



# UNIVERSITY EXAMINATIONS

**SECOND SEMESTER 2023/2024 ACADEMIC YEAR**

**FOURTH YEAR EXAMINATION FOR THE DEGREE OF  
BACHELOR OF SCIENCE (ICT) AND BACHELOR OF  
COMPUTER SCIENCE**

**COMP 421/BICT 327: EMERGING ISSUES IN IT**

***STREAM: R***

***TIME: 2 HRS***

***DAY: THURSDAY [2.30 – 4.30 P.M]***

***DATE: 11/04/2024***

**THIS QUESTION PAPER CONSISTS OF FOUR (4) PAGES**

**PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.**



**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS****Case Study: The Digital Transformation of Healthcare****QUESTION ONE (30 MARKS)**

In a rapidly evolving healthcare landscape, a regional health system is embarking on a comprehensive digital transformation initiative to enhance patient care, improve operational efficiency, and stay ahead of technological advancements. The health system serves a diverse population and operates several hospitals, clinics, and specialized care facilities.

- i. Assess the challenges and benefits of integrating digital healthcare solutions, including electronic health records (EHR), telemedicine, and remote patient monitoring, across the entire health system. **(4 Marks)**
- ii. Propose a roadmap for the phased implementation of digital healthcare integration, considering the diverse needs of patients, healthcare providers, and administrative staff. **(4 Marks)**
- iii. Explore the potential applications of artificial intelligence in diagnostic decision-making within the health system. Discuss how AI could enhance diagnostic accuracy, reduce turnaround times, and improve patient outcomes. **(4 Marks)**
- iv. Evaluate the ethical considerations and potential concerns associated with the use of AI in diagnostic processes. Recommend strategies to ensure responsible and unbiased AI integration. **(4 Marks)**
- v. Examine the role of blockchain technology in ensuring secure and interoperable health data management. Discuss how blockchain can address issues related to data privacy, security breaches, and data exchange among healthcare providers. **(4 Marks)**
- vi. Propose a detailed plan for implementing a blockchain-based health data management system, taking into account regulatory compliance, data ownership, and patient consent. **(5 Marks)**
- vii. Analyze the potential benefits and challenges of expanding telehealth services within the health system. Discuss the infrastructure requirements, including network capabilities and cybersecurity measures, to support widespread telehealth adoption. **(5 Marks)**



**QUESTION TWO (20 MARKS)**

- a) Explore the integration of mobile payment solutions for healthcare services, including appointment scheduling, prescription payments, and telehealth consultations. Discuss the potential advantages for both patients and the health system. **(4 Marks)**
- b) Assess the security and privacy concerns related to mobile payment integration in healthcare. Recommend measures to safeguard sensitive financial and health information. **(4 Marks)**
- c) Explore the role of telemedicine in improving healthcare accessibility. Discuss the advantages, challenges, and potential future developments in the digital healthcare landscape. **(4 Marks)**
- d) Analyze the importance of data security in the context of electronic health records. Discuss the challenges and potential solutions for maintaining patient privacy and security in the digital healthcare era. **(4 Marks)**
- e) Trace the evolution of mobile payment systems from their inception to the present day. Evaluate the impact of mobile payments on traditional banking and the challenges and opportunities associated with this technology. **(4 Marks)**

**QUESTION THREE (20 MARKS)**

- a) Assess the security concerns associated with mobile transactions. Discuss the measures taken by the industry and regulatory bodies to address these concerns and ensure a secure mobile payment ecosystem. **(4 Marks)**
- b) Examine recent advancements in assistive technologies designed to enhance the lives of individuals with disabilities. Discuss the potential benefits, challenges, and ethical considerations surrounding the use of these technologies. **(4 Marks)**
- c) Explore the role of robotics in the development of assistive technologies. Discuss specific examples and their impact on improving the independence and quality of life for individuals with disabilities. **(4 Marks)**
- d) Analyze the role of IoT in the development of smart cities. Discuss the potential benefits, challenges, and ethical considerations associated with the widespread implementation of IoT in urban environment **(4 Marks)**



- e) Evaluate the security and privacy concerns associated with the proliferation of IoT devices. Discuss potential solutions and regulatory measures to address these concerns and ensure the responsible use of IoT technology. **(4 Marks)**

**QUESTION FOUR (20 MARKS)**

- a) Explore the transformative impact of 5G technology on communication and connectivity. Discuss potential applications, benefits, and challenges associated with the widespread adoption of 5G networks.
- b) Examine the synergy between 5G technology and the Internet of Things. Discuss how the enhanced capabilities of 5G networks contribute to the development and efficiency of IoT applications.
- c) Discuss the ethical considerations surrounding the use of AI and machine learning in various domains. Explore potential risks, biases, and strategies to ensure responsible AI development and deployment.
- d) Evaluate the integration of AI in healthcare, including diagnostic tools, personalized medicine, and predictive analytics. Discuss the opportunities and challenges associated with leveraging AI for improved patient outcomes.
- e) Examine the application of blockchain technology in supply chain management. Discuss how blockchain enhances transparency, traceability, and security in supply chain processes.

**QUESTION FIVE (20 MARKS)**

- a) Explore the role of blockchain in the emergence of decentralized finance. Discuss the potential advantages and challenges associated with the decentralized nature of financial transactions enabled by blockchain technology. **(6 Marks)**
- b) Analyze the advancements in 3D printing technology in the medical field. Discuss how 3D printing is revolutionizing healthcare, including the production of customized implants, prosthetics, and organs. **(6 Marks)**
- c) Discuss the environmental impact of 3D printing technology. Evaluate the sustainability aspects, including material usage, waste generation, and potential strategies to minimize the environmental footprint of 3D printing. **(8 Marks)**

