

University of Technology

Computer Engineering & Information Technology Department

Examiner: Dr. Bassim A. Jumaa

Subject: Microcomputer system design

Class: 3<sup>rd</sup>

Date: /09/2008

Time: 3 Hours

**Note:** Answer only FOUR questions.

**Q1:** a) What is the purpose of instruction queue?

b) The 8086 microprocessor has four segment registers. Why? Explain it.

c) What is the difference between aligned word and misaligned word? Explain it.

**Q2:** a) A data segment is to be located from address  $A0000_{16}$  to  $AFFFF_{16}$ . What value must be loaded into Data Segment?

b) Explain the interrupt signals of the 8086 microprocessor.

c) Explain the read bus cycle.

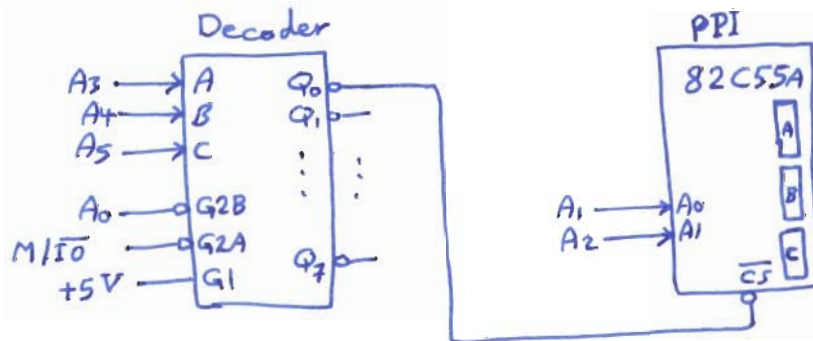
**Q3:** a) Draw the circuit diagram of the 74F373 (address bus latch) and explain its operation.

b) Identify the I/O address lines used in isolated I/O type.

c) What is the difference between PROM and EPROM ?

**Q4:** a) How is an 82C55A configured if its control register contains 9BH?

b) What are the addresses of the A, B, and C ports of PPI in the following circuit.



Note: All the don't care address lines are assumed to be logic 0.

c) Write an instruction sequence that loads the value  $12_{16}$  into the least significant byte of the count register for counter 2 of an 82C54, starting at memory address  $05000_{16}$ .  $A_1A_0$  of the microprocessor are directly connected to  $A_1A_0$  of the 82C54.

**Q5:** a) Write an instruction sequence that reads the value of the address from the current address from channel 0 into the AX register. Assume that the 82C37A has the base address 10H.

b) What is the mode register format of the 82C37A DMA controller?

c) If counter 1 of the 82C54 is programmed to operate in mode 2 and is loaded with decimal number 18. Describe the signal produced at  $OUT_1$ . Assumed that the counter is configured for BCD counting.

University Of Technology  
Computer Engineering And Information Technology  
Second Attempt  
2008

Subject: Operating System  
Lectuarer: Dr. Muna Al-Nayar

Time: 3 Hours  
Class: Third

**Attempt only five questions**

**Q1:**

- When a process should be terminated with its children?
  - A system with four levels of access each level can send a process to CPU such that
    - Level1 for emergency
    - Level2 for directing
    - Level3 for casual user
    - Level4 for maintenance
- Design a scheduler for this system.

**Q2:**

- How can O.S. pass a message using direct communication and what are its properties?
- Write an algorithm to synchronize n-process in a system

**Q3:** Compare between

- Soft real time/ hard real time
- Batch system / time sharing
- Long term scheduling / short term scheduling
- Paging / segmentation

**Q4:**

Define the following  
Multiprogramming, MVT, starvation, compaction, client-server system

**Q5:**

- A system with a total 150 units of memory, 5 printers and 20 disk drives, allocated to five processes as shown

Process	Max-need			Allocated		
	Memory	Printer	Disk	Memory	Printer	Disk
P1	70	4	13	45	1	2
P2	60	3	12	40	1	5
P3	60	4	10	15	0	1
P4	80	2	2	10	0	0
P5	77	3	15	20	1	3

Apply the banker's algorithm to determine whether it would be safe to grant each of the following requests? If yes, indicated a safe sequence that could be guaranteed possible. If a request from the third process arrives, for maximum memory need of 120, 5 printers and 19 disk drives with initial allocated of 45 memory units, 1 printers and 0 disk drives, can that request be safely granted immediately? In what state would this request leave the system?

