GCE A2

Applied Information and Communication Technology

Summer 2009

Mark Schemes

Issued: October 2009

MARK SCHEMES (2009)

Foreword

Introduction

Mark Schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of 16- and 18-year-old students in schools and colleges. The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes therefore are regarded as a part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

The Council hopes that the mark schemes will be viewed and used in a constructive way as a further support to the teaching and learning processes.

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Unit 7: Investigating Systems

[A6J11]

FRIDAY 15 MAY, MORNING

MARK SCHEME

1

Cancellations are difficult to process.	✓
Customers will always be pleased with their treatments.	
A lot of data needs to be recorded and updated.	✓
Therapists will be able to work quicker.	
The business premises will be kept tidier.	
Janet Legg needs to be able to produce management information.	✓
TIP TOP TOES does not open on Saturdays.	
Foot care products are frequently out of stock.	✓
Secretary wants to have a longer lunch break.	
TIP TOP TOES needs to keep up with other similar businesses.	✓

Five ticks only to be entered as shown above.

[1] for each correct tick. [5] 5

2

Systems analysis experience	✓
Web development skills	
Maintenance experience	
Project management skills	✓
Business administration awareness	✓
Beauty therapy skills	

Three ticks to be entered as shown above.

[1] for each tick. [3] 3

3	**(a)**	DSDM – [1]. Only answer acceptable	[1]	
	(b)	Any **two** from – • Focuses on business needs • Actively includes the user • Rework is built into the process • Iterative delivery • Categorises requirements – Must have, should have, could have, won't have this time • Responsive to changing requirements • Integrated testing throughout project. [1] for any **two** of the above reasons or any suitable alternative.	[2]	3

If SSADM is chosen in part (a)
accept valid reasons for SSADM

- Very structured with structured tools
- Well documented
- Formal deliverables
- Linear model
- Covers full development cycle
- Presented exit criteria

[1] for any **two** of the above reasons or any suitable alternative.

4

Therapists	✓
Suppliers	
Clients	
Cleaners	
Janet	✓
Secretary	✓

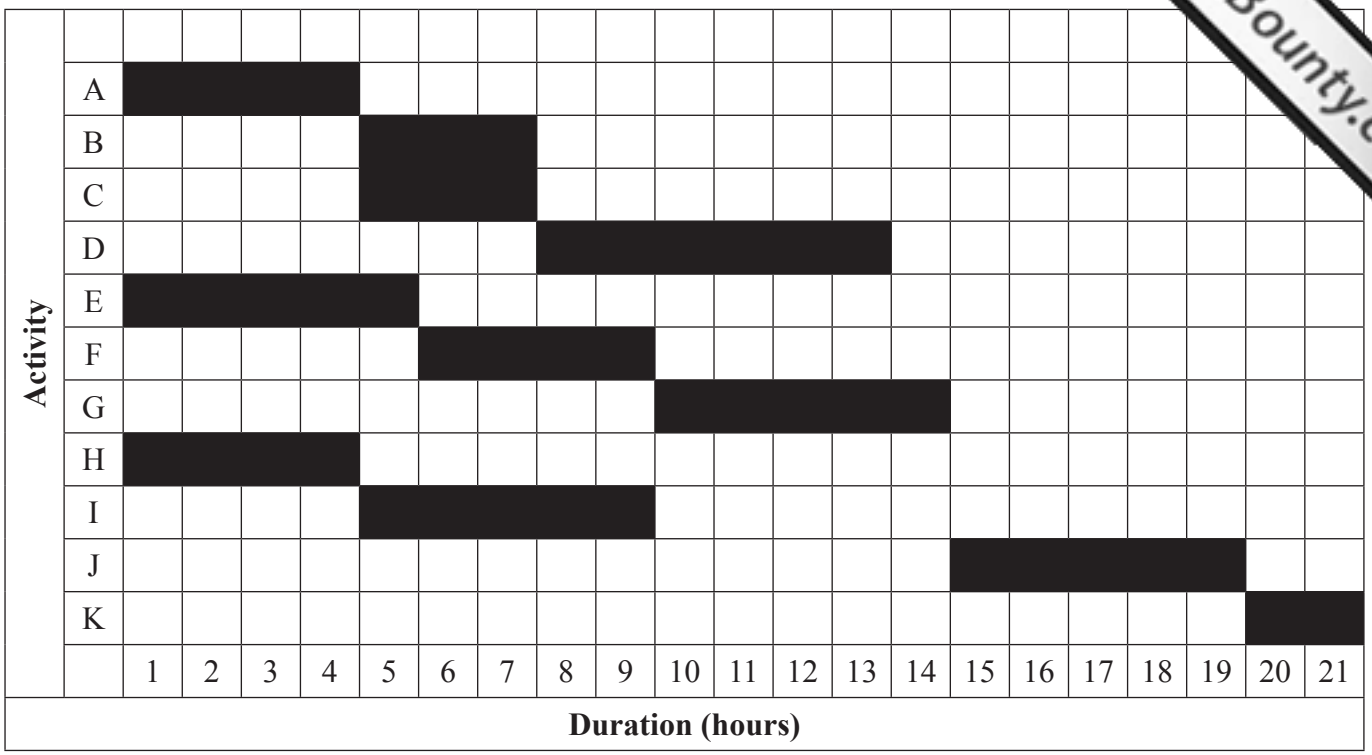
Three ticks to be entered as shown above.

