

Unit 3 – Mark scheme

Question number	Answer	Additional guidance	Mark
1(a)(i)	<p>Award one mark each for any of the following up to a maximum of two marks.</p> <ul style="list-style-type: none"> To ensure data is fit to be processed/in the correct format (1). To ensure input errors are identified (1). To ensure that any information extracted is reliable (1). <p>Accept any other appropriate response.</p>	Do not award 'correct' in relation to the data itself.	2

Question number	Answer	Additional guidance	Mark															
1(a)(ii)	<p>Award one mark for each correctly completed cell in the table up to a maximum of four marks.</p> <table border="1"> <thead> <tr> <th>Validation type</th> <th>Validation rule</th> <th></th> </tr> </thead> <tbody> <tr> <td>Length check</td> <td>The mobile number must be 11 digits long/ len (mobile_number) = 11.</td> <td>(1)</td> </tr> <tr> <td>Range check</td> <td>Duration must be a minimum of 3 to a maximum of 12/3 >= policy term <= 12.</td> <td>(1)</td> </tr> <tr> <td>Lookup check</td> <td>Type of insurance: buildings, contents, car, life, travel, pet insurance.</td> <td>(1)</td> </tr> <tr> <td>Presence check</td> <td>Name/email/mobile cannot be blank.</td> <td>(1)</td> </tr> </tbody> </table>	Validation type	Validation rule		Length check	The mobile number must be 11 digits long/ len (mobile_number) = 11.	(1)	Range check	Duration must be a minimum of 3 to a maximum of 12/3 >= policy term <= 12.	(1)	Lookup check	Type of insurance: buildings, contents, car, life, travel, pet insurance.	(1)	Presence check	Name/email/mobile cannot be blank.	(1)	Accept either description words or implementation detail.	4
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Question number	Indicative content	Mark
1(b)	<p>Candidates are not required to have working knowledge of the insurance industry but should apply their knowledge of CRM systems to the information provided in the scenario.</p> <ul style="list-style-type: none"> • Manage communication with customers to improve customer service (returning calls after complaints). • Upsell insurance products (all customers with car policies could be target marketed for a travel insurance promotion). • Customer retention (all customers whose household policies were up for renewal next month could be sent an offer of a price reduction, a free month, or a gift). • Identify overall sentiment about their customer service department (after each call with a customer service representative, the customer could be sent an email survey. The responses could be analysed to identify new customer services or ways to improve existing ones). • Identify buying trends (e.g. those over the age of 65 and living alone may be more likely to purchase pet insurance). • Synchronise marketing events (to ensure customers are not sent too much marketing material). 	6

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2	<ul style="list-style-type: none"> • Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a response that lacks development.
Level 2	3-4	<ul style="list-style-type: none"> • Demonstrates knowledge and understanding which is mostly relevant but may include some inaccuracies. • Applies understanding to make some coherent connections and a partially developed response.
Level 3	5-6	<ul style="list-style-type: none"> • Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a fully developed response.

Question number	Answer	Mark
2(a)	<p>Award one mark for each linked descriptive point up to a maximum of four marks.</p> <p>The Colombo factory encrypts the data (before sending to London) (1) using the public key (1). The London office will decrypt the data it receives (1) using the private key (1).</p>	4

Question number	Answer	Mark
2(b)(i)	<p>Award one mark for identifying the impact and one mark for justification/expansion up to a maximum of two marks.</p> <ul style="list-style-type: none"> • There will be greater free space on live storage (1) because the historical data has been moved to a different storage medium (1). • There will be delays accessing the historical/archived data (1) because it will have been moved to a slower storage medium (1). • The archiving requires additional storage media (1), which will incur financial costs/occupy physical space (1). 	2