**Q6:**

a-Consider a system as follows

Process	Arrival time	Burst time
P1	0	7
P2	2	15
P3	3	3
P4	12	5
P5	14	9

Draw Gantt chart and find the average turn around time and waiting time using preemptive SJF and Round Robin (quantum = 3) algorithms

b- Define a cooperating process and why to use it?

الدراسات

Software and information technology department

Final examination 2007/2008

Examiner: - Hanady abbas

subject:-computer control

Class:-3<sup>rd</sup> year

Time: - 3 hours

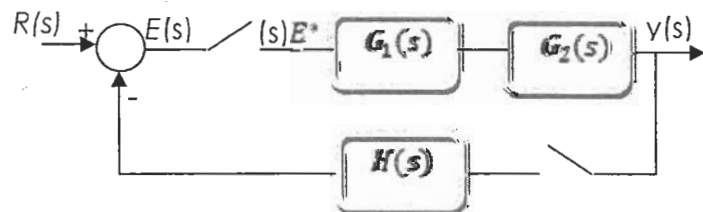
Note:-answer five questions only

Q1:- Complete the following (choose only seven)

1. Jury test array exists if .....
2. In under damped response, the closed loop are .....,while in over damped response the poles are .....
3. Shannon's theorem state that .....
4. The block diagram of a system whose closed loop pulse transfer function  $\frac{C(z)}{R(z)} = \frac{G_1(z)G_2(z)}{1+G_1(z)G_2(z)H(z)}$  is .....
5. He closed loop poles of a stable system must lie in the .....of s-plane ,this is corresponds to .....in z-plane
6. The sampling time is .....
7. There are several method are used to obtain inverse z-transform ,two of them are .....
8. The transfer function defined as.....
9. The steady state error can be calculated from the step response figure of any system as.....

Q2:A- Consider the closed loop system given as  $\frac{C(s)}{R(s)} = \frac{W_n^2}{s^2 + 2\zeta W_n s + W_n^2}$  determine the value of  $\zeta$  ,  $\omega_n$  so that the system responded to a step input with approximately 5% overshoot and with settling time of 2sec (for 2% criteria)

Q2: B- Derive the closed loop pulse transfer function of the sampled data system shown below



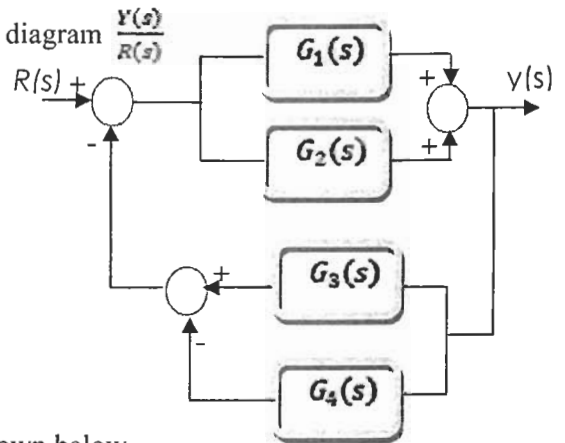
Q3:- for a unity feedback digital control system with open loop pulse transfer function

$$G(z) = \frac{0.632Kz}{(z-1)(z-0.3679)}$$

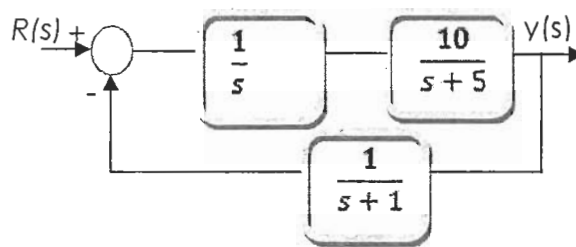
calculated at T=1sec

1. Determine the range of K for stability
2. Find the critical closed loop poles

Q4:-A- Find the transfer function of the following block diagram  $\frac{Y(s)}{R(s)}$



