Affix label with Candidate Code Number here.
If no label, enter candidate Number if known

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No. 9196

Plumbers, Gasfitters and Drainlayers Board

REGISTRATION EXAMINATION, JUNE 2023

CERTIFYING GASFITTER

QUESTION AND ANSWER BOOKLET

Time allowed THREE hours

INSTRUCTIONS

Please check that the booking reference number on your booking confirmation slip is the same as the number on the label at the top of this page.

Do not remove the exam booking confirmation slip from your exam paper.

Do not start writing until you are told to do so by the Supervisor.

Total marks for this examination: 100.

This exam booklet consists of 2 sections

Section A – Questions 1 to 11

Section B – Questions 1 to 10

The pass mark for this examination is 60 marks.

Write your answers and draw your sketches in this booklet. If you need more paper, use pages 26-28 at the back of this booklet. Clearly write the question number(s) if any of these pages are used.

All working in calculations must be shown.

Candidates are permitted to use the following in this examination:

Drawing instruments, approved calculators, document(s) provided.

Publications, Acts, Regulations, Codes of Practice, or Standards other than the ones provided are NOT permitted in the examination room.

Do not use red pen for drawings or writing in your paper.

Check that this booklet has all of 30 pages in the correct order.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

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USEFUL FORMULAE

Circumference of circle = $2 \times \pi \times R$ or Circumference of circle = $\pi \times D$

Area of circle = $\pi \times R^2$ or Area of circle = $0.7854 \times D^2$

Volume of cylinder = $\pi \times R^2 \times H$ or Volume of cylinder = $0.7854 \times D^2 \times H$

$$\text{Heating time (seconds)} = \frac{\text{mass of water (kg)} \times 4.2 \times \text{temp diff (ºC)} \times 100}{\text{heat energy input per hour (kJ)} \times \text{efficiency (\%)}}$$

$$\text{Correction factor} = \frac{\text{atmospheric pressure + supply pressure}}{\text{atmospheric pressure}}$$

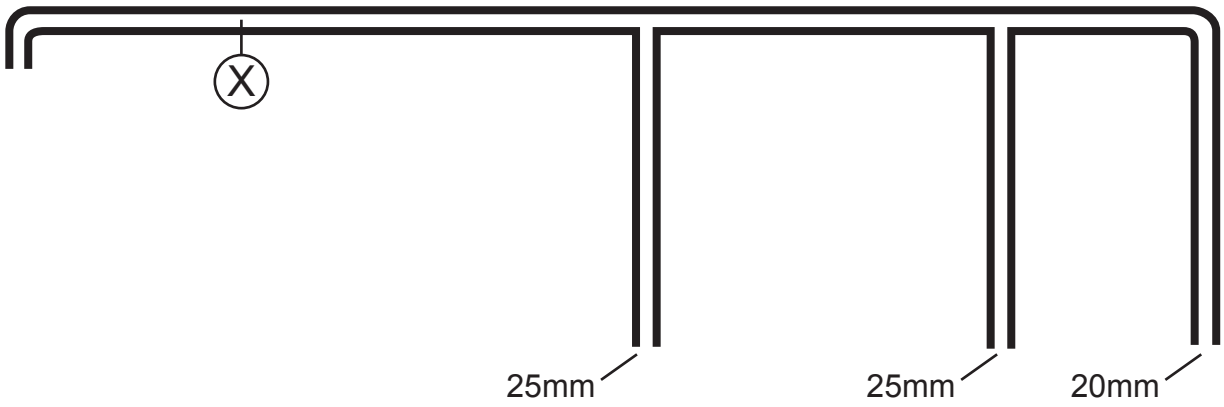
$$\text{Gas rate (m}^3\text{/h)} = \frac{\text{volume (m}^3\text{)} \times 3600}{\text{time (seconds)}}$$

SECTION A

QUESTION 1

The diagram below shows a common vent line X that serves the regulator and relief valves for a gas appliance. The gas appliance has three vents with diameters 25 mm, 25 mm and 20 mm.

Using AS/NZS 5601 Part 1, determine the minimum diameter of the common vent line X.



