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East Spring Secondary School

Towards Excellence and Success

Name:()

Class:

Second Semestral Assessment 2019 Secondary 2 Normal Technical

Science

4 October 2019
Friday

1 h 30 mins
0800 – 0930

Additional materials:
1 sheet of OTAS

INSTRUCTIONS TO CANDIDATES

Write your name, class and register number in the spaces provided above, and on all the work you hand in.

Write in dark blue or black pen.

You may use a soft pencil for any diagrams, graphs, tables or rough working.

Do not use staples, paper clips, highlighters, glue or correction fluid.

Calculators and mathematical sets are allowed.

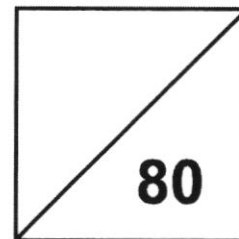
Section A [30 marks]

Answer all questions on the OTAS.

Section B [50 marks]

Answer all questions.

Write your answers in the spaces provided.



Section A: Multiple Choice Questions [30 Marks]

Choose the most suitable answer and shade the corresponding letter **A, B, C** or **D**, in the OTAS sheet.

A1 In which of the following sources is oxides of nitrogen released?

- I car and buses
- II lightning activity
- III volcanic eruptions

- A** I and II
- B** II and III
- C** I and III
- D** I, II and III

A2 Farmers cut down and burn trees to clear the land quickly in order to grow rice plants.



Which of the following is the main pollutant released when trees are cut down and burnt?

- A** carbon monoxide
- B** CFCs
- C** dust and soot
- D** sulfur dioxide

A3 Which of the following is a consequence of the greenhouse effect?

- A** flooding in low lying area
- B** breathing difficulties
- C** haze
- D** lower temperature

- A4** A strong-smelling gas leaked in town and the elderly living nearby complained of watery eyes, nose irritation and breathing difficulties.

What is the most likely identity of the gas?

- A** carbon monoxide
- B** carbon dioxide
- C** dust and soot
- D** sulfur dioxide

- A5** Which of the following are affected by acid rain?

- I** marble buildings
- II** vehicles
- III** plants

- A** I only
- B** I and II
- C** II and III
- D** I, II and III

- A6** Which of the following is the least effective at reducing air pollution?

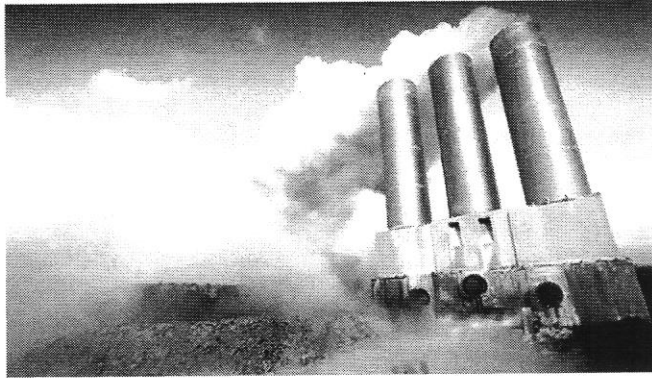
- A** driving old cars instead of replacing them with new ones
- B** reduce, reuse or recycle every food packaging
- C** planting one tree per month
- D** using public transport as the main form of transportation

- A7** Which of the following can release electrical energy?

- I** light bulb
- II** fossil fuel
- III** solar panels

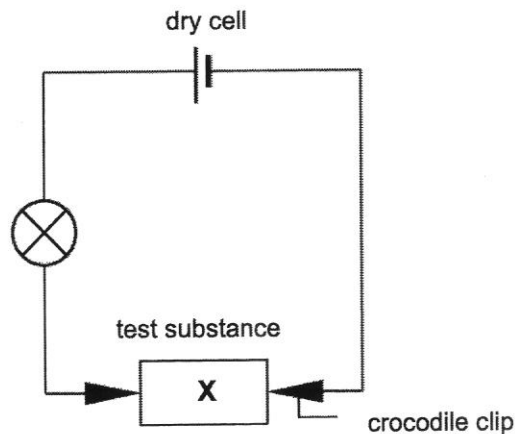
- A** I and II
- B** II and III
- C** I and III
- D** I, II and III

- A8** The diagram below shows a geothermal power station where hot rocks underneath Earth heats up water in pipes, turning it into fast-moving steam.



What is the energy change taking place?

- A** chemical energy \rightarrow heat energy
 - B** kinetic energy \rightarrow heat energy
 - C** heat energy \rightarrow kinetic energy
 - D** heat energy \rightarrow electrical energy
- A9** A test is conducted on substance **X**, as shown in the diagram below, to determine whether it is an electrical conductor.



