



ملحوظة : الأسئلة على ثلاث أوجه ويمكن الاستعانة بالجدول في صفحة 3 إذا لزم ذلك

Q1

30

1- Define

- Real Time Control System
- Embedded Control System
- Embedded Computer
- Real Time Operating System

الترجمة
لغات الكمبيوتر
والأنظمة
الوقتية

2- Discuss the effects of the following factors on the performance of the real time control systems:

- Word length
- Addressing mode
- Busses
- Computer Ports
- Operating System

3- Compare between Windows and Linux Operating Systems based on Real Time Control System.

Q2

25

(a) Compare between serial and parallel data transfer.

(b) Two on-off valves and on-off motor are interfaced with computer parallel port, in which the output of an alarm is connected with the status of the parallel port. Write a real time program to control the operation of these valves as:

- 1- Open the two valves
- 2- Turn motor on



3

119
Minoufia University
Faculty of Electronic Eng.
Dep. Of Ind. Electronics and Control Eng.

4th Year Ex.
Real Time Control System
14-1-2008
3 hour

Answer all questions

الإجابة عن أربع ساعات

Q1

Choose the correct statement.

- 1- A batch process is
 - a- process in which a sequence of operation is carried out.
 - b- System in which production is maintained for long periods of time without interruption.
 - c- Laboratory system.
- 2- Word length
 - a- Is a hardware requirements.
 - b- Is a software requirements.
 - c- Is not a hardware or software requirements.
- 3- Interfacing relays is
 - a- Analog
 - b- Digital
 - c- Pulse.
- 4- Asynchronous transmission
 - a- Implies that both the transmitter and receiver circuits use their own local clock signals.
 - b- Implies that both the transmitter and receiver circuits use the same clock signals.
 - c- Both (a) and (b).
- 5- In data bus computer network
 - a- All the devices are plugged into the transmitting medium.
 - b- The data are sent to the central switch.
 - c- The data are sent to many of central switches.
- 6- The better interfacing card is
 - a- ISA
 - b- EISA
 - c- PC
 - d- PCI
- 7- For a process with time constant = 20 ms., the sampling can be
 - a- 2 ms
 - b- 20 ms
 - c- 22 ms
 - d- 220 ms
- 8- The PID controller
 - a- Can not stabilize unstable real system.
 - b- Can stabilize unstable real system.

الانتهاء من
الامتحان في الساعة 12:00
بالتفصيل في ورقة
الاجابة

Minoufia University
Faculty of Electronic Eng.
Dep. of Ind. Electronics and Control Eng.

4th Year Ex2013
Real Time Control System
Mid-year Exam
1 hour

Student Name :

Section :

Student ID :

Q1

- 1- Give some examples of Type 2 Real Time Control system.
- 2- Explain why embedded systems are time critical applications.
- 3- What are the main activities of computer in industry?

Q2

A Heater model is given as $y(k+1) = -0.1y(k) + 0.2y(k-1) + 0.1u(k)$.

Using a sample period = 10 ms. Write a program to simulate the following operation :

- 1- Turn the Heater ON.
- 2-DDC begin using PD controller in which ($k_p = 0.2$ and $k_d = 0.1$)
- 3-After half hour turn the Heater OFF

Is this program real time ? Explain.

Real time
2013/2014
mid term
د. البرزنجي

د. البرزنجي !

د. البرزنجي !

UNIVERSITY OF MENOUFIA
FACULTY OF ELECTRONIC ENG.
DEPT OF INDUSTRIAL ELECTRONICS
AND CONTROL ENG.