Question number	Answer	Additional guidance	Mark
2(b)(ii)	<p>Award one mark for each linked descriptive point up to a maximum of two marks.</p> <ul style="list-style-type: none"> • A warm/parallel system/site, with appropriate hardware already installed and ready, could be maintained (1), which could be brought online with restored data (1). • A hot/mirrored system/site, with appropriate hardware already installed and ready, could be maintained (1) which could be brought online immediately (1). • A planned fund could be established for hardware/software to be purchased (1) so that a replica of the system can be created quickly (1). 	Do not accept responses indicating only backing up of data.	2

Question number	Indicative content	Mark
3(a)	<p>Advantages in context:</p> <ul style="list-style-type: none"> • could save lives caused by accidents • could save time by having practised exact procedures • could save harm to the environment by understanding how to handle chemical spills • system could be reused to train additional teams of emergency responders • emergency personnel could be better trained by experiencing unique situations challenging to reproduce in real life. <p>Disadvantages in context:</p> <ul style="list-style-type: none"> • might be expensive if the procedure was a one-off, not to be repeated • would be expensive/costly to buy the best/high-end virtual reality hands-free kit • would not simulate the full experience of being in a dangerous situation because of smells or touch • the emergency response personnel could experience bad side-effects such as dizziness or nausea during the training. 	6

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2	<ul style="list-style-type: none"> • Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a superficial and unbalanced discussion.
Level 2	3-4	<ul style="list-style-type: none"> • Demonstrates knowledge and understanding which is mostly relevant but may include some inaccuracies. • Applies understanding to make some coherent connections, leading to a discussion that shows some development, but may be unbalanced.
Level 3	5-6	<ul style="list-style-type: none"> • Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a balanced and fully developed discussion.

Question number	Answer	Mark
3(b)	<p>Award one mark for each correctly drawn part of the information flow diagram up to a maximum of twelve marks.</p> <ul style="list-style-type: none"> • identification of a smartphone app • identification of GPS • input to smartphone input of GPS location • identification of driver • parking information (car park, free spaces) sent to driver • multiple bays in a car park • light/pressure sensor collecting bay status • aggregator/monitor collecting status of all bays in a single car park • car park monitor sends information to city central • car park monitor sends car park ID and number of free spaces • telecoms sends parking information to parking processing • parking processing sends parking information to record keeping • parking processing sends accumulated information back to telecoms • telecoms sends accumulated data to smartphone app • fully functional solution that could work. <p>Marks can also be awarded for any additional functionality, such as payments, indicated on the diagram.</p> <pre> graph TD GPS[GPS] -- Location --> App[Smartphone Parking App] App -- "Car park ID Number free space (Near location)" --> Driver[Driver] LG12[Light Gate Parking Bay 12] -- "Bay number Status" --> SM[Status Monitor Car Park AA] LG36[Light Gate Parking Bay 36] -- "Bay number Status" --> SM SM -- "Car park ID Number free Timestamp" --> Telecoms[Telecoms] Telecoms -- "All car park IDs Number free at each park Timestamp" --> PP[Parking Processing] PP -- "Car park ID Number free Timestamp" --> RK[Record Keeping] RK -- "Car park ID Number free Timestamp" --> App </pre>	12

Question number	Indicative content	Mark
4(a)	<p>For each characteristic</p> <p>Incremental release</p> <ul style="list-style-type: none"> • The design team could create a design as quickly as possible. • They could then have the users of the room give feedback on the design. • They could then amend the design and show it to the users again. • This process could iterate several times until the design is correct and/or the timeframe is exhausted. <p>Detailed planning by each team</p> <ul style="list-style-type: none"> • The team calculating the cabling costs could plan two sprints. • They could deliver the costs for the electrical cabling in the first sprint and the costs for the network cabling in the second sprint. • The team could further break down the calculation task into subtasks such as measuring up, calling vendors, and making spreadsheets. <p>Verbal communications</p> <ul style="list-style-type: none"> • Face-to-face communications is the preferred method in agile developments. • Each day or two, the entire team will meet for a very short time (scrum), perhaps only 10 minutes, to discuss what has been accomplished and what is left to do. • These meeting may take place in larger groups of several teams and could include the users of the games room (stakeholders) as well. • The two teams installing the cabling and the benches could meet to avoid working in the same part of the room at the same time. 	6

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Level 3	5-6	<ul style="list-style-type: none"> • Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a fully developed response.

