COMPUTER SCIENCE UNITS 1 and 2

Student Name : _____

Teacher :   **Ms Radzi**

Time allowed for this paper

Reading time before commencing work: ten minutes
Working time: three hours

Materials required/recommended for this paper

To be provided by the supervisor
This Question/Answer booklet
Source booklet

To be provided by the candidate
Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction
                  fluid/tape, eraser, ruler, highlighters
Special items: up to three calculators, which do not have the capacity to create or store
                  programmes or text, are permitted in this ATAR course examination, Mathomat
                  and/or Mathaid and/or any system flowchart template

Important note to candidates
No other items may be taken into the examination room. It is **your** responsibility to ensure that you
do not have any unauthorised material. If you have any unauthorised material with you, hand it to
the supervisor **before** reading any further.

Structure of this Paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of examination
Section One Short answer	20	20	70	78	40
Section Two Extended answer	4	4	110	116	60
					100

Instructions to candidates

1. The rules for the conduct of the Western Australian external examinations are detailed in the *Year 11 Information Handbook 2020: Part II Examinations*. Sitting this examination implies that you agree to abide by these rules.

2. Write your answers in this Question/Answer booklet. Wherever appropriate, fully labelled diagrams, tables and examples should be used to illustrate and support your answers.

3. You must be careful to confine your answers to the specific questions asked and to follow any instructions that are specific to a particular question. Where no specific instructions are given, you should feel free to use a range of formats to express your knowledge and understandings.

4. Supplementary pages for planning/continuing your answers to questions are provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

5. The Source booklet is to be handed in with your Question/Answer booklet.

Section One: Short answer 40% (78 marks)

This section contains **twenty (20)** questions. You must answer **all** questions. Write your answers in the spaces provided.

Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 70 minutes.

_____

Question 1 **(2 marks)**

Outline the difference between RAM and ROM.

_____

_____

_____

_____

_____

_____

_____

Question 2 **(1 mark)**

State the type of authentication that uses physiological characteristics.

_____

Question 3 **(4 marks)**

The HP Pavilion All-in-One desktop personal computer has the following specifications:

> Intel® Core™ i5-8400T
> 8GB RAM
> 1TB HDD storage
> NVIDIA GeForce MX130 graphics (2GB GDDR5)
> FHD BrightView WLED-backlit touch screen (1920 x 1080)
> HP Truevision FHD IR camera with dual array digital microphone
> Wireless keyboard and mouse

Identify a hardware component from the above computer system designed for the following specific purpose:

Input _____

Output_____

Processing _____

Primary storage_____

See next page

Question 4 **(6 marks)**

Describe the function of the following components in the central processing unit (CPU).

Control unit _____

_____

_____

_____

Arithmetic logic unit (ALU) _____

_____

_____

_____

System clock _____

_____

_____

_____

Question 5 **(5 marks)**

Outline the steps of the boot process from power up to OS booting.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Question 6 **(3 marks)**

Use the image below to answer the following questions about spreadsheet functions.

	A	B	C	D	E	F	G
1	Name	State	Sales				
2	Claire	WA	$100.00			Result	
3	Simon	SA	$155.00		Sales under $100	2	
4	Philip	NSW	$250.00		Sales by Claire	3	
5	Claire	WA	$50.00		Sales in NSW	2	
6	Steve	SA	$125.00				
7	Claire	WA	$245.00				
8	Philip	NSW	$75.00				
9							
10		Total	$1,000.00				
11		Average	$142.86				
12							

State the formula that would be contained in the following cells:

C10 _____

C11 _____

F3 _____

Question 7 **(3 marks)**

Define the following database terms:

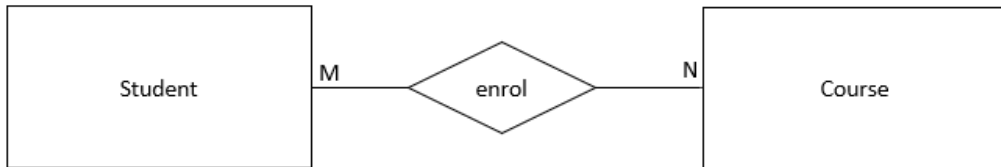Relation _____

_____

_____

Data integrity _____

_____

_____

Data redundancy_____

_____

_____

Question 8 **(6 marks)**

A problem exists in this entity relationship diagram (ERD). Illustrate how you would resolve this issue in the space below. Show only entities, relationships, cardinality, primary and foreign keys. No non-key attributes are required.