The bulb does not light up.

Which of the following is correct?

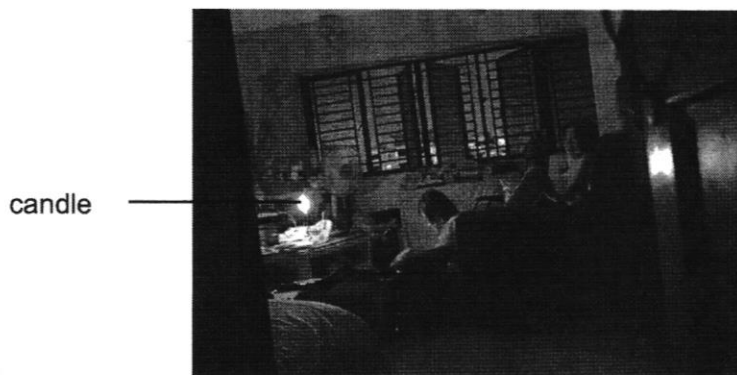
| | can it conduct electricity? | type of material |
|----------|-----------------------------|------------------|
| A | yes | iron |
| B | yes | paper |
| C | no | iron |
| D | no | paper |

A10 A student wants to measure the current flowing through a bulb.
Which of the following is not needed to perform this measurement?

- A ammeter
- B switch
- C battery
- D wires

A11 A student buys a used fan online.

After he plugs in and switches on the fan in his house, electricity is cut off and there is a blackout as shown below.



Which of the following statements is not correct?

- A The blackout is caused by the circuit breaker cutting off electricity to the house.
 - B The blackout may have been caused by wear and tear in the wires of the fan.
 - C The blackout is caused by switching on the fan with wet hands.
 - D The blackout protects the household from an excessive large current flowing through the fan.
- A12** Which of the statements about voltage is correct?
- A Voltage is measured by an ammeter.
 - B The unit of voltage is amperes (A).
 - C Voltage is the energy for current to flow.
 - D Adding more batteries does not change the voltage.

A13 Which of the following food prevents constipation?

- A rice
- B meat
- C butter
- D vegetables

A14 Which part of the digestive system contains a substance that kills bacteria?

- A mouth
- B oesophagus
- C stomach
- D small intestines

A15 Which part of the digestive system is digested food absorbed into the blood?

- A stomach
- B small intestines
- C large intestines
- D rectum

A16 Which of the following statements best describes physical digestion?

- A Large, insoluble food particles are broken down by enzymes.
- B Large, insoluble food particles are broken into smaller pieces by teeth.
- C Large, insoluble food particles enter the bloodstream.
- D Large, insoluble food particles leave the body through the anus.

A17 Which of the following are products of respiration?

- I oxygen
 - II carbon dioxide
 - III energy
- A I and II
 - B II and III
 - C I and III
 - D I, II and III

- A18** Which of the following statements about breathing and respiration is not correct?
- A** Breathing takes place in the lungs while respiration takes place in all body cells.
 - B** Both breathing and respiration takes place all the time.
 - C** Both breathing and respiration require nutrients.
 - D** Breathing is a physical process while respiration is a chemical process.
- A19** Which of the following is the female sex cell?
- A** egg
 - B** foetus
 - C** sperm
 - D** red blood cell
- A20** Which of the following may result in delayed puberty in a young person?
- A** not enough enzymes are produced
 - B** not enough sex hormones are produced
 - C** not enough sperm or eggs are produced
 - D** fertilisation occurs
- A21** Which of the following structure is the fertilised egg implanted in?
- A** fallopian tube
 - B** ovary
 - C** vagina
 - D** uterine lining
- A22** Both egg and sperm cells are placed in a glass dish for fertilisation to occur. The fertilised egg is then inserted into the female body.
- What is the name of this process?
- A** artificial insemination
 - B** ligation
 - C** in vitro fertilisation (IVF)
 - D** vasectomy

- A23** Which of the following sexually transmitted infections cannot be treated by antibiotics?
- I AIDS
 - II gonorrhoea
 - III syphilis
- A** I only
- B** I and III
- C** II and III
- D** I, II and III
-
- A24** Which of the following increases the risk of sexually transmitted infections in a person?
- A** having only one sexual partner
- B** sharing needles with another drug user
- C** smoking cigarettes
- D** drinking alcohol
-
- A25** Which of the following is required for a healthy lifestyle?
- I having a balanced diet
 - II avoiding smoking and harmful drugs
 - III regular exercise
- A** I only
- B** I and III
- C** II and III
- D** I, II and III
-
- A26** Which of the following statements about drugs is not correct?
- A** All drugs are harmful and should not be taken.
- B** Drugs causes changes to the brain and body functions.
- C** People abuse drugs because they are curious.
- D** Drug abusers may turn to crime such as robberies to get money to buy drugs.

