



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 11

AGRICULTURAL TECHNOLOGY

EXEMPLAR 2007

MARKS: 200

TIME: 3 hours

This question paper consists of 19 pages and a 1-page answer sheet.

INSTRUCTIONS AND INFORMATION

1. GENERAL INSTRUCTIONS
 - 1.1 This question paper consists of TWO sections, namely SECTION A and SECTION B.
 - 1.2 BOTH sections are COMPULSORY.
2. SECTION A: MULTIPLE-CHOICE QUESTIONS
 - 2.1 Answer the questions in this section on the attached ANSWER SHEET.
 - 2.2 Follow the instructions when answering these multiple-choice questions.
 - 2.3 Place the COMPLETED ANSWER SHEET in the ANSWER BOOK.
3. SECTION B: STRUCTURED QUESTIONS
 - 3.1 This section consists of FIVE questions.
 - 3.2 Answer the questions in this section in the ANSWER BOOK provided.
 - 3.3 Number the answers correctly according to the numbering system used in this question paper.
 - 3.4 Accuracy and neatness are important.

SECTION A**QUESTION 1**

Various possible options are provided as answers to the following questions. Choose the correct answer and make a cross (X) over the appropriate letter (A – C) next to the question number (1.1 – 1.20) on the attached answer sheet.

EXAMPLE:

1.0	A	B	C
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- 1.1 The basic rule applicable to PTOs and all other drive mechanisms, is that it must be ...
- A painted red.
 - B covered.
 - C able to turn clockwise. (2)
- 1.2 Wooden poles that are used as posts when erecting fences, are treated with ... to protect it against insects and decay.
- A varnish
 - B paint
 - C creosote (2)
- 1.3 Which ONE of the following types of soil is the most undesirable to build on, as it is one of the causes of cracks in buildings?
- A Clay
 - B Red loam soil
 - C Lime soil (2)
- 1.4 Drain pipes used for domestic applications are normally manufactured from ... because they are subjected to chemicals and other cleaning agents that cause corrosion.
- A copper
 - B stainless steel
 - C PVC (2)
- 1.5 According to law, the fence of a game farm must be of a specific height. If the fence is NOT of the correct height, the farm cannot be registered as a game farm.
- What is the minimum height of a game fence?
- A 3 m
 - B 2,4 m
 - C 1,8 m (2)

- 1.6 Generator welders that are used to weld non-ferrous metals, use ... current as an energy source.
- A direct
 - B alternating
 - C chemical
- (2)
- 1.7 The process in which worn parts can be built up by padding with a wear resistant metal, is called ...
- A shrinking.
 - B hard facing.
 - C distortion.
- (2)
- 1.8 What is the name of the mechanism in the distribution board that switches off the current when a short-circuit occurs in the wiring system of a house?
- A Earth-leakage protector
 - B Circuit breaker
 - C Main switch
- (2)
- 1.9 A tractor needs 12 volts to operate the electrical circuit and for charging the battery.
- Which ONE of the following devices is best suited for this job?
- A Transformer
 - B Generator
 - C Alternator
- (2)
- 1.10 A three-phase electrical motor uses ... volts to operate.
- A 220
 - B 12
 - C 380
- (2)
- 1.11 When ploughing very large pieces of land with heavy implements, a tractor of about ... is needed to do the task effectively.
- A 25 kW
 - B 90 kW
 - C 200 W
- (2)
- 1.12 Which ONE of the following tools can be used to cut a hole in an empty container that has been used to store fuel in before?
- A Tin snip
 - B Angle grinder
 - C Cutting torch
- (2)

- 1.13 A/An ... sprayer is the most effective piece of equipment for spraying large areas, for example maize fields with pesticides.
- A tractor mounted
 - B knapsack
 - C aerosol
- (2)
- 1.14 The function of a camshaft in the engine of a tractor is to ...
- A pump oil to the different bearings.
 - B open and close the valves.
 - C drive the gearbox.
- (2)
- 1.15 Which ONE of the following parts CANNOT be found in a diesel engine?
- A Injector
 - B Spark plug
 - C Crankshaft
- (2)
- 1.16 The most important function of the sensitivity element in the three-point mechanism of the tractor is to ...
- A keep the back of the plough as deep as possible in the soil.
 - B keep the plough level at all times.
 - C lift the plough from the soil when it penetrates a soft patch of land.
- (2)
- 1.17 The device on the drive system of a tractor that compensates for the larger turning circle of the outer wheel when the tractor negotiates a bend, is the ...
- A differential.
 - B final drive.
 - C drive shaft.
- (2)
- 1.18 The setting of time of a diesel pump in relation to the engine, is known as ...
- A calibration.
 - B phasing.
 - C standardisation.
- (2)
- 1.19 The pedestal drilling machine turns ... when working.
- A to the left (anticlockwise)
 - B in both directions
 - C to the right (clockwise)
- (2)