Total 5 marks

QUESTION 2

A commercial property is fuelled by LPG, and has a maximum total gas consumption of 580 MJ/h. The average lowest temperature at this location is 4ºC.

(a) Using AS/NZS 5601 Part 1 as a guide, calculate the number of 45 kg LPG exchange cylinders needed to supply an adequate gas supply when all appliances are continually operating at once.

(2 marks)

(b) State how many cylinders should be kept in reserve for use when the primary cylinders have been emptied.

(1 mark)

(c) Two 45 kg LPG exchange cylinders are to be installed on the outside wall of a house. The customer has requested the cylinders be located below an openable window.

Referring to AS/NZS 5601 Part 1, give the minimum clearance below the window required for the cylinder valves.

(1 mark)

(d) State when a location compliance certificate/ site location certificate is required for an LPG installation.

(2 marks)

(e) AS/NZS 5601 Part 1 lists clearances required from LPG cylinders to openings.

Name another hazard that LPG cylinders must have clearances from.

(1 mark)

QUESTION 2 (cont'd)

(f) A changeover regulator that has a 20 mm vent terminal is to be installed on the wall between the two cylinders.

(i) Referring to AS/NZS 5601 Part 1, state the minimum clearance below the window required for the vent terminal.

_____

(1 mark) ☐

(ii) If the clearance in (f) (i) cannot be achieved, give a solution that does not include changing the regulator or altering the window.

_____

(1 mark) ☐

(g) Explain why an auto-changeover regulator may switch to the reserve cylinder while the primary cylinder is still half full.

_____

(1 mark) ☐

(h) Give TWO actions that can be taken to reduce the likelihood of the situation in (g) from happening.

1 _____

2 _____

(2 marks) ☐

(i) Several factors govern the vaporisation rate of LPG in a cylinder.

Give TWO of these.

1 _____

2 _____

(2 marks) ☐

Total 14 marks ☐

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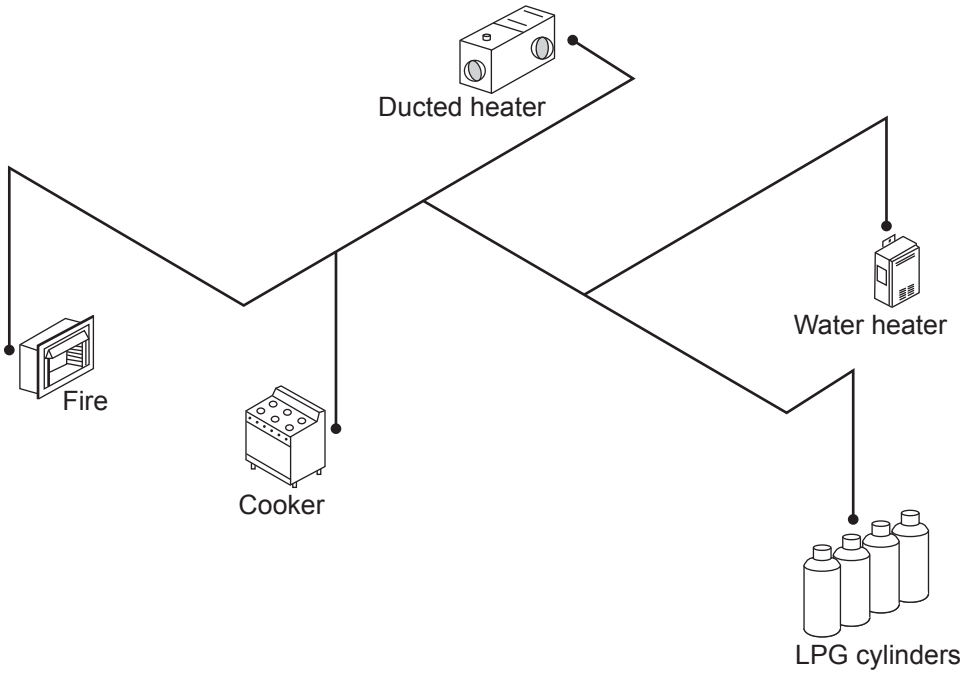
QUESTION 3

(a) The diagram below shows the layout of a single residential gas installation.

