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MARKSCHEME

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INFORMATION TECHNOLOGY IN A GLOBAL SOCIETY

Higher Level

Paper 3

11 pages

Examiners should be aware that in some cases, candidates may take a different approach, which if appropriate should be rewarded. If in doubt, check with your Team Leader.

If candidates answer more than the prescribed number of questions:

- In the case of an "identify" question read all answers and mark positively up to the maximum marks. Disregard incorrect answers.

- In the case of a "describe" question, which asks for a certain number of facts *eg* "describe two kinds", mark the **first two** correct answers. This could include two descriptions, one description and one identification, or two identifications.

- In the case of an "explain" question, which asks for a specified number of explanations *eg* "explain two reasons", mark the **first two** correct answers. This could include two full explanations, one explanation, one partial explanation *etc*.

1.   (a)   **If the main communication system used by *Red Dragon Taxi Company* between the control centre and the taxis fails, other means of communication need to be available.**

Identify *two* possible backup communication methods that could be used.   *[2 marks]*

Answers may include:
- mobile phone between control centre and driver. *Accept mobile phones as students may take the case scenario as being completed and use mobile phones as backup.*
- public / Citizens' Band two-way radio. *Do not accept radio by itself.* There needs to be an understanding of two way communication
- landline used by the driver to make contact with the control centre
- Private Mobile Radio (PMR) – used in data mode
- public GSM/ GPRS/3G/4G used in data mode. *However do not accept two items that use the same technology for example 3G and GPRS.*
- company social network pages
- company's mobile app (Using 3G/4G)
- SMS technology
- smartphone access through website/email/apps to access and send data.
- city wide WiMax. *Do not accept wireless alone.*

Do not accept pager or any other one-way communication tool.

No marks are allocated for identifying the main communications system, which is described in general terms in the case study.

*Award **[1 mark]** for each appropriate backup communication method identified up to a maximum of **[2 marks]**.*

(b) **State *two* items of information that could be displayed on the control centre map when a mouse is placed over a taxi icon on the system interface *(lines 51–54)*.** *[2 marks]*

Answers may include:
Car information:
- taxi number
- exact location
- distance from control centre
- direction of travel
- moving/stopped
- type of taxi – capacity, special features
- registration number
- fleet number
- is taxi available or in use?
- destination (if in use)
- length of time driving (this shift) for legal maximum reasons?
- estimated time to arrival destination
- traffic issues/problems near the taxi
- amount of petrol/gas in taxi
- a video feed / CCTV from the inside of the taxi
- current fare on meter.

Driver information:
- driver name
- start and ending times of shift
- driver number.
- male/female for customers who have preference *eg* ladies who feel safer with woman driver.

Trip information:
- being used for trip
- on way to pickup
- returning from drop-off
- available for a pickup to be allocated
- number of passengers
- current destination
- time started trip
- distance to nearest customer.

Items must be relevant to the use of the control centre dispatcher.

Award [1 mark] for each appropriate item of information stated up to a maximum of [2 marks].

2.   **The new data management system will collect large amounts of data about journeys, drivers, passenger movements, bookings and taxi performance and maintenance. Explain *three* ways this data can be used by *Red Dragon Taxi Company* to improve the operations of the company.**   *[6 marks]*

The term "operations" is to be understood in a broad way and covers the efficiency and effectiveness of the internal operations of the company. It also covers the performance of the company in satisfying and attracting customers.

Answers may include improvements from this list of possibilities:
- saving fuel
- number and types of taxis needed at various times
- optimization of allocation of taxis
- optimization for common routes
- improved schedule for maintenance of taxis
- economy of scale in purchasing spare parts
- future choice of vehicles
- organizing regular passenger trips
- use Business Intelligence software to analyse driver/car data
- rewarding most efficient drivers based on number of trips per day, times for trips, *etc*
- reducing times spent with taxis idle
- providing advertising to customers
- special offers to customers
- addressing special needs of customers
- determining where and when it is best to pick up passengers from the side of the streets, airport, stations, *etc*
- accident reduction
- analysing the growth and change in the use of taxis to plan future strategies
- determining key performance indicators to evaluate drivers and dispatchers
- analysis of problems with pickups and trip times
- organising drivers to be "based" in areas that they are more familiar with
- where are customers coming from? Regional patterns
- destination patterns
- add more staff (operators) to work on telephone lines when it is seen many bookings are coming in by phone.