1.20 A ... is used to close the end of a drainage pipe for the purpose of keeping rodents out.

- A grid
- B plug
- C canvas

(2)

TOTAL SECTION A (20 x 2): 40

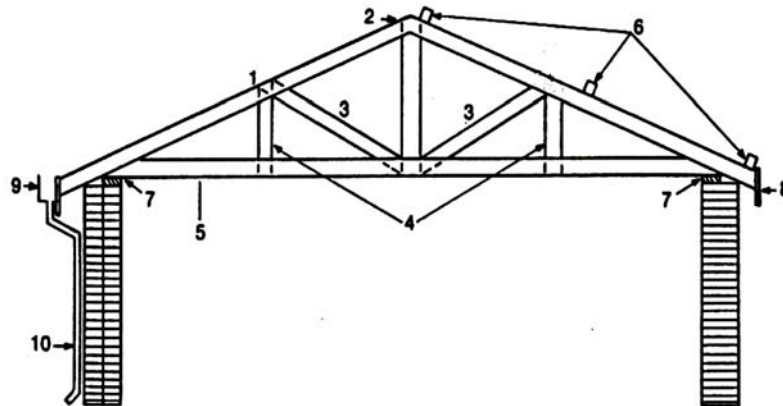
SECTION B**QUESTION 1: MATERIALS AND STRUCTURES**

- 1.1 Building a structure is a very expensive process and the builder must have a thorough understanding of the complicated techniques and principles involved in the process.



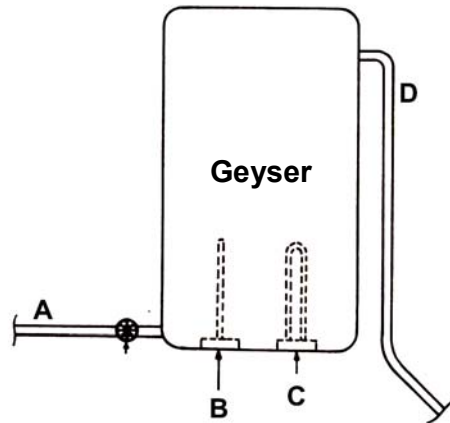
- 1.1.1 What happens to concrete that is mixed with too much water? (2)
- 1.1.2 State TWO rules that must always be kept in mind when mixing concrete. (2)
- 1.1.3 Give the ratio of cement, sand and grit for mixing each of the following:
- (a) Heavy foundations
 - (b) Reinforced concrete floors (25 MPa)
 - (c) Basic concrete floors (75 mm tot 85 mm; 15 MPa) (3)
- 1.1.4 Why is it important to do slump tests with concrete? (2)

- 1.2 The drawing below shows different concepts, design and construction principles used in the building industry:



- 1.2.1 Write down the numbers (1 to 10) of the parts on the drawing that shows the following parts:
- Gutter
 - Down pipe
 - Wall plate
- (3)
- 1.2.2 Briefly differentiate between the *measurements* and *brick formation* of an outside and inside wall.
- (4)
- 1.2.3 What purpose does stretcher bond have in walls?
- (1)
- 1.2.4 Give TWO functions of the cavity between the walls in the cavity wall (a kind of outside wall).
- (2)

1.3 The figure below shows an electric geyser with its components:



1.3.1 Label the parts A to C. (3)

1.3.2 Briefly describe the principles on which a geyser works. (3)

1.3.3 Name the most effective materials that are used for the manufacturing of the following:

- (a) Cold water pipes
- (b) Hot water pipes (2)

1.4 Design and make an isometric freehand sketch of a mobile loading ramp for loading and off-loading cattle on a farm. (5)

1.5 Name THREE types of non-electrical fencing, suitable to be used for security purposes on a farm. (3)

[35]

QUESTION 2: ELECTRICAL ENERGY

2.1 Electricity is provided to farms by means of power lines from the national electricity provider. The typical voltage provided in these power lines is 11 000 volts (11 kV).

