

Information Technology

Time allowed: 1.5 hours (90 minutes)

You should answer 2 questions

Answer **TWO** questions. Each question answered will be worth 50 marks.

1

- a) Discuss the role of proxy servers in network communication, including how they work, their uses for privacy, security, and content filtering, and how they differ from VPNs.

[15 marks]

- b) Explain the difference between a URL and an IP address, and how they work together in web browsing. Discuss the role of a URL in providing a human-readable address and the IP address in identifying devices on a network. Briefly describe the role of Domain Name System (DNS) in this process.

[10 marks]

- c) Do you think that the Google search engine has a good interface for users? Why/why not? You may want to compare it with other search engines.

[12 marks]

- d) Discuss the importance of encryption and secure communication in HTTPS protocol.

[13 marks]

2

- a) Artificial Intelligence (AI) has found diverse applications across various industries. Choose one industry of your preference and discuss possible applications of AI within that industry. Discuss the impact of AI on efficiency, decision-making, and innovation in the chosen industry. Additionally, explore any challenges or ethical considerations associated with the integration of AI in that industry. Provide examples and insights to support your discussion.

[15 marks]

b) Discuss the principles of responsive web design and how it affects the experience of website viewing on different devices. Explain how and for what purpose responsive design utilizes layouts, images, and CSS media queries.
[11 marks]

c) What are digital signatures and how can they be used to ensure the authenticity of documents?
[12 marks]

d) Analyse the various types of cloud storage options available (public, private, hybrid) and their respective advantages and disadvantages for both personal and business use.
[12 marks]

3

a) Network bandwidths and home broadband specify expected speeds measured in bits per seconds, but end users typically experience slower than specified data transfer rates. Explain the reasons for this discrepancy in speed that users encounter compared to the stated bandwidth. Consider factors such as network protocols, overhead, congestion, and hardware limitations in your response.
[17 marks]

b) Convert the 16-bit binary number 10101100 10111000 to:
i) Hexadecimal
ii) Decimal
You should show your working.
[8 marks]

c) A computer fundamentally operates on the binary digits 0 and 1. Therefore, any character has to be encoded as a binary number. In ASCII the letter j has the hexadecimal value 6A. Give its value in:
i) Binary
ii) Decimal
You should show your working.
[8 marks]

d) Many programming and search related tasks require combining Boolean operators to create more complex expressions and operator priorities will affect the result. Create a truth table that describes expression below and accompany your result with discussion of operators' priorities you used to solve this task:

NOT (A AND B XOR NOT C) AND A
[17 marks]