[1] for each tick. [3]

Fact Finding Technique	Information	Obtained from
Observation	Monthly stock taking is very time consuming.	TIP TOP TOES premises
Reading around the system	Writing can be difficult to read on the appointment books.	Appointment books
Interview/observation	Secretary finds it difficult to record appointment details on multiple documents	Secretary
Questionnaire/interview	Treatments are very enjoyable.	Clients

[1] for each correct answer as shown above. [6] 9

5 (a)



[1] for each correctly placed activity. [11]

AVAILABLE MARKS

(b) 21 hours [1]

(c) Between activity I and J 10–14 (Activity I)

Or between D and J 14 (Activity D)

[1] for either of the above. [1] 13

6

	To be produced for	Content 1	Content 2
Feasibility Study	Janet Legg or manager of company	Operational Technical Economic	Budget
System Specification	Programmers	Algorithms Data models Screen designs Data dictionary	Hardware spec Data comms Test plan Output requirements
Technical Guide	Technician	Trouble shooting Hardware installation Backup routines	Security Maintenance HW & SW upgrades
User Guide	User or manager or Janet or therapists	Logging on Adding/updating/ deleting data	Running reports Logging off

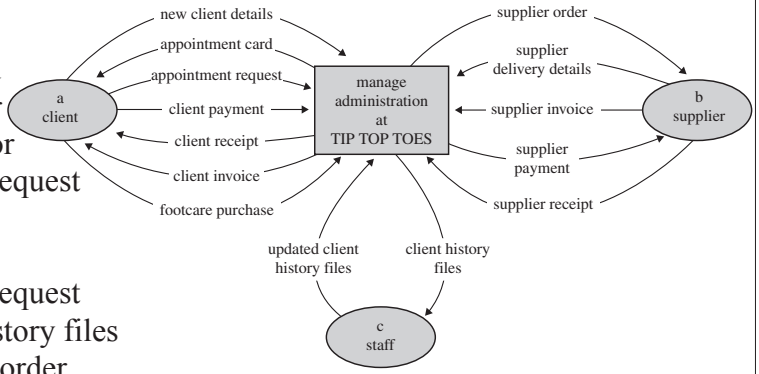
[1] for each correctly completed section in the above table. [12] 12

7 **(a)** Reasons for drawing a context diagram –

- Identify external entities
- Identify all data flows to and from the organisation
- Provide an overview of the main function
- Useful means of communication with users
- Provides a graphical representation of the system

[1] for any **two** answers from the above list or suitable alternative. [2]

(b) **(i)** a
(ii) appointment card
(iii) client payment or cancellation fee or cancellation fee request
(iv) client receipt
(v) client invoice or cancellation fee request
(vi) updated client history files
(vii) supplier order or order
(viii) supplier delivery details
(ix) supplier payment or payment
(x) b
(xi) supplier



[11] 13

N.B. Answers **(ii)**, **(iv)** and **(v)** are interchangeable and answers **(vii)** and **(ix)** are interchangeable.

8 (a)

	Field Name	CLIENT	STAFF	APPOINTMENT	TREATMENT
	Client Number	✗		✗	
[2]	Client Name	✗			
[1]	Client Telephone	✗			
[1]	Client DOB	✗			
[1]	Date			✗	
[1]	Time			✗	
[1]	Duration				✗
[1]	Staff ID		✗	✗	
[2]	Cost				✗
[1]	Payment Method			✗	

[1] Table completed as shown above.