2.1.1 What is the device called that converts this high voltage to lower voltage? Give the value of the lower voltage generally used for South African three-phase farming conditions. (2)

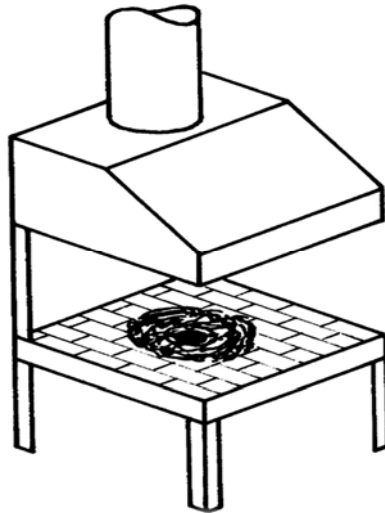
2.1.2 Is a farmer or any worker on the farm allowed to repair this device if it trips or breaks down? (1)

2.1.3 What type of electrical wire is used to connect the transformer to the distribution board, if the farmer uses three-phase electricity on the farm? (1)

- 2.1.4 What is the device called that is used in the distribution board to protect the electrical circuit during thunder and lighting? (1)
- 2.1.5 Draw the symbol indicating that only an earth wire may be connected to that specific point. (1)
- 2.2 When an electric current flows through a relatively thin electrical conductor, it is found that the conductor (electric wire) heats up after a long period of use.
- 2.2.1 Briefly explain why the electric wire heats up. (4)
- 2.2.2 State TWO reasons why electric wires heat up, referring to electrical hazards. (2)
- 2.2.3 Give TWO examples of the application of this phenomenon (increased resistance) in equipment on the farm. (2)
- 2.3 A farm manager decides to electrify a building containing a chicken-battery and requests you to do the following:
- 2.3.1 Compile a list of ALL the materials needed to wire this building. (4)
- 2.3.2 Name TWO safety precautions regarding the fitting of the wires in the building. (2)
- [20]**

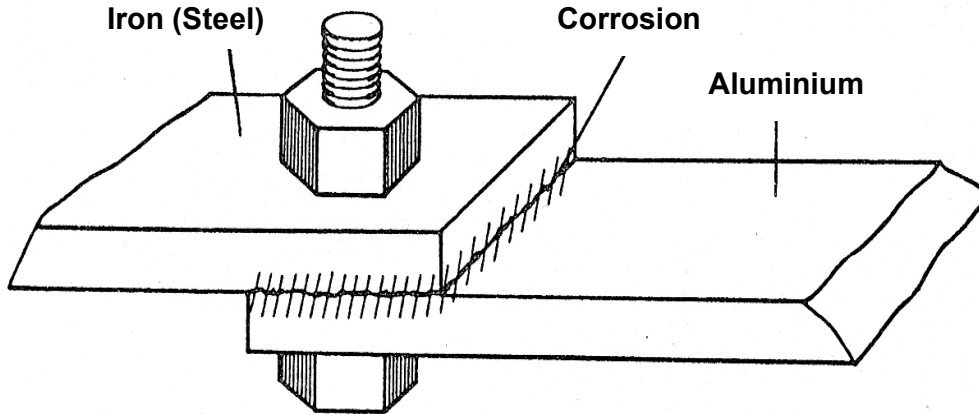
QUESTION 3: SKILLS AND CONSTRUCTION PROCESSES

- 3.1 Heat treatment is the process by which the properties of plain carbon steel can be changed by heating to different temperatures and then cooling it in different ways and speed.