A27 After eating an unknown pill at a party, a woman feels more alert and can dance continuously without feeling tired.

The pill is likely to contain a _____.

- A hallucinogen
- B inhalant
- C narcotic
- D stimulant

A28 Which of the following habits lead to damaged liver and stomach irritation?

- A drinking too much alcohol
- B taking drugs
- C smoking cigarettes
- D inhaling smoke passively

A29 Which of the following describes the effects of alcohol?

- A causes the user to feel "high"
- B improves memory
- C slows down brain activities
- D causes extreme hunger

A30 What is passive smoking?

- A smoking one cigarette in a day
- B smoking many cigarettes in a day
- C inhaling smoke from cigarettes
- D failing to quit smoking

Section B: Structured Questions [50 marks]

Answer all questions in the spaces provided.

B1 Towns **A**, **B** and **C** have different amount of cars, factories and trees as shown in Table B1.1.

| town | amount of | | | number of elderly with breathing difficulties |
|----------|-----------|-----------|----------|---|
| | cars | factories | trees | |
| A | high | high | very low | |
| B | high | low | low | |
| C | low | low | high | |

Table B1.1

(a) State two gaseous pollutants released by cars and factories.
 and [2]

(b) The number of elderly with breathing difficulties in Table B1.1 is incomplete.
 (i) Predict the number of elderly with breathing difficulties in each town by completing Table B1.1 with the numbers '10', '400' and '1300'. [2]

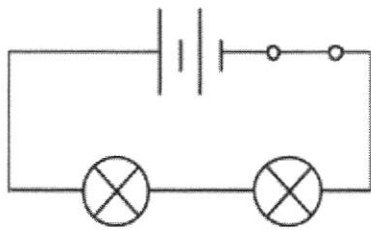
(ii) Besides having breathing difficulties, state one other harmful effect on the environment from having large number of cars and factories.

[1]

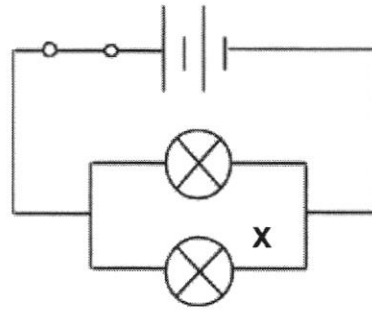
(c) With reference to Table B1.1, suggest two ways to reduce air pollution in Town **B**.
 1.

 2.
[2]

B2 Two circuits, **A** and **B**, are represented by Figure B2.1.



A



B

Figure B2.1

(a) State one main difference between circuit **A** and circuit **B**.

.....
[1]

(b) Suggest which of these circuits should be used in a classroom.

.....[1]

(c) Explain your answer to (b).

.....
[1]

(d) On Figure B2.1, draw a voltmeter to show how the voltage of bulb **X** can be measured. [1]

(e) An additional bulb is connected in series to circuit **A** in Figure B2.1.

Circle the correct option below to show how the resistance and current will change.

resistance *increases* / *decreases* / *does not change*

current *increases* / *decreases* / *does not change*

[2]

- B3** A charging cable for a phone is shown in Figure B3.1.

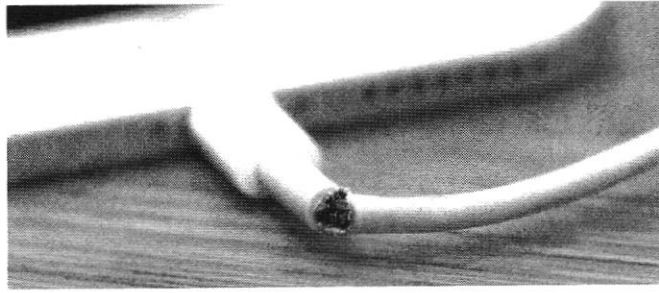


Figure B3.1

With reference to Figure B3.1,

- (a) explain the danger in using such wire;

.....
[1]

- (b) state what should be done as a precaution.

.....
[1]

- B4** Breathing is the process by which air is brought into the lungs and removed from it.

- (a) State one difference between inhaled air and exhaled air.

.....
[1]

- (b) Explain why breathing is necessary for survival.

.....
[1]

B5 A diagram of the human digestive system is shown in Figure B5.1.