On the diagram, show where pressure test points and isolating valves are required in order to comply with the minimum requirements of AS/NZS 5601 Part 1.



(3 marks)

(b) State what special feature is required of a pressure test point that is to be used on an installation where pressures exceed 7 kPa.

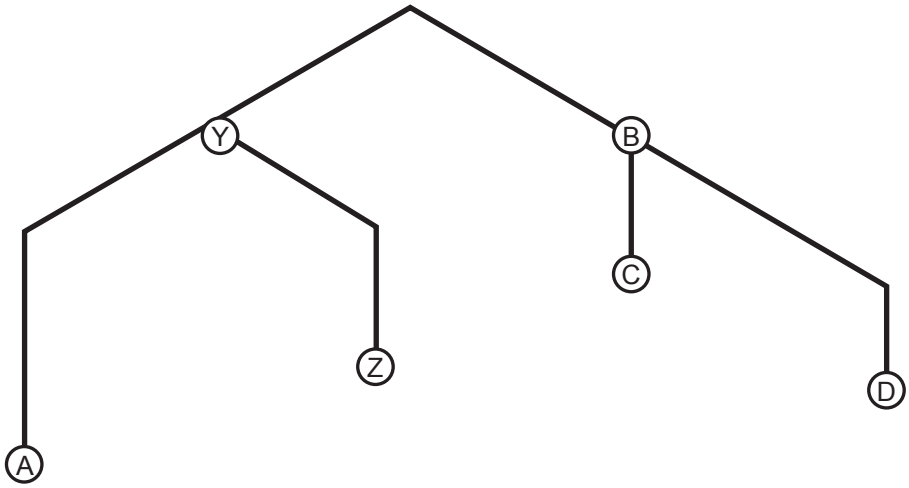
_____

(1 mark)

Total 4 marks

QUESTION 4

(a) A new appliance is to be added to an existing commercial installation. A diagram of the installation is shown below. The new appliance is to be supplied by the pipework section Y – Z.



The installation has an operating pressure of 6 kPa.

State the types of pressure tests and testing pressures required to be performed throughout the course of the installation.

(8 marks)

QUESTION 4 (cont'd)

(b) (i) Complete the following table for the installation in (a).

Section	Length	Material	Volume
A - B	7 m	40 mm steel AS1074	
B - C	3 m	20 mm copper NZ3501	
B - D	4 m	32 mm steel AS1074	
Y - Z	4 m	32 mm polyethylene AS/NZS4130	

(4 marks)

(ii) Give the maximum allowable pressure drop when the installation in (a) is being tested.

_____

_____

(2 marks)

Total 14 marks

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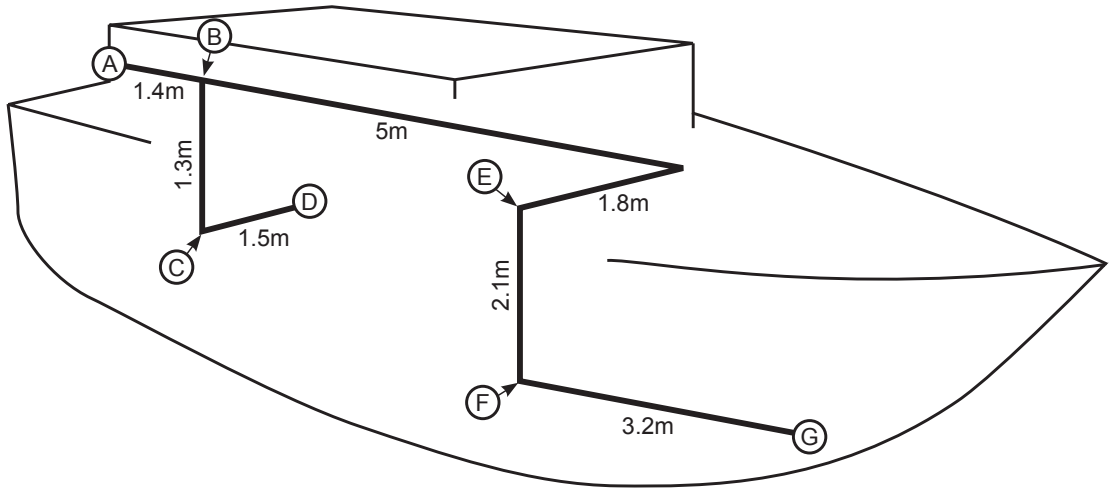
QUESTION 5

The diagram below is a schematic of rigid pipework to be installed in a boat.