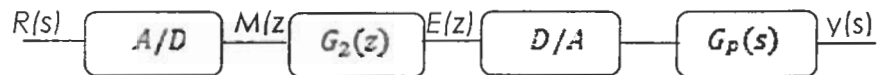
Q4:- B: - Obtain the state space model of the system shown below



Q5:- for the system shown below  $G_2(z)$  solve the following difference equation

$m(k) = 0.9m(k-1) + 0.2e(k)$ , the sampling time = 1sec and the plant transfer function is

given by  $G_P(s) = \frac{1}{s+0.2}$



1. Find the system transfer function  $\frac{Y(z)}{R(z)}$
2. Find the steady state value of the system output
3. The step response of this system

Q6:- A unity feedback system with open loop transfer function  $G(s) = \frac{10(s+1)}{s(s-3)}$

- a. Check the stability by Routh criteria
- b. Find the closed loop poles and locate them on s-plane
- c. Find the step response
- d. Find the steady state error if the input  $r(t) = 5 + 2t$

**GOOD LUCK**

السؤال الثاني

**(Answer only 4 questions)**

**Q-1:** A high-pass filter has transfer function:-

$$H(z) = \frac{(z^{12} - 1)^2 (z - 1)}{z^{23} (z + 1)^2}$$

- 1) Sketch its pole-zero configuration & frequency response (magnitude).
- 2) Find its D.E.
- 3) Find & sketch its impulse response. (25 mark)

**Q-2:** A 4-point, radix -2, decimation in time, FFT may be defined by the following index-map equations:-

$$n = 2n_1 + n_2, \quad k = k_1 + 2k_2, \quad \text{rang (0 to 1)}$$

- 1) Construct index maps for n & k.
- 2) Drive the FFT equations.
- 3) Draw the signal flow graph in terms of the basic. (25 mark)

**Q-3:** Use the inverse Fourier transforms (IFT) to find & sketch the impulse response h (n) of an ideal, zero-phase, low-pass filter with cut-off frequency  $\Omega_c = 0.4\pi$ . (25 mark)

**Q-4:** Choose a suitable pole-zero configuration for a recursive digital filter with the following properties:-

- 1) A pass band centered at  $\Omega = 0.3\pi$ , with a (-3db) band-width of  $0.03\pi$ .
- 2) Steady-state rejection of components at  $\Omega = 0.8\pi$ . (25 mark)

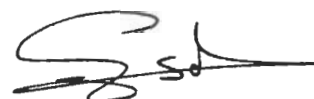
**Q-5:** A signal x[n] begins at n=0 & has six finite sample values:-

(1, 2, 3, 1, -1, 1). It forms the input to an LTI processor whose impulse response h[n] begins at (n=0) & has three finite sample values: - (1, 1, 1).

Convolve x[n] with h[n] to find the output signal y[n]. (25 mark)

**Good luck**

**Lecture: -Sahar Al-Aubaidy**



Answer four Questions only

Q1. Solve the following D. Es. using power series method.

a.  $(1+x)\bar{y} = y$

b.  $y'' = 3y' - 2y$

Q2.a. Find the work done by the force  $F(x, y, z) = \frac{1}{x^2 + 1} j$  along the

path:  $R(t) = ti + tj + tk \quad 0 \leq t \leq 1$ .

b. Prove and graph Legendre polynomial of degree 5

$$P_5(x) = \frac{1}{8}(63x^5 - 70x^3 + 15x).$$

Q3. a. Find the Taylor series of the function  $f(z) = \cos z$  with the point  $-\frac{\pi}{2}$  and determine the radius of convergence.

b. Find the Flow Integral of the vector field  $F(x, y, z) = (x+y)i - (x^2 + y^2)j$  along the path line segment from (1,0) to (-1,0)

Q4. a. Find  $\int_C (xy+x)dx + (xy-y)dy$ , where C: is the square bounded by  $x=0$ ,  $x=1$ ,  $y=0$ ,  $y=1$  using Green's theorem.

b. Find the values of the root  $\sqrt[4]{-1}$  and plot them in the complex plain.