*Award **[1 mark]** for the first three improvements identified up to a maximum of **[3 marks]**. For each of these, award an additional **[1 mark]** for an explanation of how it will improve the operation of the company up to a maximum of **[6 marks]**.*

3.   *Red Dragon Taxi Company* **is investigating the suitability of different companies to provide a reliable new communication and booking management system. With reference to your research, discuss what criteria could be used to evaluate the various providers and their proposed solutions.**   *[8 marks]*

Answers may include reference to the following:
- cost – initial and ongoing
- maintenance agreement – costs, parts covered, time to fix guarantees, upgrades
- warranties/guarantees
- scalability
- TCO – total cost of ownership
- range and quality of components that are supplied – choices for hardware and software features
- disaster recovery and backup setup
- system setup in-house or outsourced
- SLA Service level agreement, *eg* time guaranteed to be "up", response times *etc*
- legal reasons (ownership of product, modifications in future)
- data security of solution, and location / hosting of data if cloud based
- implementation of standards and protocols
- future plans, product roadmap, white papers *etc*
- availability of starting time
- length of implementation
- flexibility of implementation
- changeover methodology available – direct, parallel, phase-in, pilot
- testing and quality control of system and implementation
- setup and transfer of existing data
- training and support provided during implementation
- ongoing support
- documentation provided
- requirements/specifications fulfillment
- expertise of staff
- size of company
- references from other customers
- number and type of previous customers
- geographic location.

If the student has focused on the requirements/criteria for the system instead of the provider, a maximum of *[3 marks]* *is awarded as long as the student has not simply reused information from the case study but showed analysis with new content.*

In this question it is expected there will be a balance in the ITGS terminology between IT technical terminology and the terminology related to social and ethical impacts.

SL and HL paper 1 part (c) and HL paper 3 question 3 markband

Marks	Level descriptor
No marks	• *A response with no knowledge or understanding of the relevant ITGS issues and concepts.* • *A response that includes no appropriate ITGS terminology.*
Basic **1–2 marks**	• *A response with minimal knowledge and understanding of the relevant ITGS issues and concepts.* • *A response that includes minimal use of appropriate ITGS terminology.* • *A response that has no evidence of judgments and/or conclusions.* • *No reference is made to the scenario in the stimulus material in the response.* • *The response may be no more than a list.*
Adequate **3–4 marks**	• *A descriptive response with limited knowledge and/or understanding of the relevant ITGS issues and/or concepts.* • *A response that includes limited use of appropriate ITGS terminology.* • *A response that has evidence of conclusions and/or judgments that are no more than unsubstantiated statements. The analysis underpinning them may also be partial or unbalanced.* • *Implicit references are made to the scenario in the stimulus material in the response.*
Competent **5–6 marks**	• *A response with knowledge and understanding of the relevant ITGS issues and/or concepts.* • *A response that uses ITGS terminology appropriately in places.* • *A response that includes conclusions and/or judgments that have limited support and are underpinned by a balanced analysis.* • *Explicit references to the scenario in the stimulus material are made at places in the response.*
Proficient **7–8 marks**	• *A response with a detailed knowledge and understanding of the relevant ITGS issues and/or concepts.* • *A response that uses ITGS terminology appropriately throughout.* • *A response that includes conclusions and/or judgments that are well supported and underpinned by a balanced analysis.* • *Explicit references are made appropriately to the scenario in the stimulus material throughout the response.*

4. **Red Dragon Taxi Company** **requires that all taxis under their control are fitted with location and activity monitoring systems. This decision has divided the opinion of the drivers. With reference to the different monitoring systems that you have studied, evaluate this decision.**   *[12 marks]*

*It should be recognized that, given time constraints, answers **are likely to include a much** narrower range of issues and concepts than identified below.   There is no "correct" answer.*

*Examiners **must** be prepared to award full marks to answers which synthesize and evaluate even if they do not examine all the stimulus materials.*

The discussion should lead to conclusions about future strategies for *Red Dragon Taxi Company* with regard to the installation and use of a variety of monitoring systems.

