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ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)

ORGANISATION OF ISLAMIC COOPERATION (OIC)

Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION
DURATION: 1 HOUR 30 MINUTES

WINTER SEMESTER, 2022-2023
FULL MARKS: 75

CSE 4561: Computer Science and Technology III

Programmable calculators are not allowed. Do not write anything on the question paper.

Answer **all 3 (three)** questions. Figures in the right margin indicate full marks of questions whereas corresponding CO and PO are written within parentheses.

1. a) Define Business Analytics and highlight its key areas. 2 + 3 (CO1) (PO1)

   b) You are a junior data analyst at EcoTech Solutions, an eco-conscious startup specializing in sustainable energy solutions. The CEO, Dr. Maria, envisions a broader impact on the renewable energy market. She believes that analyzing consumer energy usage patterns could unveil opportunities for growth. Your task is to focus on EcoTech's flagship product, the "EcoGen Solar Panel System". By dissecting usage data and customer feedback, you will provide critical insights to shape the company's marketing strategy. Your findings will be presented to the executive team, driving EcoTech towards a leading position in the global renewable energy sector. Your role is pivotal in revolutionizing sustainable energy consumption. 5 × 5 (CO3) (PO2)

   Considering the scenario and the phases of data analysis, answer the following questions. State necessary assumptions if needed.

   i. Write three relevant questions that will help you define the problem statement.
   ii. What steps will you take to prepare the data? Mention the tools.
   iii. Assuming that you are working with tabular data where the columns contain strings taken as user inputs, what kind of data processing steps should you take before analysis?
   iv. What are the tools and techniques that you will use to obtain meaningful insights from the data?
   v. Mention two high-level recommendations that you can present to the executive team to improve EcoTech's business strategy.

2. You and your team are launching "UrbanXpress", a platform aiming to revolutionize urban mobility with integrated transportation options like electric scooters, bicycles, and ride-sharing services. Despite securing venture capital funding, you face significant hurdles. Navigating complex regulatory landscapes, developing a user-friendly app, understanding and changing commuter behavior, ensuring sustainability, devising a viable revenue model, and building a recognizable brand are all formidable challenges. Additionally, scaling operations and expanding to new cities require careful planning. Success hinges on assembling a diverse and capable team, strategic partnerships, and adaptable strategies to establish UrbanXpress as a disruptive force in urban transportation.

   a) Define the Client-Server architecture. 5 (CO1) (PO1)

   b) Highlighting the tools and technology, provide a descriptive overview of a web-based or mobile application for UrbanXpress. 10 (CO2) (PO1)

   c) Draw a black-box architectural diagram of your proposed application. The diagram should be self-explanatory without any description. 8 (CO3) (PO2)

3. a) Provide a real-life scenario where gut instincts outperformed data-driven decisions. 3 (CO2) (PO1)

b) Answer True/False for the following statements. If False, provide the correct answer. 1×10 (CO1) (PO1)

i. Computers can only understand decimal values.
ii. Big picture thinkers are good at sculpting the problem to the finest details.
iii. A database is an example of unstructured data.
iv. Resistors are the working units of a CPU.
v. Prescriptive analysis deals with identifying the root cause of the problem.
vi. Regression is a form of statistical analysis.
vii. Images are stored as arrays of numbers in a computer.
viii. Early humans were good at identifying patterns in nature.
ix. Context should be ignored while analyzing the data.
x. The plot of a movie is a form of qualitative data.

c) Provide an example for the following terms: 2×3 (CO1) (PO1)

i. Nominal and Ordinal Data
ii. Data Storing and Visualization Tools
iii. Primary and Secondary Data

d) What are the advantages of using databases instead of spreadsheets? 3 (CO2) (PO1)