

KATHMANDU UNIVERSITY
End Semester Examination
January/February 2024

Level : B.E.
Year : III
Time : 2 hrs. 30 mins.

08 FEB 2024

Course : EPEG 317
Semester : I
F.M. : 40

SECTION "B"

[5 Q × 8 = 40 marks]

Attempt *ANY FIVE* questions. Symbols have their usual meanings. Urgent appropriate assumptions are permissible.

1. Design a fuzzy logic controller for a self-driving vehicle shown in Figure 1. It is desired that the motor speed of the vehicle increase when it approaches a steep road as well as when the total weight of people in the car is high.
Consider that the steep plane varies from 0 to 70 degrees, total weight of the car varies from 1000 to 2000 kg, and the motor speed varies from 0 to 100 rpm. Also, calculate the crisp output for motor speed for a particular weight and inclination angle [8]

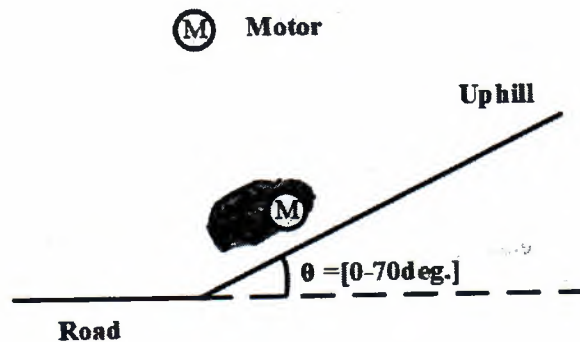


Figure 1. A self-driving vehicle traveling uphill

2. a. Develop a 5-bit Binary Weighted Digital to Analog converter and explain its advantages and disadvantages. [4]
b. Explain the errors in measurement system and need for calibration. [4]
3. a. Explain the working principles of an ammeter and voltmeter based on Permanent magnet moving coil. [5]
b. Explain the operation of instrument transformers. [3]
4. a. Develop a Data acquisition system (DAS) to measure the temperature of a certain equipment. Specify the type of sensor, ADC and other necessary components that you will use to build it along with their functions. [6]
b. Show how can we practically develop the DAS in real-world. [2]
5. a. Derive the relationship for output for voltage to current converter used in instrumentation. [5]
b. Explain the process of occurrence of inductive and capacitive interference in electronic circuits. [3]

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6.
 - a. A TV company requires to rotate (change the position) of their disc antenna according to some reference setting for a proper operation. Develop a closed loop control system for it and also explain the function of each component that will be used for its implementation. [6]
 - b. Explain the working and application of a thermocouple. [2]