Question number	Answer	Additional guidance	Mark
4(b)(i)	Award one mark for each correct value up to a maximum of three marks. <ul style="list-style-type: none"> • $x = E(1)$ • $y = 3$ • $z = 9$. 	E must include duration.	3

Question number	Answer	Mark
4(b)(ii)	Award one mark for: A, B, C, H, K	1

Question number	Answer	Mark												
5(a)	<p>Award one mark for each correctly completed cell in the table up to a maximum of four marks.</p> <table border="1"> <thead> <tr> <th>Criteria</th> <th>How the objective meets the criteria</th> </tr> </thead> <tbody> <tr> <td>S</td> <td>The objective is specific, clearly defined and precise. It is clearly applicable to the delivery of cheese (1).</td> </tr> <tr> <td>M</td> <td>Delivery times can be easily monitored so are measurable (1).</td> </tr> <tr> <td>A</td> <td>Provided that cheeses, vehicles, and drivers are available, the objective is achievable (1).</td> </tr> <tr> <td>R</td> <td>Reliable delivery is relevant in maintaining good customer relationships (1).</td> </tr> <tr> <td>T</td> <td>Time-bound to one month (1).</td> </tr> </tbody> </table>	Criteria	How the objective meets the criteria	S	The objective is specific, clearly defined and precise. It is clearly applicable to the delivery of cheese (1).	M	Delivery times can be easily monitored so are measurable (1).	A	Provided that cheeses, vehicles, and drivers are available, the objective is achievable (1).	R	Reliable delivery is relevant in maintaining good customer relationships (1).	T	Time-bound to one month (1).	4
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5(b)	<ul style="list-style-type: none"> • A direct changeover is where the whole new system is installed into all the business at one time and the old system is removed. • A direct changeover of the control software caused the whole day's production to be lost. • A pilot changeover is where the new system is put into operation at a single location and tested to see if it works. • A pilot changeover would mean that only one cheese-making location would have failed on August 11th. • A phased changeover is where only part of the new system is installed at a time. • A phased changeover could work in the cheese factory if the cheese-making process was changed on one day, in one location, and the milking process changed on another day. • A parallel changeover is where both the old and the new systems run at the same time. • A parallel changeover would not work because the hardware cannot be controlled by two different software programs at the same time. 	6

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-4	<ul style="list-style-type: none"> • Demonstrates limited knowledge and understanding, some of which may be inaccurate. • Applies understanding with limited coherence to produce a response that lacks development. • Demonstrates limited awareness of competing arguments. Conclusion, if present, is generic or unsupported.
Level 2	5-8	<ul style="list-style-type: none"> • Demonstrates knowledge and understanding, which is mostly relevant and may include some inaccuracies. • Applies understanding to make some coherent connections and a partially developed response. • Demonstrates some awareness of competing arguments, but this may be unbalanced, and partially supports conclusion with evidence.

Level	Mark	Descriptor
Level 3	9-12	<ul style="list-style-type: none"> • Demonstrates accurate and relevant knowledge and understanding throughout. • Applies understanding coherently to produce a fully developed response. • Demonstrates an awareness of competing arguments and supports conclusion with evidence.