- Support is to be provided 150 mm from each end of the pipe.
- Three supports are to be included for each tee, each located 150 mm from the tee.
- Two supports are to be included for each bend, each located 150 mm from the bend.



Complete the following table to give the number of supports required for the pipework. The supports are to be installed to comply with the minimum requirements of AS/NZS 5601 Part 2.

Pipe Section	Number of clips
A - B	
B - C	
C - D	
B - E	
E - F	
F - G	

Total 6 marks

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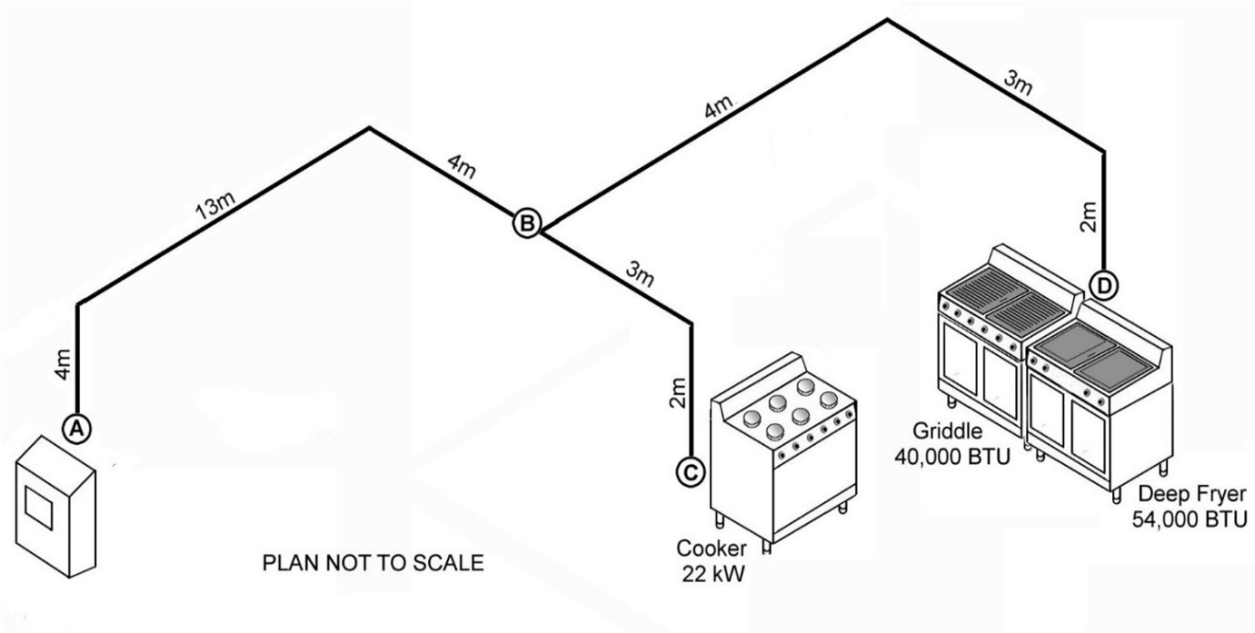
QUESTION 6

The diagram below shows the pipework and appliances for a gas installation in a commercial kitchen. The first section of pipework (Section A – B) is to be constructed of steel to protect it from damage.

Installation details are as follows:

- Natural gas
- Pipework section A – B is to be steel AS 1074
- All other pipework is to be copper NZS 3501
- The installation supply pressure is 3.0 kPa.



Use the Pipe Sizing Tables (not the graphs) from AS/NZS 5601 Part 1 to complete the table below.