A range of monitoring systems from the candidate's own research that could be installed by *Red Dragon Taxi Company* should be described covering both location and activity monitoring.

The answer should refer to the ideas stated below, but may not address all.

Description of a variety of location and activity monitoring systems:
*   video recording
*   voice recording
*   GPS location
*   speed and activity of car
*   operation and control of systems
*   transmission and storage of data.

Data collection:
*   uses of data by *Red Dragon Taxi Company* – in real-time and recorded
*   access to data by employees
*   length of time kept
*   disposal of data
*   storage and location of data from previous days
*   security of data
*   access to data by drivers.
*   webserver logs / website usage statistics
*   usage data collected by mobile phone apps.

Question 4 continued

Other applicable items:
- education and training of control centre staff and drivers
  - about using the systems
  - about the purposes of the systems
- application of privacy laws and principles
- use by outside organizations and authorities
- ethical issues linked to surveillance, employee monitoring
- policies by the company about employee use
- data access policies and user agreements with customers
- legislations of the local country.

Impacts arising from use of the data:
- positive impacts for *Red Dragon Taxi Company* business:
  - productivity analysis
  - assessment of drivers
  - safety of passengers – advertisement possibilities
  - data gathered may be sold to third parties
  - information for authorities / police in emergency or criminal situations
- positive impacts for drivers:
  - safety of drivers and passengers
  - promotion and rewards based on data collected
  - even distribution of jobs and quality of jobs
- negative impacts for *Red Dragon Taxi Company* business:
  - reaction of staff – may not use or damage systems
  - potential invasion of privacy of drivers – legal and reputation problems
  - potential invasion of privacy of passenger – legal and reputation problems
- negative impacts for drivers' privacy:
  - impact employment based on assessment of work activities – may be distorted
  - recording of private activities when not on duty – inappropriate use.

For the top markband, it is expected that the student covers a range of topic areas.

In this question it is expected there will be a balance in the ITGS terminology between IT technical terminology and the terminology related to social and ethical impacts.

HL paper 3 question 4 markband

Marks	Level descriptor
No marks	• *A response with no knowledge or understanding of the relevant ITGS issues and concepts.* • *A response that includes no appropriate ITGS terminology.*
Basic **1–3 marks**	• *A response with minimal knowledge and understanding of the relevant ITGS issues and concepts.* • *A response that includes minimal use of appropriate ITGS terminology.* • *A response that has no evidence of judgments, conclusions or future strategies.* • *No reference is made to the information in the case study or independent research in the response.* • *The response may be no more than a list.*
Adequate **4–6 marks**	• *A descriptive response with limited knowledge and/or understanding of the relevant ITGS issues and/or concepts.* • *A response that includes limited use of appropriate ITGS terminology.* • *A response that has evidence of conclusions, judgments or future strategies that are no more than unsubstantiated statements. The analysis underpinning them may also be partial or unbalanced.* • *Implicit references are made to the information in the case study or independent research in the response.*
Competent **7–9 marks**	• *A response with knowledge and understanding of the relevant ITGS issues and/or concepts.* • *A response that uses ITGS terminology appropriately in places.* • *A response that includes future strategies, conclusions and/or judgments that have limited support and are underpinned by a balanced analysis.* • *Explicit references to the information in the case study or independent research are made at places in the response.*
Proficient **10–12 marks**	• *A response with a detailed knowledge and understanding of the relevant ITGS issues and/or concepts.* • *A response that uses ITGS terminology appropriately throughout.* • *A response that includes conclusions, judgments or future strategies that are well supported and underpinned by a balanced analysis.* • *Explicit references are made appropriately to the information in the case study and independent research throughout the response.*