Q5: a. Integrate the  $\frac{z^2}{z^2+1}$  in the counterclockwise sense around the circle  $|z+i|=1$ .

b. Find the flux of the vector fields  $F(x, y) = xi + yj$  along the curve  $R(t) = \cos t i + 4 \sin t j \quad 0 \leq t \leq 2\pi$ .

*University of Technology*  
*Computer Engineering and Information Technology Dept*  
*IT & Software Engineering Section*

Subject: Software Eng.

Examiner :Hayder H.Safi Aljbory

June 2008

Time:3 hours

Class: 3<sup>rd</sup> year

Q1/

Answer five only?

- A\_ What is the software engineering ?
- B\_ what are the software life cycle ,only number ?
- C\_ who is engineering understood and what is need to do it ?
- D\_ what are describe system modeling ?
- E\_ what is UML ?
- F\_ what is RAD ?

الدور الثاني

(10 marks )

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Q2/Answer two only : every one (10 marks)

- A\_ Explain prototyping ?
- B\_ What are steps analysis and design ?
- C\_ What are Requirements management ?

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Q3/Answer flowing: every one (10 marks)

- A\_ what are Guideline for constring DFD ?
- B\_ How to execute a loop a given number of times it has general form with example ?

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Q4/Answer two only: every one (10 marks)

- A\_ what are problem to waterfall model?
- B\_ How to Describe student database and what main function it ?
- C\_ Draw the software development cycle?

Good luck

**University of Technology**  
**Department of Computer Engineering And Information Technology.**  
**Final Exam 2007-2008**

**Subject Communication Engineering.**

**Year : Third ( Software Engineering and Information Technology)**

**Note: Attempt Only Four Question.**

Q1

\_\_\_ A) Suppose the following block of 16 bits to be sent using a checksum of 8 bits

10101001 00111001 00011101

And the received pattern is

10100010 00011001 00011101

Did the receiving system detect the error defend your answer?

B) What kind of arithmetic is used to add segment in the checksum generator and checksum checker? List the steps involved in creating checksum? And how does the checksum checker know that the received data is undamaged?

Q2 100 MHz carrier frequency modulated by 10 KHz(fm) sinusoid signal Determined The bandwidth for FM signal if

a)  $\beta=0.1$ .

b) Repeat if  $\beta=5$ .

c) Repeat if  $f_m=20$  and  $\beta=10$ .

Q3

A) Draw the block diagram for TDMA and FDMA encoder and decoder and what is the difference between TDMA and FDMA.

B) For CDMA multiplexing technique what is the size of Walsh if there is 8 stations share the transmission media and determined the chip code for each station.

Q4

A) For GSM mobile system what are the bands and frequencies used in communication. And what are multiplexing techniques used in this system draw the block diagram for the transmission system.

B) Define the following terms 1) handoff 2) base station 3) Mobile switching center

Q5

A) for QAM/QPSK if the carrier in I channel was  $C_I = A/\sqrt{2} \cos(\omega_c t - \frac{\pi}{4})$

While the carrier in Q channel  $C_Q = A/\sqrt{2} \sin(\omega_c t + \frac{3\pi}{4})$

Drive the phase shift table then draw the timing diagram of the message (1110110)2.

University Of Technology  
Computer Engineering and Information Technology Dept.  
Final Exam 2008

Subject : Operating System  
Class: Third

Time : 3 Hours  
Lecturer: Dr. Muna Al-Nayar

**Note (answer only five questions)**

Q1-

- a- A system with five resources and 5 processes such that
- R1 is allocated to P2, R2 is allocated to P1, R3 is allocated to P5, R4 is allocated to P3 and R5 is allocated to P4.
  - P1 invoked R1, P2 invoked R3, R4 and R5, P3 invoked R5 and P4 ~~R4~~ invoked R2.

Draw the wait-for graph, show if the system in deadlock or not, and how to recover from deadlock.

- b- Write an algorithm for producer-consumer problem using semaphore.