(a) Label the parts **A** to **D** in the boxes given.

[4]

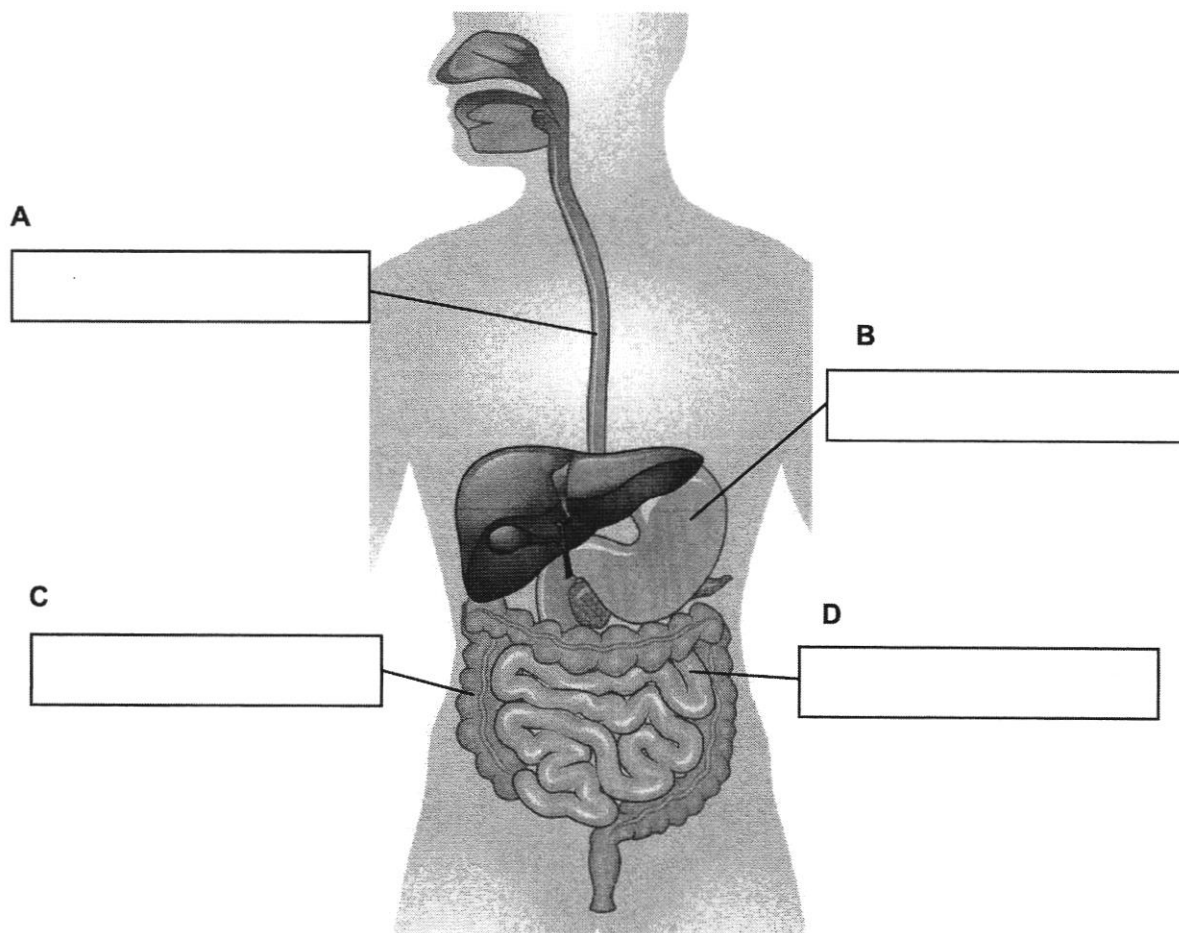


Figure B5.1

(b) A person constantly feels thirsty and often has diarrhoea.

After seeing a doctor, he is told that one part of his digestive system is damaged and unable to function properly.

(i) Suggest which part of his digestive system (**A**, **B**, **C** or **D**) is damaged.

.....[1]

(ii) Explain your answer to (b)(i).

.....
[1]

B6 A diagram of a 28-day menstrual cycle is shown in Figure B6.1.

