name) | | | | | | | | | | Y <input type="text"/> | | M <input type="text"/> | | D <input type="text"/> | | Sex: <input type="checkbox"/> | |
| Permanent Mailing Address: _____ | | | | | | | | | | (Apt./Street/Ave./P.O. Box) | | | | | | | | | | (Village/Town/City) | | | | | | | | | | (Postal Code) | | | | | | | |
| School Code: <input type="text"/> | | | | | | | | | | School: _____ | | | | | | | | | | Signature: _____ | | | | | | | | | | | | | | | | | |

I am aware of the directives, rules, procedures, and deadlines that apply to the writing of this diploma examination and of my responsibilities for complying with and/or implementing them.

Check this box if your address has changed



Science 30 January 2009 Diploma Examination

Multiple Choice Key

- | | |
|-------|-------|
| 1. B | 21. C |
| 2. D | 22. D |
| 3. D | 23. A |
| 4. C | 24. A |
| 5. C | 25. A |
| 6. C | 26. A |
| 7. C | 27. D |
| 8. A | 28. C |
| 9. A | 29. D |
| 10. A | 30. C |
| 11. C | 31. A |
| 12. B | 32. C |
| 13. B | 33. C |
| 14. B | 34. A |
| 15. D | 35. D |
| 16. A | 36. D |
| 17. C | 37. C |
| 18. A | 38. D |
| 19. C | 39. C |
| 20. C | 40. D |

Numerical Response Key

1. 4312, 4322
2. 1321
3. 4231
4. 1342
5. 1812, 2713, 3511, 4614
6. 2.66, 2.70, 2.65, 2.88
7. 115
8. 3231
9. 2314
10. 2413, 2431
11. 7.05
12. 1210