Marks allocated for each row as shown in 1st column.
Lost [1] for an incorrect extra tick [12]

(b)
- Surname
- Forename
- Job Title
- Start Date
- National Insurance No
- Hourly Rate

[1] for each of **two** from the above list or suitable alternative. [2]

(c) A primary key uniquely identifies a record in a table. [1]

(d) Client Number [1]

(e) A foreign key exists to establish a relationship between tables. It will form the many end of the relationship. It will exist as a primary key in another table. [1]

17

9 **(a)** **(i)** Chris or systems analyst [1]

(ii) Jemima or programmer or **developer** [1]

(iii) User, Janet, Secretary, Therapist [1]

(b)

	Program Testing	**System Testing**	**Acceptance Testing**
Check that therapist cannot be double-booked.	✗		
Check user manual is correct.			✗
Check all printers are working correctly.		✗	
Check that all user requirements have been addressed.			✗
Check that appointment data is easily entered.			✗

[5]

(c)

Stock No	**Description**	**Supplier Code**	**Cost Price**	**Quantity in Stock**	**Test Result**
S-05	Peppermint Foot Cream	FR09	£175	7	**Reject**
09	Camomile Wax	FR09	£2.25	10	**Reject**
S-10	Exfoliator Scrub	TG87	£1.95	6	**Accept**
	Nail Clippers	TG87	£1.90	20	**Reject**
S-07	Verucca Gel	FY78	£3.10	9	**Accept**

Final column to be completed as shown above.

[1] for each correct answer. [5]

13

10 (a) Parallel changeover [1]

(b)

Parallel changeover enables very fast implementation.	**False**
Parallel changeover is an efficient way of testing the new system.	**True**
Pilot changeover is suitable for larger organisations with several departments or branches.	**True**
Phased changeover involves different parts of the system being introduced at different times.	**True**
Direct changeover can be very confusing for the users as they have to do things using the old method and the new method.	**False**

Table to be completed as shown above.

[1] for each correct answer. [5]

(c)
- Prototype can be used for training purposes
- High degree of user involvement from the start of the project
- Ensure user "buy-in" from early on.
- User will feel comfortable and familiar with the new system.
- Users will make suggestions, re: improvements

[1] for each of any **two** reasons from the above list or suitable alternative. [2] 8

11 (a)
- Call centre
- Help line
- On-line diagnostic help
- Bulletin board
- In-house expertise – technician
- Support contract

One mark for each of any **two** alternatives from the above list or suitable alternative. [2]

(b) [1] for suitable reason × 2 [2] 4

Total **100**

Rewarding Learning

ADVANCED
General Certificate of Education
2009

Applied Information and Communication Technology

Assessment Unit A2 13

assessing

Unit 13: Networking and Communications

[A6J71]

TUESDAY 19 MAY, AFTERNOON

MARK SCHEME

1

A STAR network is a network which is physically arranged in the shape of a star and where the **centre of the star connects to all other nodes**.
A RING network is a network which is logically connected in the shape of a ring and data passes from one node to the other using a **token**.
A BUS network is a network which is physically linear and has all nodes connected to a **common cable** with terminators attached to the ends of the cable.
A LAN is a network consisting of computers linked in a small **(local) geographical area**

1 mark for each correct answer = [1] × 4 = [4] 4

2

Cable	
Bridge	✓
Two computers	
Serial port	✓
Printer	✓
Broadband connection	✓

1 mark for each correct tick = [1] × 4 = [4] 4

3 A hub is a common connection point for devices in a network. Hubs were commonly used to connect **segments** in a LAN. A hub can contain multiple **ports**. When a **packet** arrives at one port, it is retransmitted to all other ports on the hub. The hub simply serves as a conduit for the **data**.

