



Cambridge International AS Level

ENGLISH GENERAL PAPER

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Paper 2 Comprehension

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INSERT

1 hour 45 minutes

INFORMATION

- This insert contains all the resources referred to in the questions.
- You may annotate this insert and use the blank spaces for planning. Do not write your answers on the insert.

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This document has **8** pages. Blank pages are indicated.

Material for Section A

More people are travelling around the world than ever before. Global international tourist arrivals have risen from 25 million in 1950 to 1235 million in 2016. Tourists are taking more holidays owing to higher incomes and receiving more paid holiday time away from work. In addition, globalisation has encouraged businesses to locate their operations in different parts of the world to maximise profit, requiring regular movement of business travellers. Recent times have also seen the rise of airlines who offer a 'no frills' experience for cheaper fares.

As a result of this, the state of Tonrovia is considering building extra runway capacity around the capital city in the south-east of the country. Such a project will increase the state's ability to take advantage of recent growth in international tourism and increase flights to emerging economies: its current capacity prohibits the country's ambition.

There are already two airports around the capital city in the south-east of Tonrovia. The first, Stimton, has two runways and lies to the west; it is used by approximately 70 million passengers a year and is the country's busiest and the world's sixth busiest airport. The second, Mainstone, located to the south, has one runway handling approximately 40 million passengers annually. Both airports are operating at full capacity. Severe flight congestion in both locations is causing some financial problems; increasingly passengers are choosing to travel to other hubs in neighbouring countries to avoid delays and expensive ticket costs. The government believes any airport expansion will stimulate growth in the local economies through direct job creation and increased demand for housing and services as a multiplier effect takes hold.

The government is considering three options to increase runway capacity.

Option X

Build a third runway at Stimton to increase its capacity and regain its position as the world's busiest airport. Estimated construction time: three years.

Option Y

Build a second runway at Mainstone and improve transport links in the surrounding area. Estimated construction time: four years.

Option Z

Build a brand-new airport with three runways to the east of the capital on unused River Malgen estuary land. Estimated construction time: seven years.

Fig. 1.1 is a map showing the location of options X, Y and Z.

Other considerations

- 1 A new airport would generate 20 000 jobs both in construction and in local business attracted to the area.
- 2 Airlines support the expansion of Stimton but there is hope to keep costs within a manageable amount.
- 3 Estimates show that a third runway at Stimton would cost around \$15 billion; part of the cost would be funded by taxation.

- 4 Huge investment in supporting infrastructure would be needed for a brand-new airport including roads, hospitals and schools for the workforce and their families.
- 5 Expanding Mainstone's runway could create 12000 jobs in the local economy as new businesses will be attracted to the area's better connections.
- 6 The Malgen estuary is a Site of Special Scientific Interest for its variety of birds and wildlife.
- 7 Many people are affected by the noise of planes flying over their homes; people can suffer from significant stress and subsequent ill health.
- 8 Research by supporters of Mainstone's expansion estimate that a second runway would cost approximately \$8 billion funded through private investment and would not have to rely on taxes.
- 9 Stimton's expansion would mean several hundred homes, including a whole village, would need to be demolished to make way for the new runway.
- 10 Critics of expansion declare that the aviation industry is the fastest growing contributor to global warming.
- 11 The River Malgen once housed significant dock facilities; these have now fallen into disrepair and dereliction, leaving large amounts of land in the east of the capital city disused.
- 12 A brand-new airport east of the capital would cost in excess of \$50 billion.
- 13 Several areas around Stimton's and Mainstone's airport sites already exceed agreed safe guidelines for air pollution.
- 14 Recent scientific studies have shown that children achieve less in school when they are constantly interrupted by aircraft noise.
- 15 Landing planes usually approach Tonrovia from the east, south and north-east due to prevailing winds and take off towards the west.
- 16 Motorway routes around the capital are busy, especially at junctions in the south and west.