Q2-

- a- A computer system with R1=200, R2=5, R3=15 , allocated to 5 processes such as

P	MAX-NEED			ALLOCATED		
	R1	R2	R3	R1	R2	R3
1	100	2	5	70	2	3
2	50	3	5	35	1	2
3	120	4	7	25	1	3
4	150	2	8	20	1	2
5	130	3	4	10	-	3

Apply Banker's algorithm to find a safe sequence.

- b- How to apply shared paging?

Q3- Define the following

Cluster system, dispatcher, relocation, thread, time sharing system, distributed system, ~~PBC~~.

PCB  
↓

Q4- Compare between

- 1- internal and external fragmentation
- 2- peer-to-peer and client-server system
- 3- deadlock and starvation
- 4- MVT and MFT

**Q5-**

- a- How does windows 2000 schedule threads?
- b- How to protect memory?

**Q6-**

- a- What is address binding and when can be done?
- b- Consider the following system

P	Burst time	Arrival time
1	10	0
2	8	1
3	15	2
4	5	3

Find the average turnaround time and waiting time using FCFS, preemptive SJF (using the least burst time), Round robin (quantum=3).

**GOOD LUCK**

University of Technology  
Computer Engineering & IT Department

Subject: Information Technology  
3<sup>rd</sup> Class IT

Time: 3 hrs  
Date: / /2008

<< Final Examination-1 >>

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Note: Answer 4 questions only

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Q1/ For binary DMS, X with 2 symbols [x1, x2], prove that H(x) is maximum when  $p(x_1) = p(x_2)$  then find the value of max H(x).

Q2/ Consider DMS X with symbols  $x_i$  and  $p(x_i)$  with size  $m$ , let  $n_i$  be the length of  $x_i$  such that:

$$\log_2 (1/p(x_i)) \leq n_i \leq 1 + \log_2 (1/p(x_i))$$

Show that this relation satisfies the *Kraft* inequality and find the bound on  $K$

Q3/ A telegraph source has two symbols (*dot* and *dash*). The time of *dot* is 0.2 sec, the time of *dash* is 3 times of *dot* time, and the time between symbols is 0.2 sec. The probability of *dot*'s occurring is twice that of the *dash*. Find the average rate of information for the telegraph source.

Q4/

- a. DMS X source has 4 symbols with  $p(x_i)=[0.5, 0.25, 0.125, 0.125]$  Construct Fano code and calculate the efficiency.
- b. DMS X source has 5 symbols with  $p(x_i)=[0.2, 0.2, 0.2, 0.2, 0.2]$  Construct Huffman code and calculate the efficiency.

Q5/

For a noiseless channel with inputs=outputs=  $m$ , show that

$$H(X) = H(Y), \quad H(Y/X) = 0.$$

University of technology

Software and information technology department

Final examination 2007/2008

Examiner: - Hanady abbas

subject:-computer control

Class:-3<sup>rd</sup> year

Time: 3 hours

Note:-answer five questions only

Q1:- Answer the following briefly (choose only seven)

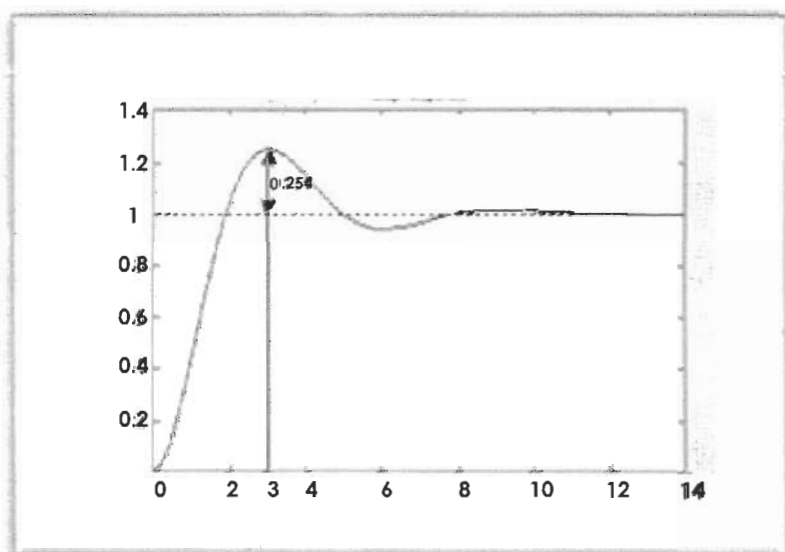
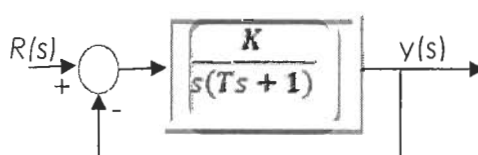
1. Based on the characteristic equation of the form  $P(z) = 1 + GH(z) = 0$ , state the possible cases of stability
2. Draw the block diagram of  $C(z) = \frac{G_2(z)RG_1(z)}{1+G_2(z)H(z)}$
3. State the three cases of step response according to the value of damping ratio with plot
4. The mathematical model of a system can be represented as transfer function or state space, which is the best? Why?
5. Sketch the general block diagram of computer control system
6. How you can check the stability of any system according to Routh method
7. Draw the block diagram of the following closed loop transfer function  $\frac{y(s)}{R(s)} = \frac{G(s)}{1-G(s)H(s)}$
8. What is the difference between the z-transform and the Laplace transform? What is the relation between them?
9. Explain the zero order hold