Question number	Indicative content	Mark
6	<p>(A) = advantage, (D) = disadvantage</p> <p>Volume</p> <ul style="list-style-type: none"> • (D) The water company will need to consider the merits of different available storage methods (local, cloud). • (D) It will need to develop policies for monitoring and archiving the large volumes of data. • (A) The large volume of data will support confidence in the analysis results (statistical significance). • (A) The large volume of historical data will provide a good foundation for business decisions (where to put new pumping stations). <p>Veracity</p> <ul style="list-style-type: none"> • (A) If the quality of the water drops on one of the pumps then action can be taken immediately to shut down the pump to ensure no ill effect on the consumer. • (D) Errors in employee records could lead to the water company failing to comply with legislation, such as taxation and reporting. • (D) The water company will have to consider methods for ensuring that data is reliable and trustworthy. • (A) Being able to trust the data could allow the water company to identify faults in the system confidently. <p>Velocity</p> <ul style="list-style-type: none"> • (D) The water company will have to consider if it has the processing capacity (machines, software) available to handle the speed at which the data arrives. • (D) Data arriving very quickly may mean having to purchase/procure/construct new machines/software/processes that are capable of working more quickly. • (A) By having data arrive quickly, the water company can respond immediately to system faults (redirect water, shut down pumps). 	12

Question number	Indicative content	Mark
6 Cont.	<p>Variety</p> <ul style="list-style-type: none"> • (D) Readings from sensors will need to be processed in a different way to the readings from the smart meters. • (D) The customer data will need to be processed in a different way to the employee data. • (A) The different varieties of data could be shared with other organisations (achieve common goals, monetary gain). <p>Analysis</p> <ul style="list-style-type: none"> • (A) The collected data could be analysed to derive insights (customer fraud, seasonal patterns in usage, patterns in pump breakdowns). • (A) The collected data could be analysed to provide a more customised service (water quality tests/pump efficiencies could be reported to consumers based on local area). <p>Security</p> <ul style="list-style-type: none"> • (D) By placing a smart meter in their customers' homes, the water company needs to consider the security of the device. • (D) The smart meter must be secured to a level which protects the device from being accessed by an unauthorised person. 	

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	0	No rewardable content.
Level 1	1-4	<p>Basic, independent points are made showing elements of knowledge and understanding of key facts/concepts/principles/issues of information technology.</p> <p>The discussion will contain basic information with little linkage between points made.</p>
Level 2	5-8	<p>Demonstrates adequate knowledge and understanding of key facts/concepts/principles/issues of information technology.</p> <p>The discussion shows some linkages and lines of reasoning with some structure.</p>

Level	Mark	Descriptor
Level 3	9-12	<p>Demonstrates comprehensive knowledge and understanding by selecting relevant knowledge and understanding of key facts/concepts/principles/issues of information technology to support the discussion being presented.</p> <p>The discussion shows a well-developed, sustained line of reasoning which is clear, coherent and logically structured.</p>

Question number	Answer	Additional guidance	Mark
7	<p>Award a maximum of ten marks for presenting a viable solution.</p> <ul style="list-style-type: none"> • Two tables identified by suitable names (1) for a maximum of (2). • Primary keys identified for two tables (1) for a maximum of (2). • Foreign keys identified (1) for a maximum of (3). • Additional fields provided in correct tables (1). • A functional solution demonstrating efficiency in terms of reducing data redundancy and reducing unnecessary storage requirements (1). • Use of notation across all tables (1). <p>CYCLIST_TABLE (<u>cyclistID</u>, cyclistLastName, cyclistFirstName, ...) BICYCLES_TABLE (<u>bicycleID</u>, bicycleLockCode, bicycleLocation, bicycleMaker, ...) SERVICE_TABLE (<u>serviceID</u>, bicycleID*, serviceDate, servicePerson, ...) BOOKING_TABLE (<u>bookingID</u>, cyclistID*, bicycleID*, bookingDate, bookingPrice, ...)</p>	<p>A solution using more tables and keys may be correct, but the maximum marks awardable are based on the simplest solution.</p> <p>Compound keys are awardable, if used correctly.</p> <p>Functionality needs to consider removing duplicated data across tables and removing unnecessary fields.</p>	10