Question 9 **(6 marks)**

Describe the purpose of the following types of software and give an example for each.

Operating system _____

_____

_____

_____

Example: _____

Utility software _____

_____

_____

_____

Example: _____

Question 10 **(3 marks)**

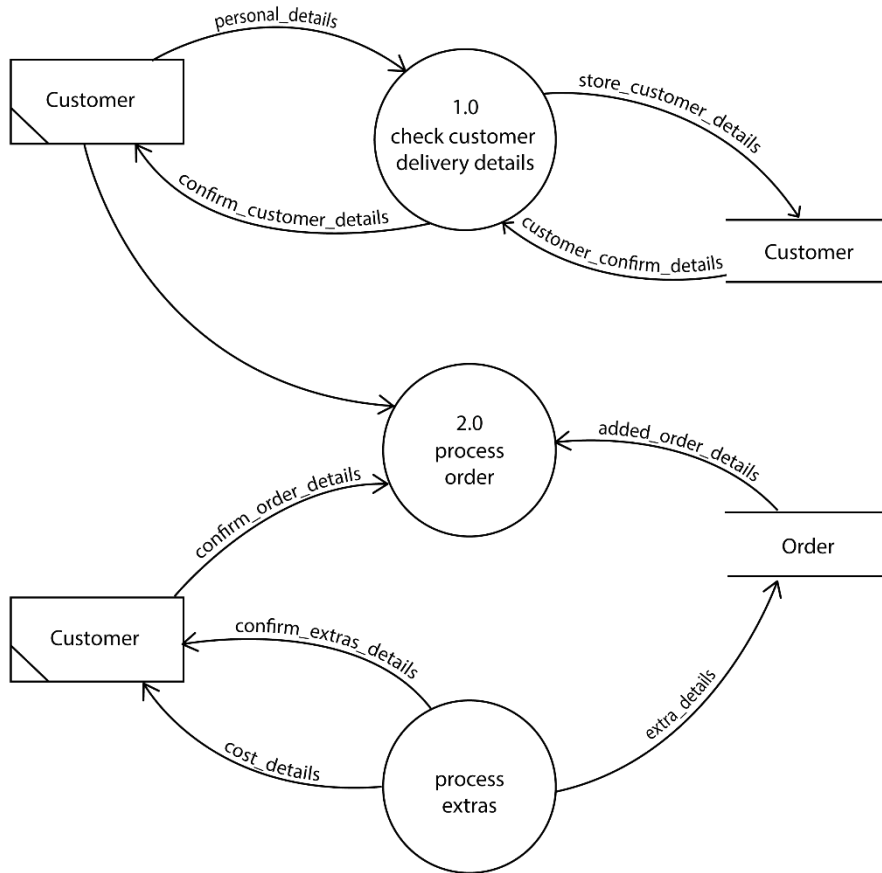Explain the difference between freeware and open source software licences.

_____

_____

_____

_____

_____

_____

_____

_____

_____

Question 11 (4 marks)

The Dataflow Diagram below has several errors. Outline **four** errors in the diagram.

One _____

_____

Two _____

_____

Three_____

_____

Four_____

_____

Question 12   **(1 mark)**

State **one** reason for appropriately naming a variable in your code.

_____

_____

Question 13   **(2 marks)**

Describe the reason a programmer would use a test first iteration over a test last iteration.

_____

_____

_____

Question 14   **(3 marks)**

a) Convert the following binary number to a decimal number.   (1 mark)

01101100 $_{Base\ 2}$ _____

_____

_____

b) Convert the following hexadecimal number to a decimal number.   (1 mark)

23B $_{Base\ 16}$ _____

_____

_____

c) Convert the following decimal number to a binary number.   (1 mark)

178 $_{Base\ 10}$ _____

_____

_____

Question 15 **(6 marks)**

Describe the function of the following network components:

Router _____

_____

_____

_____

_____

Switch _____

_____

_____

_____

_____

Modem _____

_____

_____

_____

_____

Question 16 **(6 marks)**

Describe the following transmission media and give an advantage for its use.

Wireless_____

_____

_____

Advantage _____

_____

_____

Fibre Optic_____

_____

_____

Advantage _____

_____

_____

Question 17 **(2 marks)**

Ethernet has become the most popular and widely deployed Local Area Network (LAN) technology in the world. State **two** reasons for this.