1 mark for each correct word = [1] × 4 = [4] 4

4

Block Cyclic Check (BCC)	✓
Acknowledge (ACK)	✓
Parity Check (PC)	
Start of Text (STX)	✓
Synchronise Timers (SYN)	✓
End of Broadcast (EOB)	

1 mark for each correct tick = [1] × 4 = [4] 4

5

Baseband	✓
Shared medium	✓
Carrier sense	✓
Broadband	
Multiple access	✓
Bluetooth	

1 mark for each correct tick = [1] × 4 = [4] — 4

6 SWITCH

- Filters and forwards packets between LAN segments
- Transmits to a specific port rather than to all ports
- Can carry out multiple transfers at full speed
- Can connect devices at different speeds
- 'Port trunking' – increase bandwidth for a specific port(s) e.g. connected to a file server
- Operates at data link layer (2) (and sometimes at level 3)

1 mark for each correct feature + description = [1] × 3 + 1 × [3] = [6] — 6

7

It sets up the serial port to receive data transmissions	
It controls the printer drivers used in the network	
It is a protocol for assigning or supplying IP addresses	✓
It simplifies network administration	✓
It supports a mix of static and supplied IP addressing	✓
It helps set up Instant Messaging	
It can assign router or gateway addresses	✓

1 mark for each correct tick = [1] × 4 = [4] — 4

8

4.	is a unique identifier attached to most forms of networking equipment.
6.	is a discovery protocol used to find out about MAC addresses.
2.	is used to determine the host section of a network.
1.	allows the management of network traffic to become easier and more practical.
3.	is a protocol used on the Internet.
5.	can pass through many routers on its way from source to destination.

1 mark for each correct = [1] × 6 = [6] 6

9

A firewall is a security feature that prevents an internal network being entered by unauthorised user(s).	**TRUE**
Wireless networking can use a type of security known as WEP.	**TRUE**
A file server is a dedicated piece of hardware that handles all software updates.	**FALSE**
A software engineer's main task is to set up users' access rights and permissions.	**FALSE**
DNS is a system that translates domain names into IP addresses.	**TRUE**
Denial of Service (DoS) is a type of computer virus.	**FALSE**

1 mark for each correct answer = [1] × 6 = [6] 6

10 Video conferencing uses a computer, video camera, **microphone** and a network such as the **Internet** to conduct a live conference between two or more people. A two person video conference is known as **point-to-point**, while more than two involved in a session is known as **multipoint**. It may use **ISDN** as a connection tool.

1 mark for each correct answer = [1] × 5 = [5] — 5

11

It uses radio to transmit data.	✓
It is more secure than wired systems.	
It uses the same network card as found in non wireless systems.	
It can be subject to war-driving.	✓
It can be used in locations having 'hotspots'.	✓
It needs an antenna to function.	✓
It may be subject to interference from devices operating at the same frequency.	✓

1 mark for each correct tick = [1] × 5 = [5] — 5

12 e-mail

Any reasonable answer from the following list or other:

Attachments, cc, bcc, recipient list, cost effective

1 mark for each correct business feature identified = [1] × 2 = [2]
2 marks for explanation × 2 = [2] × 2 = [4] — 6

13 ACCEPTABLE USE POLICY

- The role and responsibilities of the Board of Directors, senior managers, staff and others in relation to use of the Internet
- Information about how the Internet will be made accessible to all, regardless of age, race, gender, religion, background or disability
- A statement about whether or not the Internet (and e-mail) can be used for personal reasons (some institutions may allow limited use for these purposes, particularly for staff) and prohibiting use for commercial reasons
- A statement requiring all users not to access unsuitable material (such as defamatory, obscene, offensive, or indecent material)
- A request that unsuitable material is not created, transmitted or stored anywhere at the institution
- Information about the Computer Misuse Act 1990
- Information about the security provided by the ISP
- A reminder about copyright and the disciplinary procedure for any breach or act of plagiarism
- Notification that all material obtained via the Internet will automatically be checked for viruses
- A statement that computer equipment at the institution should not be used for accessing other computers or networks illegally or without permission
- A statement to inform users that they should not reveal any passwords or other security measures to others
- A statement about the penalties that will be incurred if this policy is infringed, such as withdrawal of access rights.