Location of options X, Y and Z

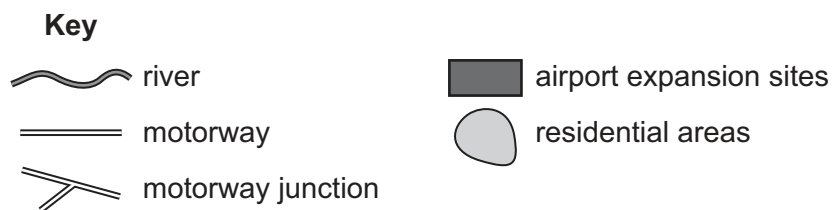
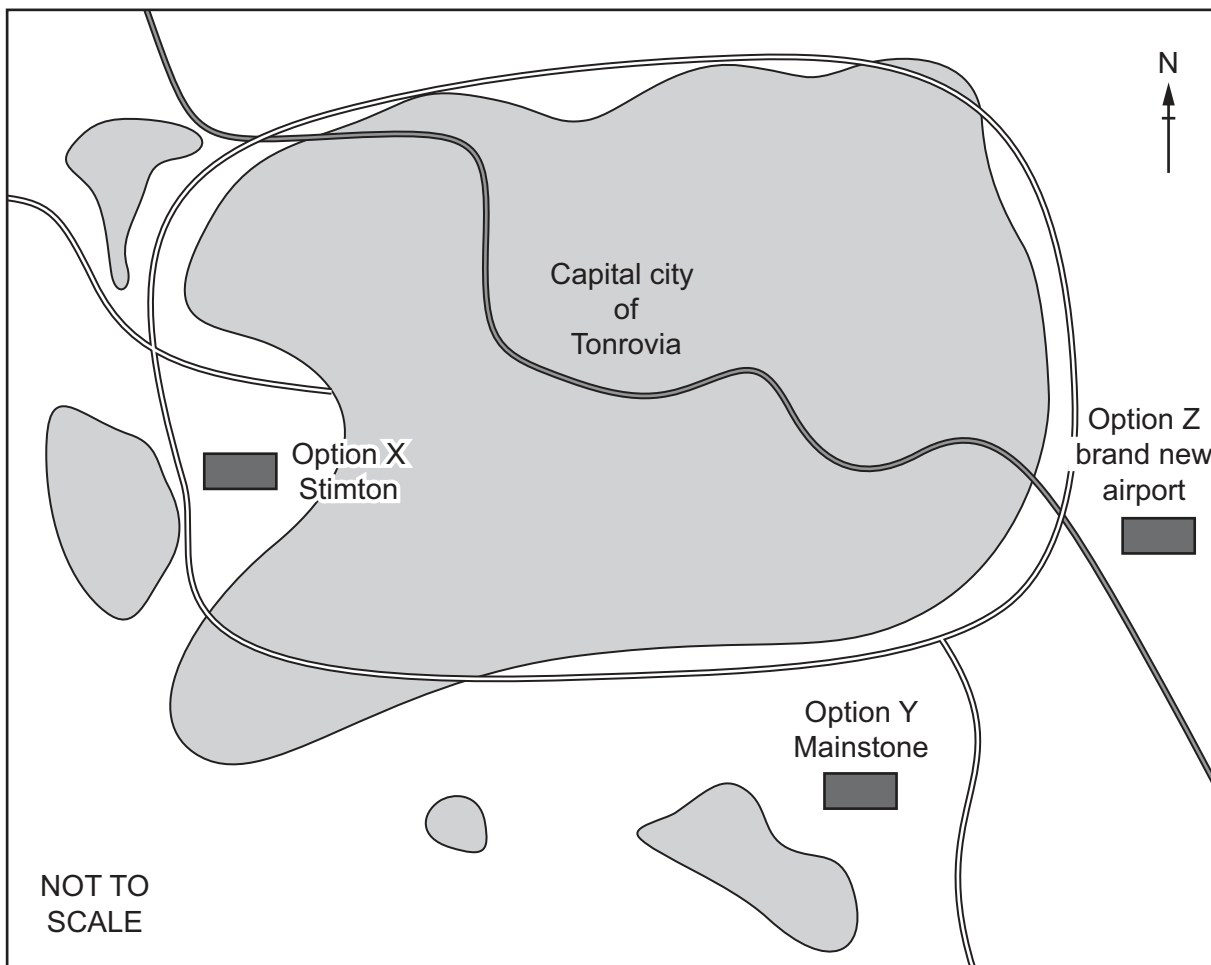


Fig. 1.1

Material for Section B

Could a hacker hijack your connected car?