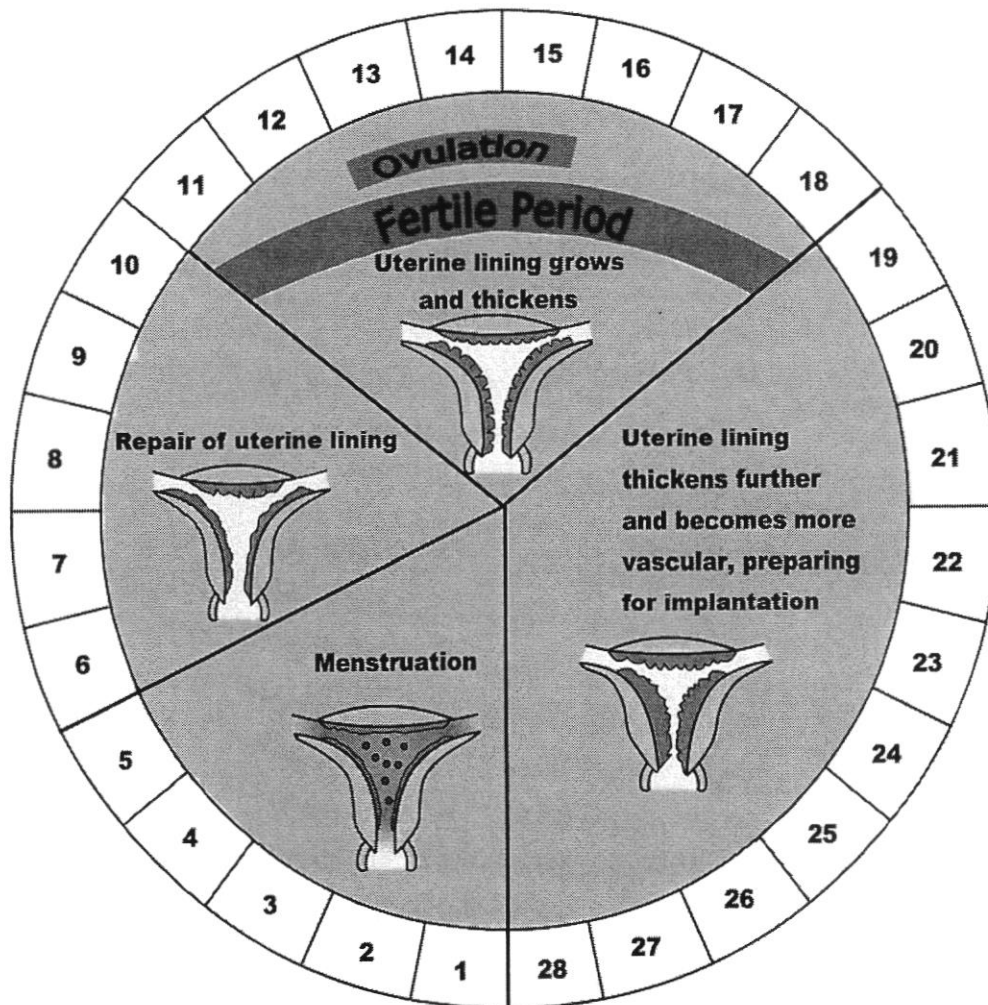


Figure B6.1

(a) Explain what is *menstruation*.

.....
[1]

(b) In Figure B6.1, days 11 – 18 is labelled as the 'fertile period'. Explain why this is so.

.....
[1]

(c) In Figure B6.1, the uterine lining thickens further with more blood vessels.
Suggest a reason why this process is necessary for the implantation of the fertilised egg.

.....
.....[1]

(d) A couple is planning for their first baby. The wife has started menstruation on 4 October 2019.

(i) State whether she is likely to get pregnant if the couple has sexual intercourse on 11 October 2019.

.....[1]

(ii) Explain your answer to (d)(i).

.....
.....
.....[2]

(e) The couple has sexual intercourse during the wife's fertile period. However, she fails to get pregnant.

Suggest one reason why fertilisation of the egg by the sperm may be unsuccessful.

.....
.....[1]

B7 Match the name of the reproductive organ with its function.

| reproductive organ |
|--------------------|
| testis |
| sperm duct |
| uterus |

| function |
|--------------------------------------|
| structure where the foetus develops |
| carries sperm to the urethra |
| produces sperm and male sex hormones |

[3]

- B8** Complete the following passage on the use of birth control methods. You may use the helping words in Table B8.1.

Each word can be used once, more than once or not at all.

| | | |
|------------|-----------|-----------|
| condom | ligation | permanent |
| spermicide | temporary | vasectomy |

Table B8.1

Some married couples may not be ready to start a family. Hence, they may go for birth control methods to allow them to have children once they stop using the birth control method.

One such method which also protects the male from getting possible sexually transmitted infections is the use of This is commonly used together with to increase the chances of preventing a pregnancy.