One _____

_____

Two _____

_____

Question 18 **(6 marks)**

Expand the acronym and describe the purpose of the following types of communication protocols.

The first one has been done for you.

HTTP: *Hypertext Transfer Protocol*

Purpose: *HTTP protocol specifies how client's request data will be constructed and sent to the server and how the server respond to these requests.*

FTP_____

Purpose _____

_____

SMTP _____

Purpose _____

_____

Question 19 **(2 marks)**

a) State **one** ethical responsibility of software developers. (1 mark)

_____

_____

_____

b) State **one** ethical responsibility of software users. (1 mark)

_____

_____

_____

Question 20   **(7 marks)**

Use the image below to answer all parts of this question about databases.

pet_id	pet_name	pet_birth_date	pet_type	pet_breed	vac_date	microchip	worm_date	owner_id
1	Bowie	Sunday, 17 February 2019	Dog	Border Collie	06-Mar-19	☑	06-Mar-19	235
2	Felix	Wednesday, 12 July 2017	Cat	Russian Blue	13-May-19	☐		462
3	Disco	Friday, 7 June 2002	Dog	Jack Russell	01-Nov-18	☑	30-Dec-17	235
4	Mews	Wednesday, 17 October 2018	Cat	Arabian Mau	18-Dec-18	☑	18-Dec-18	156
5	D'Artagnan	Wednesday, 13 June 2018	Reptile	Painted Turtle		☐		157
6	Joe	Saturday, 24 September 2022	Dog	British Bulldog	15-May-19	☑	15-May-19	344
(New)						☐		0

a) Identify which data type you would use for the following: (3 marks)

pet_id _____

pet_type _____

microchip _____

b) In the pet_birth_date field an obvious data entry error has been made. Identify the
   error.   (1 marks)

_____

_____

c) State a validation rule that could be used to avoid this issue.   (1 marks)

_____

_____

d) The Central Vet Clinic would like to develop some software to manage pet bookings.
   State **two** factors affecting the development of software.   (2 marks)

One _____

_____

Two _____

_____

END OF SECTION ONE

See next page

Section Two: Extended Answer 60% (116 Marks)

This section has **four (4)** questions. Answer all questions. Write your answers in the spaces provided.

Supplementary pages for the use of planning/continuing your answer to a question have been provided at the end of this Question/Answer booklet. If you use these pages to continue an answer, indicate at the original answer where the answer is continued, i.e. give the page number.

Suggested working time: 110 minutes.

_____

Question 21 (36 marks)

Refer to the Source booklet to answer this question.

a) The Central Vet Clinic have begun planning their new system. A system analyst suggested they use the system development life cycle (SDLC) as a development methodology. Identify the first **two** stages of the SDLC and describe what happens in each stage. (6 marks)

First Stage _____

Description _____

_____

_____

_____

Second Stage_____

Description _____

_____

_____

_____

b) A project manager discussed the concepts of planning, scheduling, budgeting and tracking. Describe why it is important to track a project's progress. (2 marks)

_____

_____

_____

_____

_____

c) Use the source booklet to complete the unfinished Context Diagram for the Central Vet Clinic appointment system below. (11 Marks)
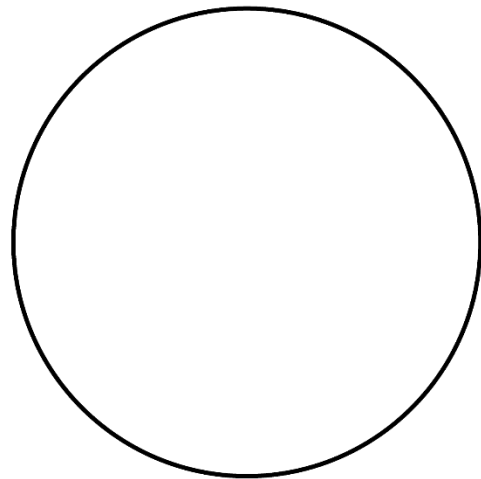
d) Use the source booklet to create the Level 0 Data Flow Diagram (DFD) for the system
    below.   (17 Marks)
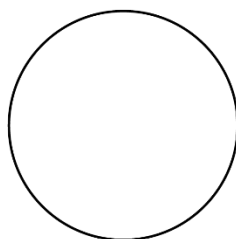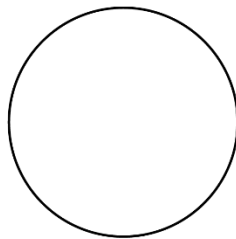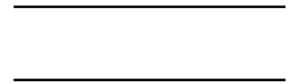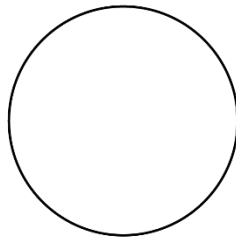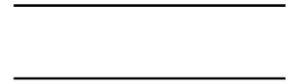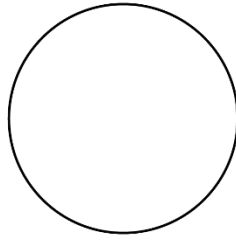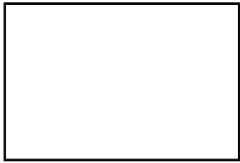
Use the source booklet to **answer the following question** for the Central Vet Clinic.