Any 3 correct named items = [1] × 3 = [3]
+ 3 correct explanations × [1] = [3] 6

14 CLIENT SERVER NETWORK

In a client server network the **client** is an individual user's computer or application that does a certain amount of processing on its own. The **server** consists of one or more computers that receives and processes requests. In a small organisation a single server machine may have more than one **function**. A computer used to authenticate access and log-in to the computer system itself is called a primary **domain** controller. Client server architecture combines the best concepts in **centralised** robust infrastructure. If implemented properly this architecture achieves the best balance between complexity, **cost** and ease of use with excellent scalability and **reliability**. The client server **environment** is a system with advantages such as **security** and **performance**. [10] 10

15 Computer virus

- Attaches itself to a program or file so it can spread from one computer to another, leaving infections as it travels.
- Much like human viruses, computer viruses can range in severity; some viruses cause only mildly annoying effects while others can damage hardware, software, or files.
- Almost all viruses are attached to an executable file, which means the virus may exist on a computer but it cannot infect the computer unless one runs or opens the malicious program.
- It is important to note that a virus cannot be spread without a human action, (such as running an infected program) to keep it going.
- People continue the spread of a computer virus, mostly unknowingly, by sharing infecting files or sending e-mails with viruses as attachments in the e-mail.

Trojan horse

- A destructive program that masquerades as a benign application.
- Unlike viruses, Trojan horses do not replicate themselves but they can be just as destructive.
- One of the most insidious types of Trojan horse is a program that claims to rid a computer of viruses but instead introduces viruses onto the computer.
- Also known to create a backdoor on the computer that gives malicious users access to a system, possibly allowing confidential or personal information to be compromised.

Worm

- **A worm** is similar to a virus by its design, and is considered to be a sub-class of a virus.
- Worms spread from computer to computer, but unlike a virus, it has the ability to travel without requiring a host (e.g. a floppy disk, e-mail attachment).
- A worm takes advantage of file or information transport features on a system, which allows it to travel unaided.
- The biggest danger with a worm is its ability to replicate itself on a system, so rather than a computer sending out a single worm, it could send out hundreds or thousands of copies of itself, creating a huge devastating effect.
- One example would be for a worm to send a copy of itself to everyone listed in an e-mail address book.
- Then, the worm replicates and sends itself out to everyone listed in each of the receiver's address book, and this continues on down the line.
- Due to the copying nature of a worm and its ability to travel across networks the end result in most cases is that the worm consumes too much system memory (or network bandwidth), causing Web servers, network servers, and individual computers to stop responding.
- Worm attacks (such as the Blaster Worm) have been designed to tunnel into systems and allow malicious users to control a user's computer remotely.

A Denial of Service attack

- It is an attack characterised by an explicit attempt to prevent legitimate users of a network service from using that service.
- The most common method is to flood a network with useless traffic, overloading the network's capacity.
- DoS techniques include disruption of the connection between two machines and malicious alteration of server configuration.
- Many variants exploit limitations in the TCP/IP protocols.
- Most routers have configuration table rules that won't allow millions of requests from the same sending address. If this happens the router merely discards them without forwarding them.
- However, with DoS, programs were such that they attached a different false IP address on each packet and thus were able to bypass the routers' security. Thus when the 'packet floods' were triggered, millions of requests for information hit the intended target.
- The routers serving the servers were unable to handle this flood and legitimate traffic couldn't get through.
- A DoS attack is not a virus.

3 marks for each correct description × 4 = [12] 12

16

PSDN is a	**data communication network that is based on the principles of packet switching as opposed to circuit switching**
ISDN or broadband or Ethernet or internet	is used as a communication medium especially used in video conferencing
Broadband transmission is a data transmission medium which can	**carry several channels at once OR can be used for large and quick data transmission OR low cost data transmission OR always on service**
Bandwidth is a measure of the	**capacity of a communications channel.**
A proxy server is	**a machine that sits between your computer and a Web server whose pages you are accessing.**
A domain name OR A host name OR URL	is the text name corresponding to the numeric IP address of a computer on the Internet.
IP is	**a packet based protocol used for delivering data across networks or numeric address**
Domain Name System (DNS)	is the system which translates URL domain names into IP addresses.

1 mark for each correct answer (or suitable alternative) = [1] × 8 = [8] — 8

17 VPN (Virtual Private Networks) usually refers to a network in which some of the parts are connected using the **public** Internet, but the data sent across the Internet is **encrypted**, so the entire network is virtually private. It is a way to communicate through a **dedicated** server securely to a corporate network over the Internet. There will be general access to the **Internet** rather than leased lines for connections. Security can be guaranteed by the use of **tunnelling** in which the entire information **packet** is encapsulated.

1 mark for each correct answer = [1] × 6 = [6] — 6

TOTAL — **100**