However, if the couple does not intend to ever have children anymore, the male may go for where the sperm ducts are cut and tied and no sperm will leave the penis through the urethra. [4]

- B9** In Singapore, the legal limit of alcohol for driving a vehicle is 35 mg/ 100mL of breath. Anyone who is found to exceed this limit will face a fine, driving ban and/or sentence to jail.

- (a) Explain why there are laws to punish people who drink alcohol and drive vehicles.

.....
[1]

- (b) State one consequence of excessive alcohol consumption on a family.

.....
[1]

- (c) Suggest one piece of advice you should give to an alcoholic to help him overcome his alcohol addiction.

.....
[1]

- (d) State the type of drug found in alcohol.

.....[1]

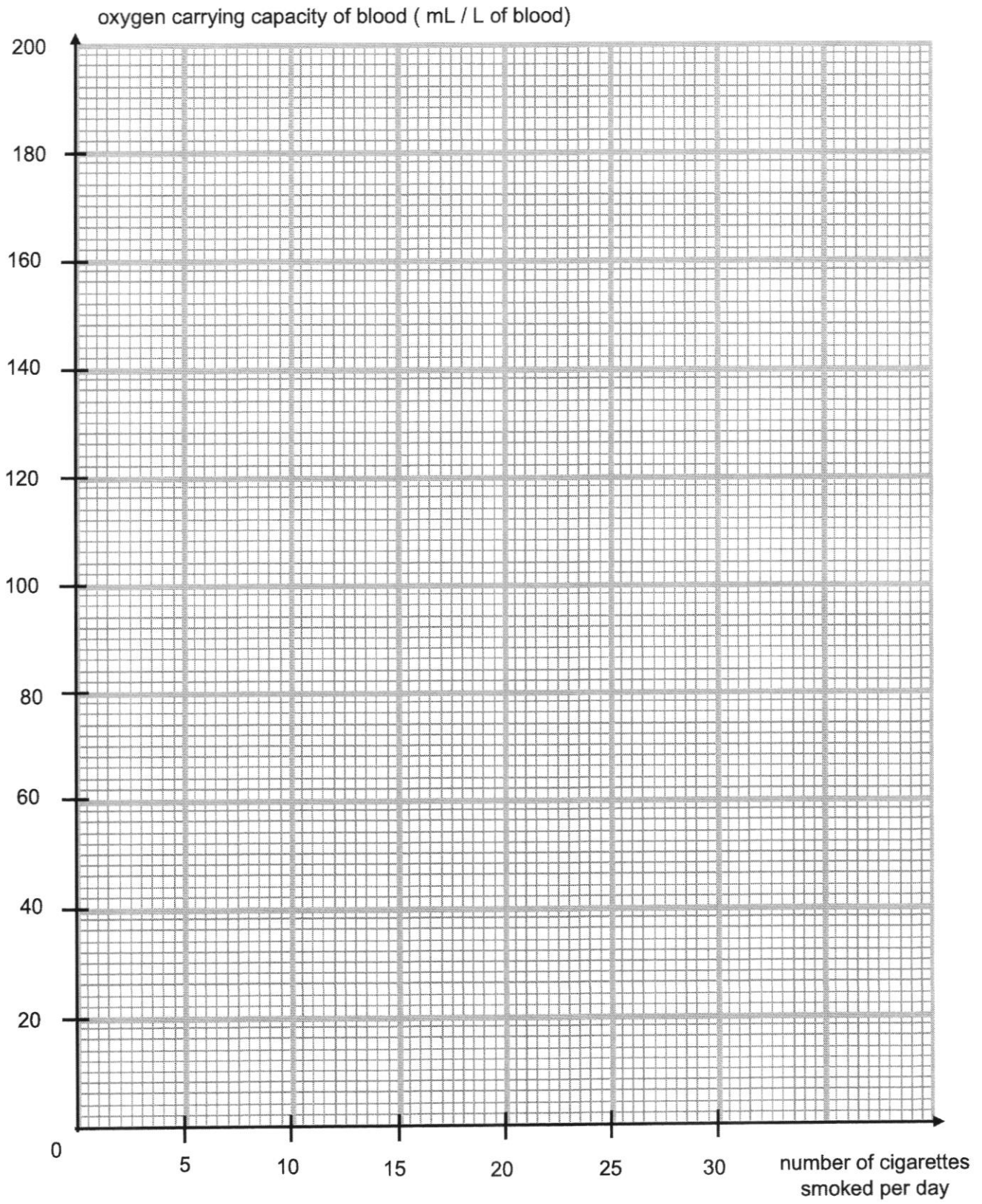
B10 A scientist investigates the effects of cigarette on the oxygen carrying capacity of red blood cell in the lungs.