Question 22 **(15 marks)**

a) Complete the Entity Relationship (ER) Diagram for this database in the area below using Chen's notation. Ensure you resolve all many to many relationships. Include Primary keys, Foreign keys, cardinality and relationships. You do not need to include non-key fields. (14 marks)

b) State **one** benefit of using a relational database to store The Central Vet Clinic's data.

(1 mark)

_____

_____

_____

Question 23 **(39 marks)**

When animals arrive at the Central Vet Clinic for their appointment, they are weighed so that the Vet knows dosage for medication. Unfortunately, the software the clinic is using is from overseas and only allows staff to input weights using pounds and not kilograms.

The clinic has asked that you create an algorithm which will provide a conversion from kilograms to pounds so that they can enter the weight in pounds into the system. The formula to convert from kilograms to pounds is:

Weight(pounds) = weight(kilograms) * 2.20462262185

Hint: the international standard symbol for pounds is lb

a) Use pseudocode to design an algorithm to convert the pet weight measured in kilograms to a pet weight in pounds.

Your algorithm should: (9 marks)

- input the appointment reference number (appointmentRefNum)
- input the pet's name (petName)
- input the pet weight in kg (petWeightKg)
- check to ensure the weight is a valid number (above 0kg and less than 200kg)
- output an error message if an invalid number is entered
- convert the pet weight to pounds (petWeightLb)
- output the appointment reference number and the pet weight in pounds (eg. Fido weighs 250lb)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____
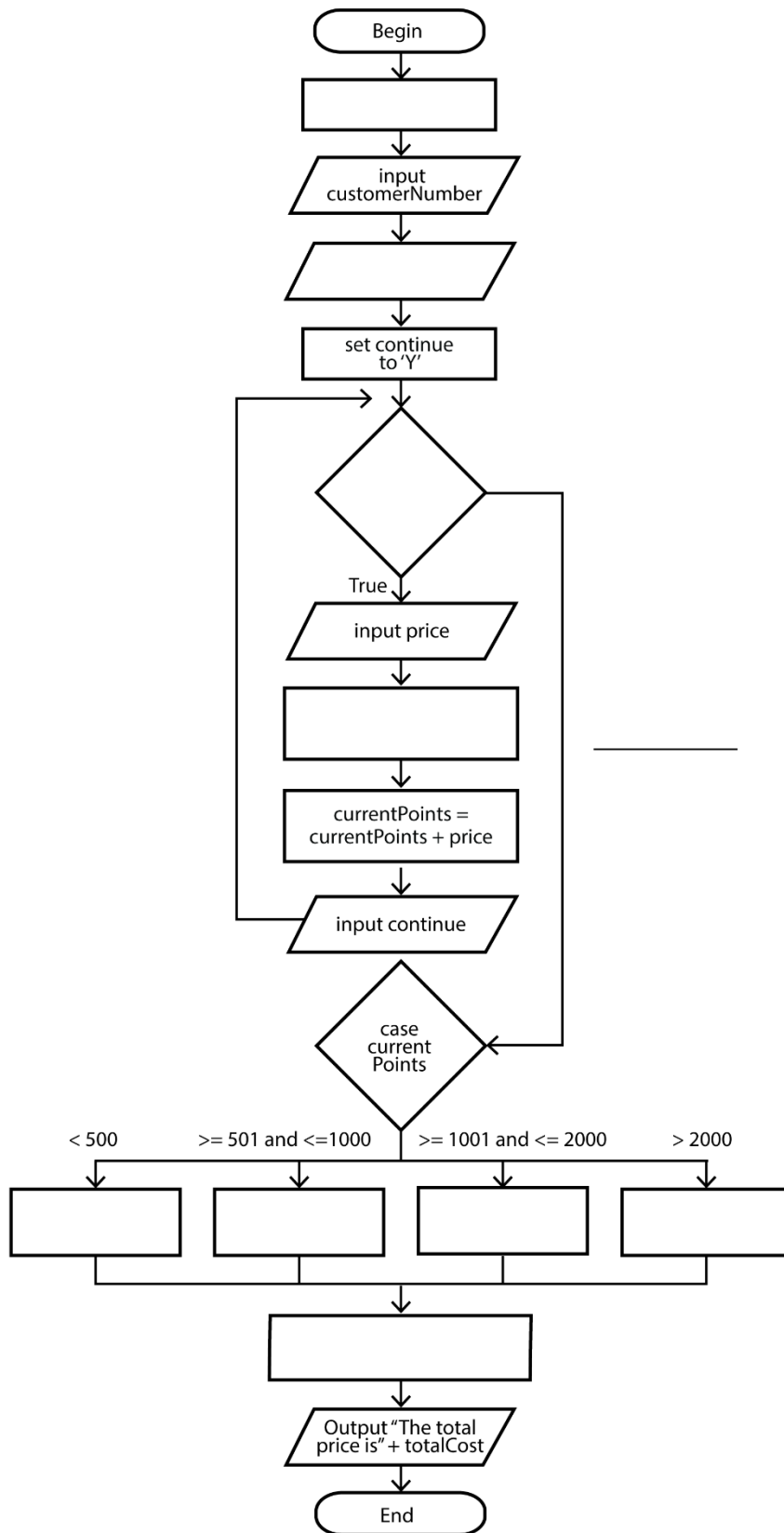
Use the source booklet to **answer the following question** for the Central Vet Clinic.