Pipe section	Length (metres)	Main Run	Gas flow (MJ/h)	Nominal size
A – B				
B – C				
B – D				

Total 10 marks

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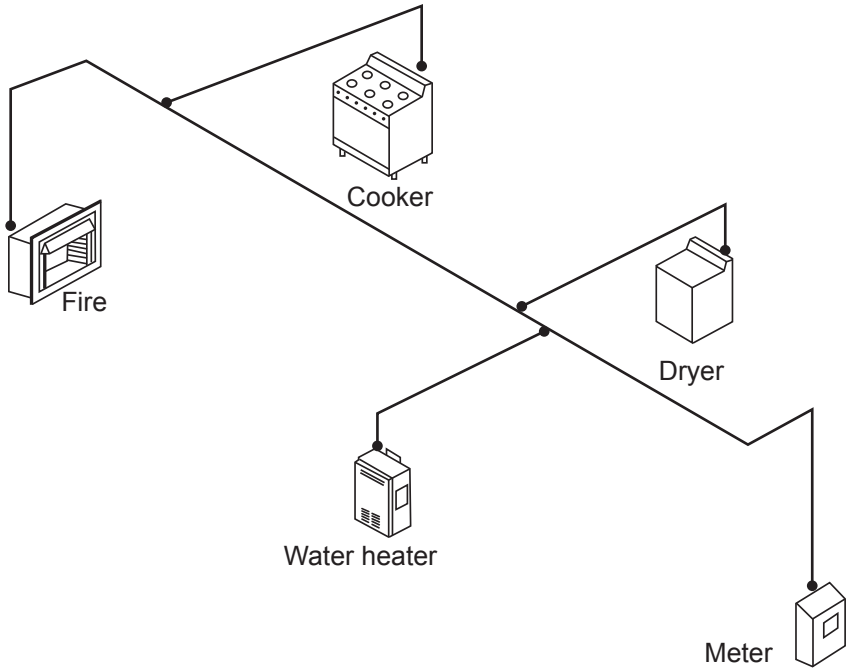
QUESTION 7

The diagram below shows the layout of the gas installation in a multi-unit dwelling. The pipe material is cross-linked polyethylene. The distance between the meter and the fire is 12.3 m.



(a) On the diagram, mark the locations where reversion fittings are required.

(2 marks)

(b) State the purpose of the reversion fittings.

_____

(1 mark)

(c) Describe TWO acceptable reversion fittings suitable for the installation.

1 _____

2 _____

(2 marks)

(d) State the special requirements with regard to identification of the proprietary piping in the installation.

_____

_____

(2 marks)

Total 7 marks

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QUESTION 8

An LPG appliance has an efficiency of 80%.

The weight of the LPG supply cylinder is measured before and after gas rating. The cylinder weighs 48.0 kg prior to gas rating. After gas rating the appliance for 3 minutes and 10 seconds, the cylinder weighs 47.5 kg.

1 kg of LPG = 50 MJ.

Calculate, in kW, the energy output for the appliance.

Formula:

$$\text{Gas rate in MJ/hr} = \frac{\text{MJ used} \times 3600}{\text{time taken in seconds}}$$

Total 6 marks

QUESTION 9

(a) Explain what is meant by the term nominated person in relation to gasfitting.

(2 marks)

(b) Name FOUR licensing categories for which workers must be supervised and have their work verified by a certifying gasfitter.

1

2

3

4

(2 marks)

(c) Define the term direct supervision as it relates to supervision of a gasfitter under the Plumbers, Gasfitters and Drainlayers Act.

(2 marks)

(d) Name TWO authorisation types that have a mandatory direct supervision period, and give the minimum length of time after obtaining the authorisation for which each supervisee must be directly supervised.

Authorisation	Minimum time of direct supervision

(2 marks)

QUESTION 9 (cont'd)

(e) Gasfitters in either of two licence categories may be permitted to carry out direct supervision of the supervisees with the authorisation types in (d).

Name these licence categories.

1 _____

2 _____

(2 marks)

Total 10 marks

INTENTIONALLY BLANK

QUESTION 10

A builder doing renovation work has requested that a metal pipe, which the builder believes to be a copper gas pipe, be repositioned.

Give FIVE actions to be carried out by a gasfitter before the pipe is cut.