B.S. - MID TERM EXAM
R.T.S.
TIME 1 H

اصلى
الجامعة

أحد في ورقة الأسئلة
اسم الطالب
القبول
الرقم الأكاديمي

1-1 The main elements of a computer control system are :

- 1- such as : software
- 2- such as : hardware
- 3- such as : firm

اصلى
الجامعة

1-2 A computer control system is a real time system (Type1 - Type2
- includes Type1 and type2- not includes type1 or type2)

1-3 Sensor based sensor is such as :

1-4 Clock based system is such as :

1-5 Direct digital control is

اصلى
الجامعة

ملحوظة : الأسئلة على وجهين
درجة التحرير 85 درجة

Q1

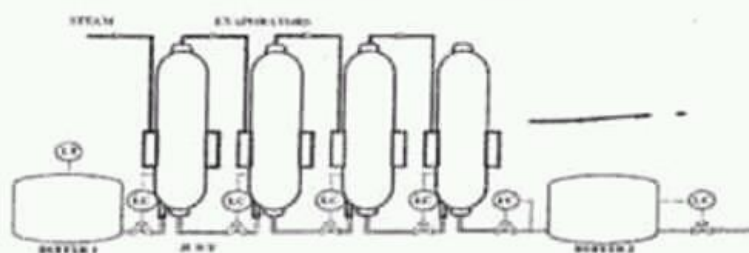
30

- 1- What is the importance of using the computers in Egypt industry?
- 2- What are the software and the hardware requirements to implement the real time control system?
- 3- Based on Real time applications. Compare between : Windows – Linux – Real time operating system.
- 4- What are the computers activates in real time control system?
- 5- What is the importance of determining the sampling period?
- 6- Based on real time applications .Compare between ruggedized industrial PCs and general purpose PCs systems.

Q2

15

The structure of the evaporator unit is shown below. All the valves are ON-OFF. Is it better to use a centralized or decentralized controller? Give your comments aided with a block diagram to show your choice



Structure of the evaporator unit

2- Ruggedized industrial PC offers benefits such as:

- 1-
- 2-
- 3-
- 4-

3- The main disadvantages of using the general PC in the industrial applications are:

- 1-
- 2-
- 3-

4- The types of computer interfaces are:

- 1-
- 2-
- 3-
- 4-



5- The classifications of real time systems are:

- 1-
- 2-
- 3-

6- Serial communication for real time applications can be characterized in several ways as:

- 1-
- 2-
- 3-
- 4-

إرشادات:

- 1- عدد الأسئلة 4 موزعة على أربع صفحات
- 2- اجب عن جميع الأسئلة
- 3- الدرجة من 85

Q1

24

- 1- Define:
- Real Time System
 - Soft Real Time System
 - Hard Real Time System
 - Firm Real Time System

إتجاه طلاب
كلية الهندسة الإلكترونية

- 2- What is the embedded operating system?
- 3- What are the applications of real time clock?
- 4- What are the types of data transfer techniques?
- 5- What is the graphical user interface?

Q2

23

Complete without explanations

- 1- The important features of the computer CPU which determine the processing power in real time applications are :

- 1-.....
- 2-.....
- 3-.....
- 4-.....
- 5-.....

A boiler has a heater, an analog temperature sensor, and one alarm. The system is controlled on line using a computer, in which the sequence of operation is:

- 1- Turn heater on.
- 2- DDC begin using a PD controller (the desired temperature is T_D , the sampling period is T_s , $k_p=1.2$ and $K_d = 0.5$)
- 3- If the alarm is on : Turn heater off.
- 4- Repeat.

- (a) Write a real time program.
- (b) What is the type of data transfer you will use?
- (c) What are the input tasks, output tasks, control tasks, and the communication tasks?
- (d) What are the types of interfaces?

With my best wishes
Dr. M. El Bardini



: اسم الطالب

: الفصل

Q1

- 1- Define: Firm real time system – Type 2 real time system
Batch process - Embedded operating system
- 2- What are the limitations of using the general purpose PC in real time industrial applications ?

Q2

An Oven has a heater, a temperature sensor, a pressure sensor, and 3 alarms. The system is controlled online in which the sequence of operation is as:

- 1- Turn heater on.
- 2- If the temperature is $> T1$: turning the heater off.
- 3- If the pressure is $\geq P1$: turning the heater off.
- 4- If one alarm is on : turning the heater off.
- 5- Wait 1/2 hour.
- 6- Go to step 1.

- (a) What are the input task, and the output task?
- (b) Draw a flowchart to show the sequence of operation to be carried
- (c) What is the operating system be better to use for this operation?