- 3.1.1 Why is steel tempered? (1)
- 3.1.2 Describe the method of tempering a piece of steel to reduce the brittleness of the steel. (3)
- 3.1.3 The bricks which are used in the furnace above are especially made to withstand the extremely high temperatures of the furnace. What are these bricks called? (1)

3.2 The given sketch shows two different metals, namely iron and aluminium that are joined by a nut and bolt:

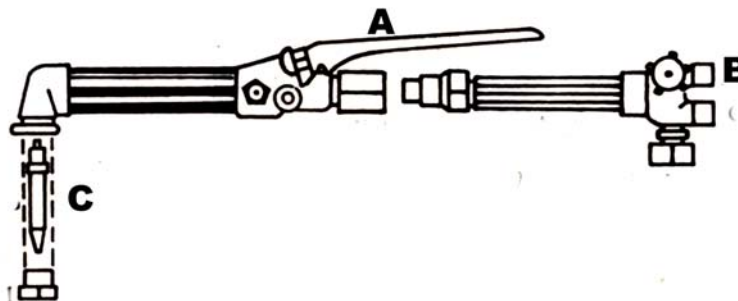


3.2.1 Identify the devices that are used to do the following:

- (a) Cut new inside thread
- (b) Cut new outside thread
- (c) Recut damaged thread (3)

3.2.2 Name TWO other appropriate methods that could be used to join these two pieces of metal. (2)

3.3 Study the sketch of the oxy-acetylene cutting torch below and answer the following questions:



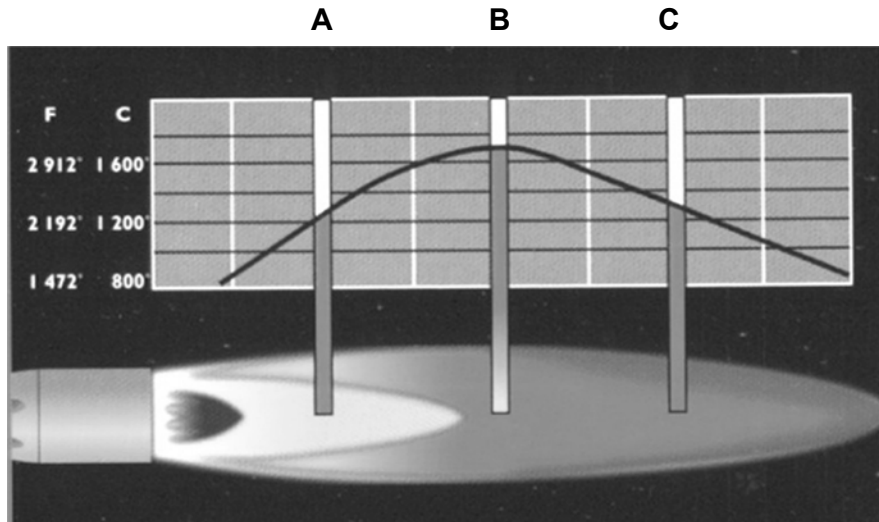
3.3.1 Describe the function and working of the lever labelled A. (2)

3.3.2 The fitting labelled B is the acetylene inlet connection. Name the type of thread used in this connection. (1)

3.3.3 Name the part labelled C and give its function. (2)

- 3.4 The sketch below shows an oxy-acetylene flame with the different temperatures shown on the graph.

Analyse this sketch and answer the questions that follow:



- 3.4.1 Identify the hottest part of the flame and write down the temperature. (2)
- 3.4.2 Where will you position the work piece in relation to the flame if you look at the graph in the sketch above? (1)
- 3.4.3 Is this flame used for cutting or welding? (1)
- 3.4.4 Identify this type of flame and state TWO uses. (3)
- 3.5 Make a neat freehand sketch of a lap joint that shows the following:
- 3.5.1 The joint (1)
- 3.5.2 The sections where the two pieces will be welded together (2)
- 3.5.3 The welding symbol for this joint (1)

3.6 The photo below shows one of the most common welding defects:



- 3.6.1 Identify this welding defect by analysing the given data in the photo above. (1)
- 3.6.2 Name TWO possible causes of this welding defect. (2)
- 3.6.3 What is the purpose of the slag that is formed on the welding run? (2)

3.7 The photo below shows a welding helmet used when arc-welding:

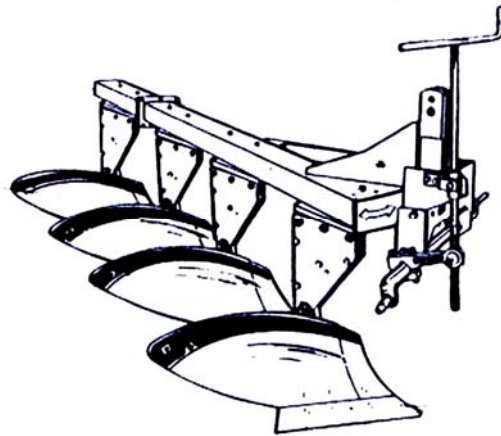


- 3.7.1 What is the function of the dark lenses of the welding helmet? (2)
- 3.7.2 Why must the helmet extend over the welder's face? (2)