As more car makers adopt 'over-the-air (OTA)' software updates for their increasingly connected and autonomous cars, is the risk of hacker hijack also increasing?

Imagine jumping in your car but being taken somewhere you didn't want to go – into oncoming traffic, say, or even over a cliff. That may seem like an extreme scenario, but the danger is real. Hackers showed two years ago that they could remotely take control of a Chrysler Jeep. And earlier this year, Elon Musk, boss of electric car maker Tesla, warned about the dangers of hackers potentially taking control of thousands of driverless cars.

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'I think one of the biggest concerns for autonomous vehicles is somebody achieving a fleet-wide hack,' he said, speaking at a National Governors' Association meeting. 'In principle, if someone was able to hack all the autonomous Teslas – just as a prank – they could send them all to Rhode Island, across the United States. And that would be the end of Tesla, and there would be a lot of angry people in Rhode Island.' Mr Musk insists that a kill switch 'that no amount of software can override' would 'ensure that you gain control of the vehicle and cut the link to the servers,' thus preventing the Rhode Island scenario.

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As cars become more sophisticated, incorporating semi-autonomous features such as lane-keeping, automatic braking and self-parking, and their 'infotainment' systems are connected to the internet, the amount of software code needed to control these systems is ballooning. Keeping all these software programs updated has typically required drivers to visit the dealership.

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'For automakers and their customers alike, such repair shop visits are a huge waste of time and money, and online updates can significantly reduce this,' explains Dr Markus Heyn, board member of automotive electronics and processing supplier, Bosch.

So OTA updates give manufacturers the ability to respond quickly as problems arise. And fixing bugs this way is safer than sending out physical USB sticks - which is what Chrysler did to patch its Jeep. Critics pointed out that criminals could have intercepted the USB sticks and sent out their own malware-infected versions instead. It's hardly surprising then that there are strong moves in the industry towards OTA updates, which mean that new features can be added, and bugs patched, in just an hour or two, all without inconvenience to the owner.

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Tesla recently demonstrated the benefits of OTA updates when Hurricane Irma was threatening Florida early in September. As people were warned they should evacuate, Tesla owners were given an unexpected and potentially life-saving freebie – an extra 45 miles of range. The ability to go further without a recharge was already built into the cars, but was unavailable to drivers until the company unlocked extra battery capacity. Tesla unlocked the extra power by sending an OTA update to the cars via Wi-Fi or 4G.

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But there's no doubt that OTA updates present a new set of risks. For a start, we've all, at one time or another, attempted to update the software on our computer or phone, only for the process to go wrong. An unusable car could be rather more of a problem than an unusable phone. In 2015, 15 per cent of car recalls in the US were related to software errors, up from 5 per cent four years before. When an update fails, says a

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Tesla spokeswoman, it's automatically re-sent, but this doesn't always have the desired effect.

On one occasion early last year, a Tesla software update designed to add an 'autopilot' feature is believed to have affected the climate control of thousands of vehicles. Then there is the risk of 'man-in-the-middle' attacks - hackers intercepting the updates in transit. This is why extra special care is taken over OTA updates, says Robert Moran, an expert in car connectivity and security. 'There are checks at each stage of the update process,' he says. 'Updated software coming over-the-air is going to be received in parallel. Only once it's passed a number of security checks is the new software actually used. It's at a different level to what we have with laptops today.'

Manufacturers are also addressing the hacker threat by isolating the various systems in the car so that, for example, the radio is isolated from the steering wheel, the power train from the brakes – each system protected by its own encryption. 'Ultimately, as cars have become more connected, it does potentially create a bigger target,' admits Mr Moran, 'and hackers have always altered their techniques as technology changes.' But he argues: 'The fact that we can provide over-the-air updates is a security feature in itself, as it gives us the ability to respond and make changes.'

Car makers know that consumer trust is crucial, so security is paramount. The big question is whether they are cleverer than the hackers.

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