- (a) His results are shown in Table B10.1 below.

| number of cigarettes smoked per day | oxygen carrying capacity of blood / (mL / L of blood) |
|-------------------------------------|---|
| 0 | 196 |
| 5 | 178 |
| 10 | 159 |
| 15 | 140 |
| 20 | 118 |
| 25 | 97 |

Table B10.1

- (i) With reference to Table B10.1, plot a graph of 'oxygen carrying capacity of blood' against 'number of cigarettes smoked per day' on the grid lines provided on page 18.



[3]

From your graph, determine:

- (ii) the oxygen carrying capacity when the number of cigarettes smoked per day is 12;

..... mL / L of blood [1]

- (iii) the number of cigarettes smoked per day for the oxygen carrying capacity to reach 130.

..... cigarettes [1]

- (b) Complete the sentence below on the relationship between the number of cigarettes smoked per day and the oxygen carrying capacity.

As the number of cigarettes smoked per day (increases/decrease), the oxygen carrying capacity (increases/decrease). [1]

- (c) Suggest one chemical in cigarette which causes the oxygen carrying capacity to decrease.

.....[1]

- (d) State one long-term effect of smoking.

.....
.....[1]

- (e) State one reason why we should avoid being near people who smoke cigarettes, even if we are not smokers.

.....
.....[1]

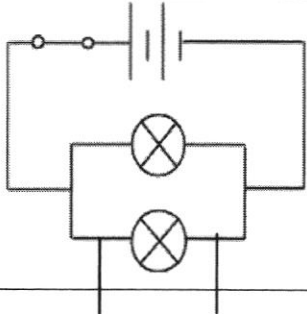
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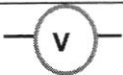
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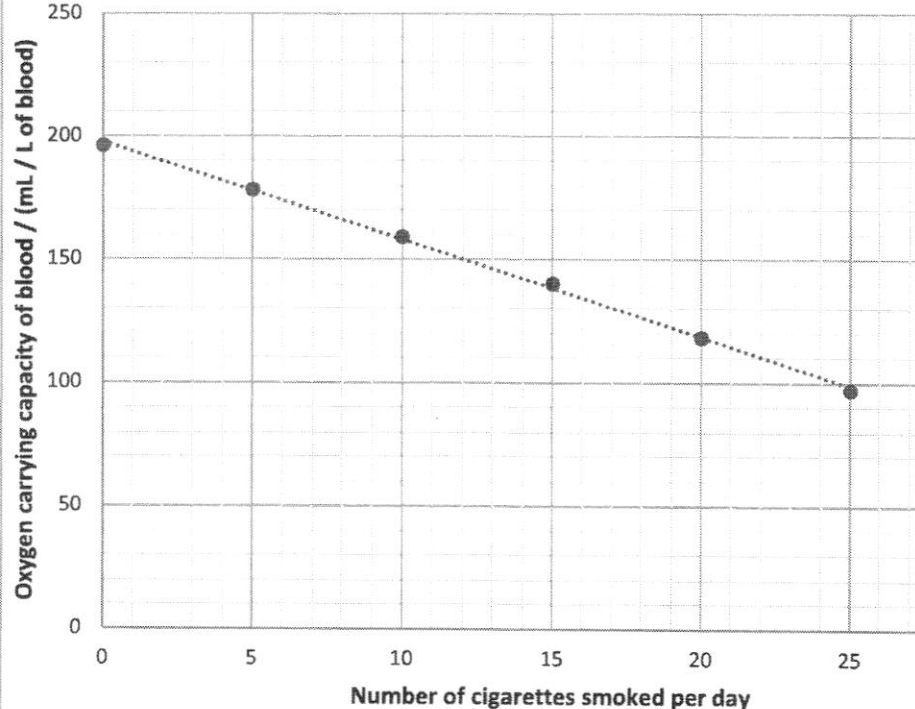
Section A (30m)

| | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| A | C | A | D | D | A | B | C | D | B |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| A | C | D | C | B | B | B | C | A | B |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| D | C | A | B | D | A | D | A | C | C |