[35]

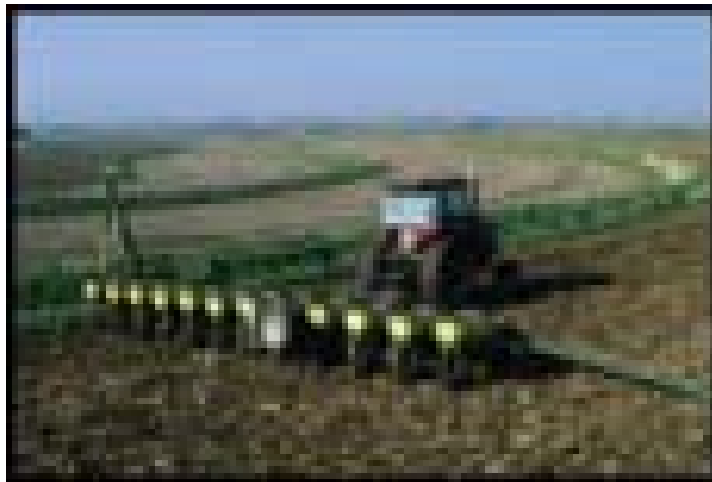
QUESTION 4: TOOLS, EQUIPMENT, IMPLEMENTS AND MACHINERY

4.1 Study the sketch below of a plough and answer the following questions:



- 4.1.1 Name the mechanism that is used to keep the back of the plough in the soil. (1)
- 4.1.2 Name a function of the shear bolt. (1)

4.2 Thorough knowledge of the calibration, setting and working of the planter is critical for a successful harvest. To ensure that the planter is in working order, maintenance has to be done on implements.

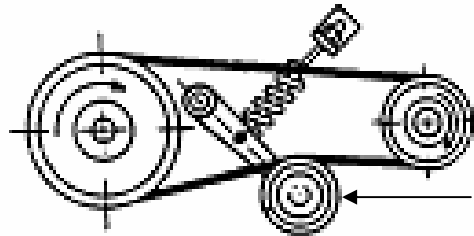


- 4.2.1 Name FOUR tasks that a person should perform when maintaining a planter. (4)
- 4.2.2 Name FIVE procedures to be followed when the planter is stored after the planting season. (5)

- 4.3 When applying pesticides on the crops one must be very cautious not to contaminate the environment.



- 4.3.1 Name FOUR precautionary measures the worker has to keep in mind when spraying crops with pesticides. (4)
- 4.3.2 Name THREE tasks that a person should perform on the pesticide sprayers after the spraying job is finished. (3)
- 4.4 The figure below shows two pulleys with a fan belt in between:



- 4.4.1 Identify the part indicated by the arrow and give its function. (3)
- 4.4.2 Name the effect that increasing and decreasing the driver pulley size will have on the speed of the driven pulley. Briefly explain your answer. (4)
- 4.4.3 Write down the formula for calculating the speed and diameters of pulleys. (1)
- 4.4.4 What would be the effect on the pulleys if the fan belt is crossed between the two pulleys? (1)

- 4.5 Ignition timing of the engine must be set exactly to the specifications of the manufacturers. These specifications can be found in the service manual of a car.
- 4.5.1 What is the tool called that is used to set ignition timing? (1)
- 4.5.2 Briefly explain how you would set the timing of a petrol engine. (6)
- 4.5.3 Name THREE symptoms that indicate that the timing of an engine is NOT set correctly. (3)

- 4.6 The illustrations below show some hazardous actions that could be performed by workers.

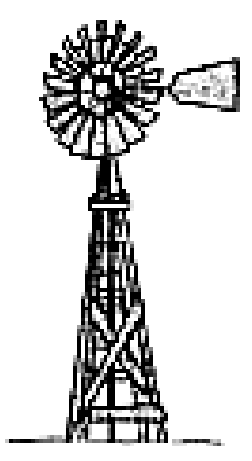


Name THREE steps that the farmer can take to prevent the workers to perform these hazardous acts.

