Course Title: Real-Time Computer Control Systems	**Date: 1/2/2015**
Course No: (630512)	**Time Allowed: 2 Hours**
Lecturer: Dr. Mohammed Mahdi	**No. of Pages: 2**

Question 1:   *(10 Marks)*

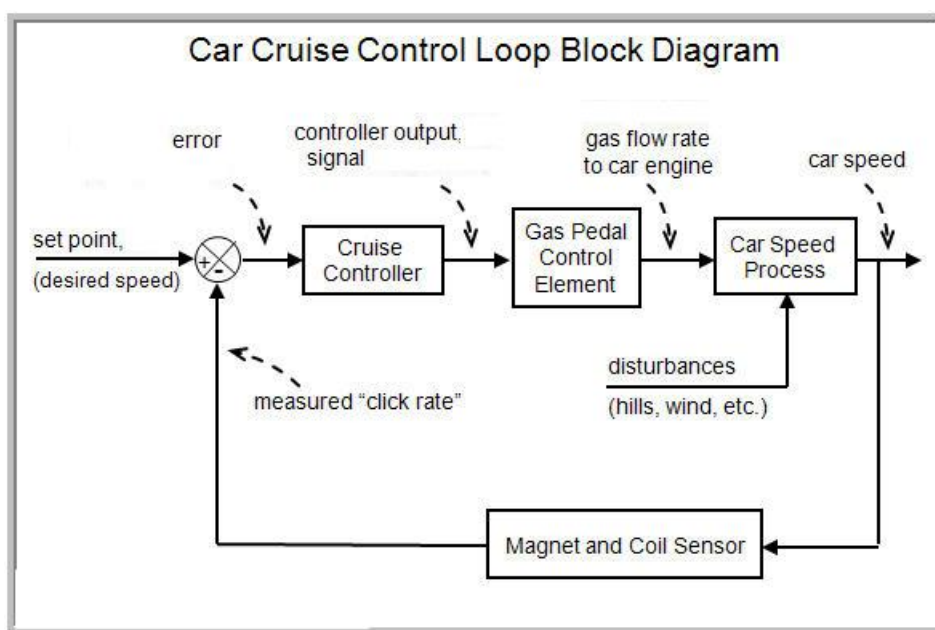**Objectives: This question is about the basic concepts RTCCS.**

Complete the following sentences: -

1. Computer control system can be assembled from…………………………………
2. Clock-based system is defined as…………………………………………………
3. Analog controller has the disadvantages of………………………………………
4. Supervisory digital computer is used to……………………………………………
5. Man Machine Interface is applied for………………………………………………
6. Pulse input interface is composed of………………………………………………
7. One can use Programmable Gain Amplifier when…………………………………

Question 2:   *(10 Marks)*

Objectives: This question is about DDC system design and Data transfer techniques

A) Given the following system block diagram, it is required to sketch its DDC real-time computer control I\O interfacing scheme. (7 Marks)

Car Cruise Control Loop Block Diagram

B) Explain the data transfer technique using INTERRUPTS, and then show what the status which is used for. (3 Marks)

Question 3: (10 Marks)

Objectives: This question is about Task scheduling and real-time languages.

A) Show in table a full comparison between the Round-Robin and Priority-based scheduling strategies. Which one is better? (5 Marks)

B) List and classify the user requirements for the real-time languages. (5 Marks)

Question 4: (10 Marks)

Objectives: This question is about discrete –time systems.

A) Show with simple mathematical example how one choose sampling time. (2 Marks)

B) Show mathematically the rules of mapping s-plane into z-plane. (3 Marks)

C) It is required to apply Jury test to check the absolute stability of the following system characteristics equation. (5 Marks)

$$P\text{ (z) } = 1 + GH\text{ (z) } = z^4 - 1.2z^3 + 0.07z^2 + 0.3z - 0.08 = 0$$