Section B (40m)

| Question | Answer | Mark |
|---------------|--|------------------------------|
| B1 (a) | oxides of nitrogen, sulfur dioxide and carbon monoxide Any 2 of 3 | 2 |
| (b)(i) | Town A: 1300 Town B: 400 Town C: 10 | 3c – 2 1-2c – 1 0c – 0 |
| (b)(ii) | Causes acid rain which damages buildings and plants. Causes global warming / greenhouse effect . <i>Do not accept any other answer not relating to environment.</i> | 1 |
| (c) | Make us of public transport instead of driving / carpooling / Reduce, reuse, recycle materials/ growing more trees / saving electricity / using alternative sources of energy. Any 2 out of 3; accept other reasonable answers. | 2 |
| B2 (a) | Circuit A is a series circuit while circuit B is a parallel circuit. | 1 |
| (b) | Circuit B . | 1 |
| (c) | If one of the bulb in circuit B is fused , the other will still light up . | 1 |
| (d) |  | 2 |

| | | | |
|----|---------|---|------------------|
| | |  | |
| | (e) | <i>resistance: increases</i> <i>current: decreases</i> | 1 1 |
| B3 | (a) | There is risk of electric shock / electrocution if someone touches the wire OR There might be a short circuit if the exposed wires touch each other. | 1 |
| | (b) | replace the damaged wires with the help of an electrician OR use an electrical (insulating) tape to cover up the exposed insulation. | 1 |
| B4 | (a) | Inhaled air has a higher concentration of oxygen while exhaled air has a lower concentration of oxygen . OR Inhaled air has a lower concentration of carbon dioxide while exhaled air has a higher concentration of carbon dioxide . | 1 |
| | (b) | Breathing allows oxygen to enter the lungs for respiration to occur, and removes carbon dioxide. | 1 |
| B5 | (a) | A: gullet / esophagus B: stomach C: large intestines D: small intestines | 1 1 1 1 |
| | (b)(i) | C | 1 |
| | (b)(ii) | His large intestines did not absorb enough water and mineral salts , therefore his stools become watery and he feels thirsty often. | 1 |
| B6 | (a) | Menstruation is the removal of the uterine lining , blood and the unfertilised egg. | 1 |
| | (b) | During this period, ovulation occurs where a mature egg is released by the female. | 1 |
| | (c) | The blood vessels carry blood containing nutrients and antibodies to the implanted foetus which can then successfully develop into a baby. | 1 |
| | (d)(i) | No , she is unlikely to get pregnant. | 1 |
| | (d)(ii) | 11 October is 7 days later, which corresponds to the stage where the uterine lining is being repaired. Hence, the foetus is not ready for implantation . | 1 1 |
| | (e) | Not enough sperm is produced / No healthy egg are released by ovaries / blockage of fallopian tube | 1 |

| | | | |
|------------|--------|---|---|
| | | Any 1 out of 3 | |
| B7 | | Testis – produces sperm and male sex hormones sperm duct – carries sperm to the urethra uterus – structure where the foetus develops | 2 |
| B8 | | temporary, condom, spermicide, vasectomy | 4 |
| B9 | (a) | Drinking alcohol affects the human reaction time, increasing the likelihood of traffic accidents. Hence, the law serves to reduce accidents arising from drinking of alcohol. | 1 |
| | (b) | Drinking alcohol may cause monetary problems in a family as alcohol is expensive. / It may increase the likelihood of family violence or conflicts. | 1 |
| | (c) | Avoid people who drink alcohol excessively. / Replace alcohol with non-alcoholic beverages. / Get help from teachers, parents, counsellors or support group if already addicted to alcohol. Learn about the harmful social and personal effects of alcohol <i>Advice needs to be specific and relate to one of the 4 above. Non-specific answers like 'Tell him just don't drink!' are not accepted</i> <i>Any 1 of 4. Accept other reasonable answers.</i> | 1 |
| | (d) | Depressant | 1 |
| B10 | (a)(i) |  <p>Oxygen carrying capacity of blood / (mL / L of blood)</p> <p>Number of cigarettes smoked per day</p> <p>Plotted points: 5-6c – 2 3-4c – 1 0-2c – 0</p> <p>Line of best fit: 1</p> | |
| | (a) | 150 mL / L of blood | |
| | (ii) | (Accept 148 – 152) | 1 |

| | | |
|--------------|---|---|
| (a) (iii) | 17 cigarettes (Accept 16.5 – 17.5) | 1 |
| (b) | increases, decreases <u>Both</u> answers must be correct to earn 1m. | 1 |
| (c) | carbon monoxide | |
| (d) | It increases the risk of lung cancer, stroke, blindness, mouth cancer, throat cancer, heart disease, stomach cancer, bladder cancer, infertility. Any 1 of the above. | 1 |
| (e) | By inhaling cigarette smoke from nearby smokers (passive smoking), one may increase the risk of eye irritation, headaches, cough, sore throat, giddiness, vomiting and increase the risk of lung cancer. Any 1 of the symptoms | 1 |

END OF MARKING SCHEME