1.2 Computers, networks and the internet

Name: _____ Class: _____ Date: _____ **Total: 30 marks**

KEY WORDS computer • network • internet • packet • cloud computing • digital divide • privacy

Objective

Study the content areas **computers** and **networks and the internet**: how they work in outline, who controls them, and their impacts on access, **privacy** and the **digital divide**.

You must be able to:

- describe the parts of a computer system and the role of cloud computing
- explain how data travels across the internet in packets
- explain who controls key parts of the internet
- explain the digital divide with data
- evaluate the impacts of always-on connection

1 Key knowledge and worked examples

Computers

A computer takes **input**, **processes** it (CPU), **stores** it (memory and storage) and gives **output**. **Cloud computing** means using computers in large data centres over the internet, e.g. online storage. Benefits: access anywhere, less local hardware. Concerns: dependence on a few companies, energy use, who can see the data.

Networks and the internet

The **internet** is a network of networks. Data is split into **packets**, each with the address of its destination; routers send each packet along the best path, and the packets are put back together at the end. The **World Wide Web** is one service that runs on the internet (web pages); email and video calls are others.

Control: companies own the cables, data centres and platforms; governments regulate, filter or shut down access; bodies such as ICANN manage domain names.

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The digital divide

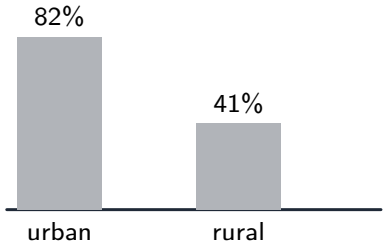
The **digital divide** is the gap between people who have useful access to digital technology and those who do not, by income, place, age, gender or skills. The ITU estimated that about 67 % of the world's people used the internet in 2023, which left about 2.6 billion people offline.

Worked example. If the world population is about 8.0 billion and 67 % are online, then offline $= 8.0 \times (1 - 0.67) \approx 2.6$ billion. Concept: **power**: people offline miss jobs, education and public services that move online.

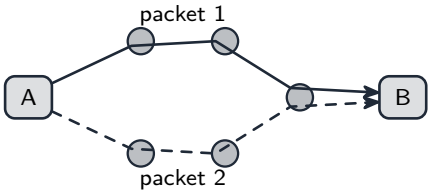
2 Practice

2.1 Distinguish the **internet** from the **World Wide Web**. [2]

2.2 In a country of 50 million people, 82 % of urban residents and 41 % of rural residents use the internet. 60 % of the people live in cities. Calculate the number of people offline, and explain **one** cause of the gap. [3]



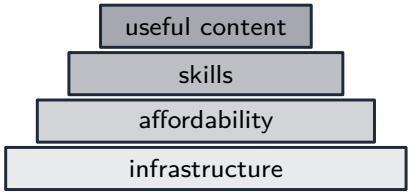
2.3 Explain how a message is sent across the internet in **packets**, and **one** advantage of this method. [4]



2.4 Evaluate the use of **cloud computing** by a school to store students' work and records. [6]

3 Exam-style questions

3.1 *(Paper 1 style.)* "Reducing the digital divide is mainly a question of building infrastructure." Discuss with reference to **one** real-world example. [15]



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Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

the internet is the global network of networks: the cables, routers and rules that carry data; the Web is one service on the internet: linked pages viewed in a browser

2.2

urban: 30 million $\times 0.18 = 5.4$ million; rural: 20 million $\times 0.59 = 11.8$ million; total offline $=$ **17.2** million; a cause, e.g. fewer masts and cables in rural areas, because they are less profitable for companies / lower incomes / fewer digital skills

2.3

the message is split into small packets, each with the destination address and a number; routers send each packet along a path, which can differ between packets; at the destination the packets are put back in order; advantage, e.g. if one route fails or is busy, packets take another route, so the network is robust

2.4

benefits: access from any device, at home and school; automatic backup protects against lost devices; lower cost of local servers; concerns: privacy: student data held by a company, possibly in another country; dependence on the internet and on one provider; a judgement, e.g. beneficial if the school chooses a provider with strong data protection and keeps control of the data

3.1

Mark with the markbands: [13-15] clearly focused on the question, accurate and relevant knowledge and real-world examples used as evidence, concepts applied, well-developed critical analysis, different perspectives evaluated, a reasoned conclusion; [10-12] focused, mostly accurate knowledge, analysis with some evaluation; [7-9] some focus, relevant knowledge, mostly narrative or description with limited analysis; [4-6] little focus, limited knowledge, mostly narrative; [1-3] little understanding of the question. Points that may be included: definition of the digital divide; a real-world example in detail, e.g. rural broadband programmes, community internet centres, mobile money in East Africa; for: without cables, masts and electricity there is no access; about 2.6 billion people offline in 2023 (ITU); mobile networks transformed access in many low-income countries; against: affordability: devices and data cost too much for many; skills: people need digital literacy to benefit; relevance: content in local languages and useful services; gender and age gaps remain where infrastructure exists; concepts used, e.g. power, space, values and ethics; conclusion: a judgement, e.g. infrastructure is necessary but not sufficient

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