1 _____

2 _____

3 _____

4 _____

5 _____

Total 5 marks

INTENTIONALLY BLANK

QUESTION 11

(a) Give FOUR safety aspects that should be checked before a cherry picker is used to access a high point on the exterior of a building.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(b) Give FOUR safety guidelines to be followed when a mobile scaffold is being used.

1 _____

2 _____

3 _____

4 _____

(2 marks)

(c) (i) Give the TWO terms that are used to categorise asbestos.

_____

(1 mark)

(ii) Give FOUR products containing asbestos that were previously used in gas installations.

1 _____

2 _____

3 _____

4 _____

(4 marks)

Total 9 marks

SECTION B

Answer the following multiple-choice questions by writing your answer (A, B, C, D or E) in the box provided after each one of the questions.

Each correct answer in this section of the examination is worth 1 mark.

Should your choice of answer be unclear no mark will be awarded.

1. An open flued gas appliance is 0.8 m high and has a 100 mm diameter flue spigot.

   The flue is required to offset with a lateral section 2.2 m long.

   Which of the following shows the minimum permitted total height of the flue?

   A 1.2 m

   B 2.2 m

   C 2.4 m

   D 3.0 m

   E 4.4 m

   ☐

2. In what situation is a gasfitter permitted to install multi-layer pipework material in a motor home gas installation?

   A When the product certification allows for it to be used.

   B If it is installed only inside the motor home.

   C When pipework is enclosed in a ventilated bulkhead.

   D For flexible connections to appliances only.

   E Only when protected from UV damage.

   ☐

3. Which of the following situations is notifiable particular hazardous work (Notifiable Work)?

   A Working in a confined space.

   B Working in a trench which is 2 metres deep and 1.5 metres wide at the top.

   C Working on the roof of a 2-storey residential building which is 6 metres high.

   D Working on a residential property which is known to contain asbestos containing materials.

   E Assembling a 4.5 m tall mobile scaffold.

   ☐

4. A digital manometer is used to perform a leakage test on an installation that has a volume of 90 litres.

   What is the test time according to AS/NZS 5601 Part 1 required for this installation?

   A 5 minutes.

   B 7 minutes.

   C 10 minutes.

   D 15 minutes.

   E 30 minutes.

   ☐

5. Which of the following would be classed as High Risk gasfitting?

   A Replacement of a gas appliance with the same make and model of appliance.

   B Repositioning gas installation pipework to allow for the installing of a new window.

   C Replacing a faulty thermocouple on a gas appliance.

   D Removing and refitting a burner from a gas hob to clear out a blockage.

   E Installing a new gas fired water heater and LPG cylinders on a new house.

   ☐

6. Where a 9 kg LPG cylinder is to be used indoors, the compartment in which the cylinder is located must have a low-level vent of which minimum size?

   A 300 mm^2

   B 600 mm^2

   C 750 mm^2

   D 800 mm^2

   E 1000 mm^2

   ☐

7. A 40 MJ storage water heater with a natural draught flue is to be installed in a cupboard.

   The cupboard will be ventilated using mechanical means.

   According to AS/NZS 5601 Part 1, what is the minimum rate at which the fan will need to supply air at low level?

   A 20 litres/second.

   B 40 litres/second.

   C 50 litres/second.

   D 100 litres/second.

   E 150 litres/second.

   ☐

8. Which of the following specifies the minimum permitted gradient on a lateral run of flue?

A 10 mm per m.

B 15 mm per m.

C 20 mm per m.

D 25 mm per m.

E 30 mm per m.

9. A 54 MJ internal gas storage water heater is to be installed in a room using only adventitious ventilation.

According to AS/NZS 5601 Part 1, what is the minimum volume the room can have?

A 10 m^3.

B 12 m^3.

C 18 m^3.

D 24 m^3.

E 30 m^3.

10. What is the minimum clearance to a combustible surface from the rear of a gas-fired commercial cooking appliance with a splashback?

A 20 mm.

B 50 mm.

C 75 mm.

D 100 mm.

E 125 mm.

Total 10 marks

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Question number _____

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Question number	Marks	Marks
1		
2		
3		
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Section B		
Total		