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# Daffodil International University

**Faculty of Science & Information Technology**
**Department of Computing and Information System**
**Final Examination, Fall-2024**

**Course Code:** CIS 121, **Course Title:** Introduction to Industry 4.0
**Level:** 1 **Term:** 1

**Exam Duration:** 2 Hours **Marks:** 40

## Answer ALL Questions

*[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]*

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|---|---|---|---|---|
| 1. | Assume you are the production manager of a smart factory looking to deploy Industry 4.0 technology to boost efficiency, reduce downtime, and improve quality control. You are responsible of using major Industry 4.0 drivers such as Big Data Analytics, Industrial IoT, and AI. However, your team identifies problems such as limited machine interoperability, poor data integration, and staff opposition to automation. | | | |
| | *a)* | Define Industry 4.0. | [2] | CO2 |
| | *b)* | What kind of features should we adopt to convert a "factory" to a "Smart Factory"? Justify your answer. | [4] | |
| | *c)* | Analyze the impact of the above mentioned technologies in Industry 4.0. | [4] | |
| 2. | In this competitive industrial era, an old manufacturing company named "Chicago solution" is struggling to survive. However, they are trying to follow the working plan of the Industry 4.0 era. Recently, the company has purchased a few machines that produce detailed data all day long. Despite having a huge amount of data they are not sure how to use them. Additionally, they encounter cryptocurrency issues. They are unsure how to integrate digital currencies and blockchain into their operations, worrying about volatility and regulatory uncertainties. | | | |
| | *a)* | What is Industrial Internet of Things (IIOT)? | [2] | CO3 |
| | *b)* | Compare the different analysis techniques for managing the huge amount of data produced by the company. | [4] | |
| | *c)* | Conclude the benefits of alliances between IIoT and Cryptocurrency for the above mentioned scenario. | [4] | |
| 3. | Robots are significant in modern industries, depending on sensors, AI, and Machine Learning to handle complex tasks. Sensors enable functionality, while AI and ML enhance intelligence and adaptability. Compared to C, Python stands out for its simplicity and vast libraries like TensorFlow and OpenCV, which streamline AI and robotics development. While C offers speed and low-level hardware control, Python excels in rapid prototyping and algorithm implementation, making it a preferred choice for AI-driven industrial innovations. | | | |
| | *a)* | Define OpenCV. | [2] | |

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|---|---|---|---|---|
| | b) | Given a "C" language code for calculating the area of a triangle:<br>`#include <stdio.h>`<br><br>`int main() {`<br>`  float base, height, area;`<br><br>`  // Get user input`<br>`  printf("Enter the base of the triangle: ");`<br>`  scanf("%f", &base);`<br><br>`  printf("Enter the height of the triangle: ");`<br>`  scanf("%f", &height);`<br><br>`  // Calculate area`<br>`  area = 0.5 * base * height;`<br><br>`  // Display the result`<br>`  printf("Area of the triangle: %.2f\n", area);`<br><br>`  return 0;`<br>`}`<br>Execute the code in python and explain how python is more efficient to use than C. | [4] | CO3 |
| | c) | Suppose you have to build a humanoid robot for your industry. Now, design the whole building process of a robot including all the necessary steps. | [4] | |
| 4. | | As a data scientist for a worldwide social media analytics company, you lead a team tasked with utilizing Big Data to extract meaningful insights from social media platforms like Twitter, Instagram, Facebook, and TikTok. The organization attempts to assist businesses understand consumer behavior, predict trends, and enhance marketing campaigns. During a strategy discussion, team members raise various issues to define the role of Big Data in achieving these objectives. You take the lead in outlining each topic in depth. | | |
| | a) | Identify the key attributes of "Big Data" and explain the significance of those attributes. | [4] | CO4 |
| | b) | Classify the various types of Big Data and provide examples from social media for each category. | [3] | |
| | c) | Evaluate the obstacles in processing Big Data derived from social media and propose solutions. | [3] | |