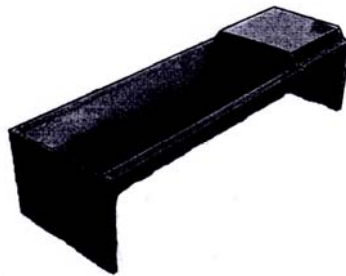
(3)
[40]

QUESTION 5: IRRIGATION

- 5.1 Windmills are the most common type of pump used on farms to pump water from deep underground water sources.

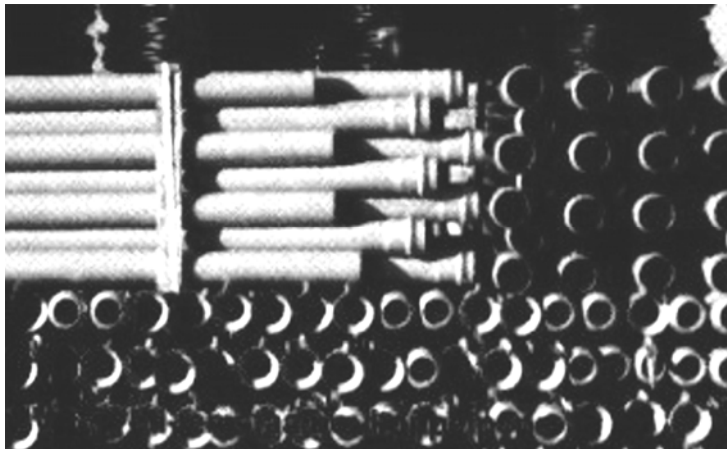


- 5.1.1 State FOUR aspects that must be kept in mind when servicing a windmill. (6)
- 5.1.2 Briefly explain why the cylinder must extend up to two metres above the bottom of the borehole. (3)
- 5.2 Thorough planning must be done when installing drinking troughs. This will prevent unnecessary maintenance and repairs later.



- 5.2.1 Name FIVE requirements that have to be considered when choosing a drinking trough. (5)
- 5.2.2 State FOUR points that should be kept in mind when installing drinking troughs for animals. (4)
- 5.2.3 Name a material that can be used to ensure watertight joining where pipes have to be joined. (1)
- 5.3 Pipe drainage systems are one of the drainage systems used on farms.
- State FOUR precautionary measures to be taken when these pipes are installed. (4)

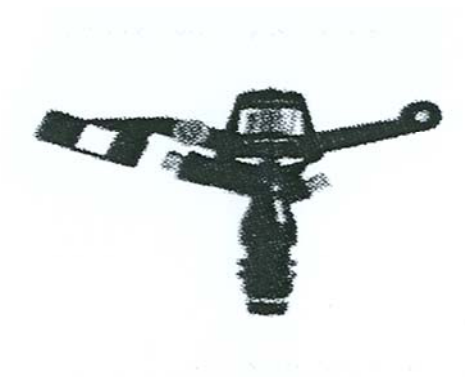
5.4 PVC pipes are a popular choice used for irrigation in agriculture.



State the method which is leak-proof, that could be used to lengthen or connect PVC pipes successfully.

(2)

5.5 Sprinklers form part of the irrigation system.



5.5.1 What is the function of the sprinkler head in the photo above? (1)

5.5.2 Name TWO effective materials used to manufacture the sprinkler head indicated above. (2)

5.5.3 State an advantage of each material used in QUESTION 5.5.2 that makes it suitable for the manufacture of sprinkler heads. (2)

[30]

TOTAL SECTION B: 160

GRAND TOTAL: 200

NAME OF CANDIDATE: _____

ANSWER SHEET**SECTION A****QUESTION 1**

1.1	A	B	C
1.2	A	B	C
1.3	A	B	C
1.4	A	B	C
1.5	A	B	C
1.6	A	B	C
1.7	A	B	C
1.8	A	B	C
1.9	A	B	C
1.10	A	B	C
1.11	A	B	C
1.12	A	B	C
1.13	A	B	C
1.14	A	B	C
1.15	A	B	C
1.16	A	B	C
1.17	A	B	C
1.18	A	B	C
1.19	A	B	C
1.20	A	B	C

TOTAL SECTION A (20 x 2):**40**