b) Complete the following flowchart using the algorithm on page 3 of the source booklet. (10 marks)

Use the source booklet to **answer the following question** for the Central Vet Clinic.

c) Use the algorithm on page 3 of the source booklet together with the data in the table below to complete the trace table below. Part of the trace table has been completed for you. (13 marks)

Customer Number	Current Points	Appointment details	Price
2822	150	Sterilisation Worming	360 40

Line No	total Price	customer Number	current Points	continue	Continue = 'Y'	price	discount	Total Cost	Output
1	0								
2		2822							
3			150						
4				Y					
5					TRUE				

See next page

d) The Central Vet Clinic don't understand the purpose of internal documentation. Describe this term and suggest who might use it. (3 marks)

Purpose _____

_____

_____

_____

_____

_____

User _____

e) When testing some code at The Central Vet Clinic, it returned a run-time error. State **one** cause of such and error. (1 marks)

_____

_____

_____

f) A system analyst suggested the Vet Clinic's new system should be developed using an object-oriented programming language.

   i. Identify **one** object-oriented language. (1 marks)

   _____

   ii. State **two** benefits for using an object-oriented language. (2 marks)

   _____

   _____

   _____

   _____

   _____

   _____

See next page

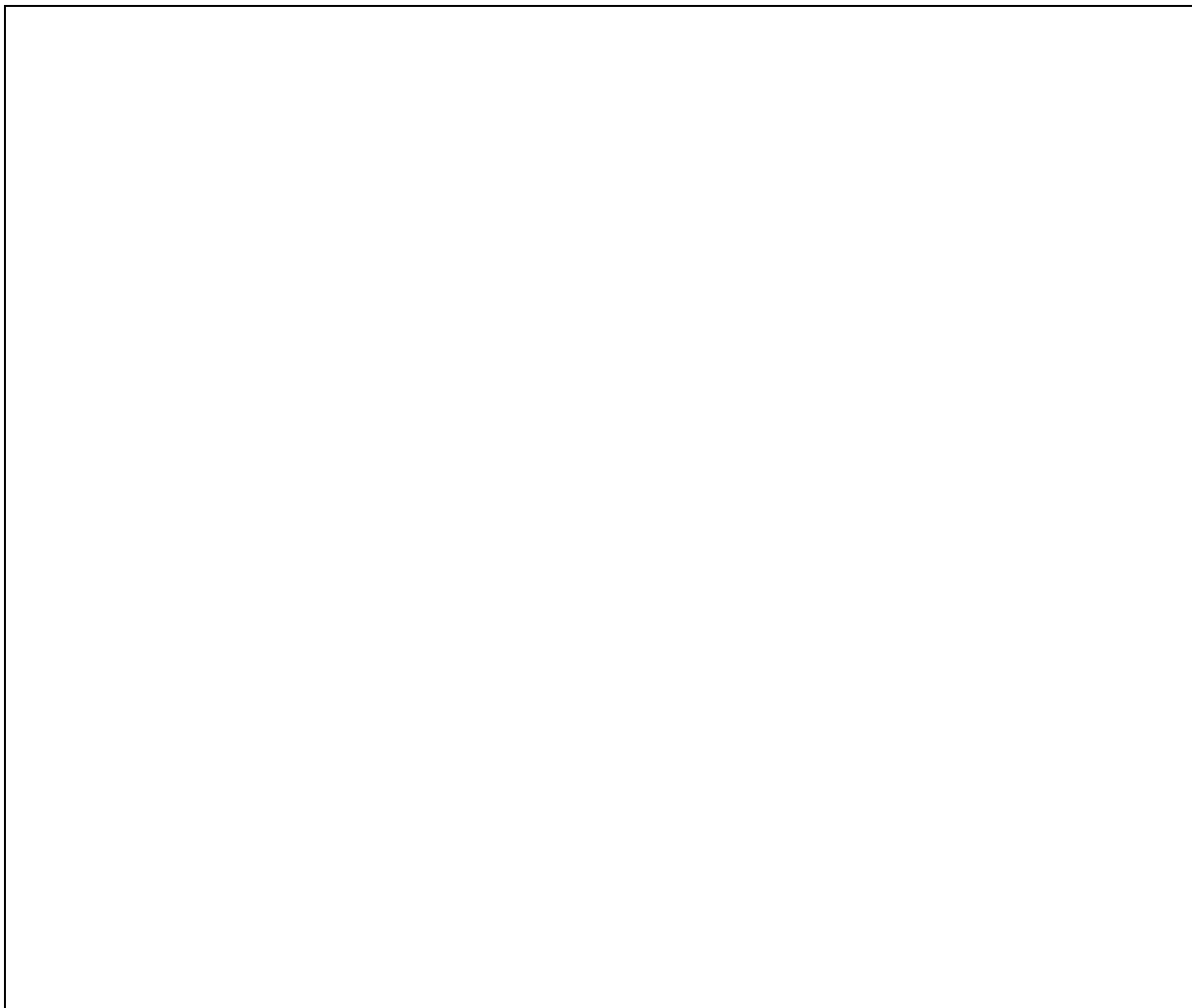Use the source booklet to **answer the following question** for the Central Vet Clinic.

Question 24 **(26 marks)**

The Central Vet Clinic have access to the internet and are upgrading their network to include the ability for the staff to enter appointment details about the pets on mobile tablet devices.

They have the following hardware network components:

- Firewall
- Router
- Modem
