Information Technology

Time allowed: 1.5 hours (90 minutes)

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

1

a) Voice-based intelligent personal assistants, such as Siri, Google Assistant, and Alexa, use a combination of technologies such as speech recognition, natural language processing, and machine learning. Describe the key components and functionalities of these assistants and provide examples of how they are integrated into everyday devices. Additionally, consider the privacy concerns associated with using voice-based assistants and how developers address these concerns.

[17 marks]

b) Compare and contrast the characteristics of networked and stand-alone computers. Discuss the advantages and disadvantages of each type in terms of functionality, resource sharing, data security, and overall system management. Provide real-world examples of scenarios where networked computers would be preferred over stand-alone computers and vice versa. Additionally, consider the implications of these choices on cost, maintenance, and data accessibility in both contexts.

[18 marks]

c) What is Secure File Transfer Protocol (SFTP)? Explain what it is used for. Additionally, explore how encryption plays a crucial role in SFTP. Provide examples of industries or situations where SFTP for secure file transfer is particularly critical.

[15 marks]

2

a) Artificial Intelligence (AI) has found diverse applications across various industries. Choose one industry of your preference and discuss about 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.

[18 marks]

b) Augmented reality (AR) and virtual reality (VR) have become an integral part of our daily lives. They might be used not only for entertainment but also in healthcare and educational sector. Provide examples of practical applications for both augmented reality and virtual reality in different industries?

[16 marks]

c) Explain how things like passwords, locks for digital information (encryption), and security walls (firewalls) help keep our digital stuff safe. Explain how these measures contribute to the overall security of digital assets and provide examples of situations where their implementation is critical.

[16 marks]

3

a) Computers fundamentally operate using the binary digits 0 and 1, while humans generally use decimal in everyday life. Often, programmers will consider numbers as hexadecimal. What are hexadecimal and binary, and why do programmers often use hexadecimal rather than decimal?

[10 marks]

b) 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 P has the hexadecimal value 50. Give its value in:

   i) Binary
   ii) Decimal
   You should show your working.

[8 marks]

c) Convert the 16-bit binary number 10010100 11111010 to:
   i)   Hexadecimal
   ii)   Decimal
   You should show your working.

[10 marks]

d) Explain with examples the purpose of a macro and a formula in a spreadsheet.

[12 marks]

e) Many programming and search related tasks require that Boolean operators be combined to generate more complex expressions. Create a truth table that describes:

(A OR NOT B) XOR NOT C

[10 marks]