

UGANDA INSTITUTE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

END OF SEMESTER TWO EXAMINATION 2024

ACADEMIC YEAR 2024/2025

DEPARTMENT: ICT

YEAR OF STUDY: TWO , SEMESTER, TWO

PROGRAMMES: DIPLOMA IN COMPUTER SCIENCE (DCS)

COURSE: SURVEY OF EMERGING TECHNOLOGIES

COURSE CODE: CSC 2205

DATE: FRIDAY, 05TH JULY 2024

TIME: 14:00 – 17:00 PM

INSTRUCTIONS:

- a) The exam consists of two sections, Section A (short answer questions) and Section B (scenario-based questions).
- b) Answer all ten (10) questions in section A. Provide clear and concise answers, focusing on key points. Each question is worth 04 marks.
- c) Answer three (3) out of five (5) scenario-based questions. Provide detailed and well-structured answers, incorporating relevant theories, examples, and case studies. Each question is worth 20 marks.
- d) Write legibly and clearly. Label each section and question number accurately. Use bullet points or numbering where appropriate to organize your answers.
- e) This is an individual exam. Do not collaborate or communicate with other candidates. Any form of cheating or plagiarism will result in disqualification and disciplinary action.

SECTION A: (40 Marks)

Answer all ten (10) questions

1. Identify the major driving forces behind technological innovation. Evaluate their impact on the pace and direction of technological advancements in various sectors. (04 marks)
2. Critically examine the ethical considerations and challenges associated with the development and deployment of AI technologies. Focus on issues such as bias, privacy, and job displacement. (04 marks)
3. Describe the essential components of an IoT ecosystem. How do sensors, actuators, and connectivity contribute to the functionality of IoT devices? Provide examples of IoT applications in smart cities, agriculture, or manufacturing. (04 marks)
4. Discuss the rise of cryptocurrencies and decentralized finance (DeFi) platforms powered by blockchain technology. How do these innovations have the potential to disrupt traditional financial systems? (04 marks)
5. Provide the ethical implications of emerging technologies, focusing on issues such as privacy, bias, and job displacement. What ethical decision-making frameworks can be applied to address these challenges? (04 marks)
6. Analyze real-world examples of successful implementation of emerging technologies. Discuss the lessons learned and best practices from these case studies. How can theoretical knowledge be applied in practical scenarios through hands-on exercises and projects? (04 marks)
7. Explain the basics of quantum computing principles, including quantum mechanics and qubits. Discuss the potential applications of quantum computing in cryptography, optimization, and simulation. (04 marks)
8. How does mixed reality combine elements of both augmented reality (AR) and virtual reality (VR) to create immersive experiences, and what are some potential applications of mixed reality in emerging technologies? (04 marks)

9. Discuss the concept of human-robot collaboration in advanced robotics, highlighting the benefits, challenges, and potential applications in industries such as manufacturing, healthcare, and logistics. (04 marks)

10. Explore the potential impacts of other emerging technologies such as nanotechnology, 5G, and renewable energy. Predict future trends and disruptions in technology and discuss opportunities for innovation and entrepreneurship in these fields. (04 marks)

SECTION B: (60 Marks)

Answer only three (03) questions.

Question 11. A retail chain is using Artificial Intelligence and Machine Learning to personalize marketing campaigns based on customer data and shopping behavior. What ethical considerations should the retail chain address when using AI and ML for personalized marketing? Propose a framework for ensuring customer data privacy and preventing biased marketing practices. (20 marks)

Question 12. In a cutting-edge hospital, medical professionals are using Augmented Reality (AR) and Virtual Reality (VR) technologies to revolutionize patient care and medical training. One such application involves using AR glasses during surgery. Surgeons can visualize a patient's anatomy in real-time overlaid with vital signs and MRI scans, enhancing precision and reducing operation times. How can AR and VR technologies improve surgical outcomes compared to traditional methods?. Discuss the ethical considerations surrounding the use of AR and VR in patient care and surgery. (20 marks)

Question 13. An automotive company is exploring the use of quantum computing to optimize the design and manufacturing processes of electric vehicles. How can quantum computing contribute to advancements in electric vehicle design and manufacturing? Discuss the potential impact and the challenges the company may face in adopting quantum computing technology. (20 marks)

Question 14. A water treatment facility is adopting nanotechnology to improve the filtration and purification process, aiming to remove contaminants more effectively. Explain how nanotechnology can enhance water treatment processes. Outline the steps involved in implementing nanotechnology-based filtration systems, including potential health and environmental impacts. **(20 marks)**

Question 15. A large agricultural enterprise is implementing Internet of Things (IoT) Technology to optimize irrigation and monitor crop health, soil moisture, temperature across its vast farmlands. Discuss the benefits and potential challenges of using IoT in agriculture. Propose a comprehensive IoT deployment plan that includes sensor placement, data collection methods, and integration with existing farm management systems. **(20 marks)**

*****Good luck! We wish you all the best in your exam. Maintain silence during the exam.*****