- Switch
- Wireless access point

- Wired network printer
- Network attached storage
- Desktop computer
- 4 x Tablet devices

a) Use the space below to create a network diagram for The Central Vet Clinic.

(10 marks)

b) State the network topology have you illustrated in question 24(a). (1 marks)

_____

c) The Central Vet Clinic has always struggled to get internet signal in the Kennel Room at the back of the block. The Kennel Room is approximately 45 metres away from the Office. Suggest which transfer media would be most appropriate and state two reasons to justify your answer. (3 marks)

Selected media _____

Reason one _____

_____

_____

Reason two _____

_____

_____

d) The Central Vet Clinic's internet service provider suggested that they should typically be getting a minimum bandwidth of 30 Mbps for their broadband internet service.

Define the following terms expanding all acronyms: (4 marks)

Bandwidth_____

_____

_____

Mbps _____

_____

_____

See next page

e)   The Central Vet Clinic are concerned about the security of their client's data especially as they have an internet connection.

Recommend **two** methods they can use to ensure the security of information over the internet.   (2 marks)

One _____

_____

_____

Two _____

_____

_____

f)   The Central Vet Clinic stated that all "malware is the same". Help educate them by distinguishing the main characteristic of the following malware and suggest a protection method to prevent infection.   (6 marks)

Worms_____

_____

_____

Protection method _____

Trojans_____

_____

_____

Protection method _____

Spyware_____

_____

_____

Protection method _____

END OF EXAMINATION

See next page

END OF EXAMINATION
Spare lined paper for long answers or corrections

See next page

See next page

End of paper