Q2:- Consider a system described by the following differential equation

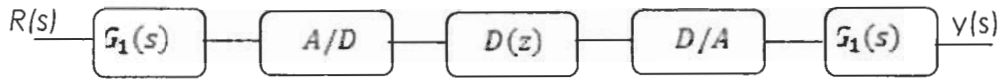
where  $y, R$  is the output and the input  $y'''' + 4y''' + 5y'' + y' + 2y = 5R$  of the system respectively

- i Find the mathematical model of this system as transfer function
- ii Obtain the estate space model of this system
- iii Sketch the block diagram that represents the output and state equations

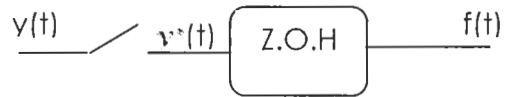
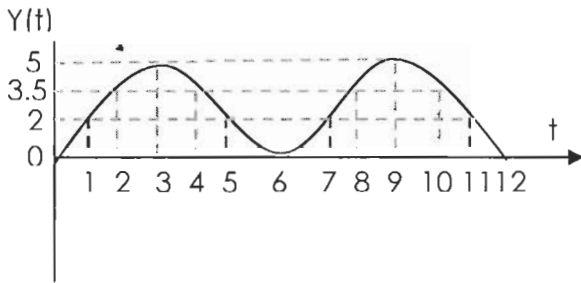
Q3:- Consider the control system as shown in figure below (a), this system is subjected to a step input, the system output response's as shown in figure b. determine the value of K, T from the plot



**Q4:- A:** - Obtain  $c(z)$  as a function of the input  $R(s)$  of the system shown below

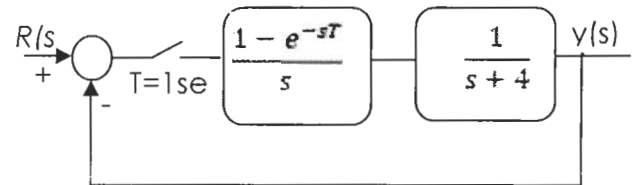


**Q4: B:** - Consider the input to a sampler is shown below, sketch the signals after the sampler and zero order hold  $Y^*(t), f(t)$

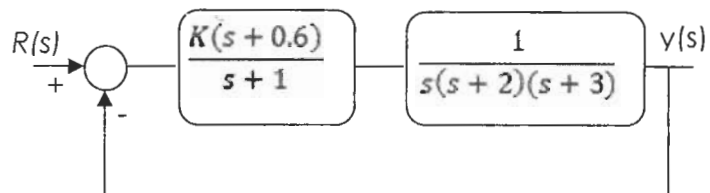


**Q5:-** For the sampled data system shown below

1. Find the open loop pulse transfer function
2. The best sampling time according to Shannon theorem
3. The steady state error for step input  $r(t) = 5$
4. Check the stability of this system by jury test and locate the closed loop poles on the z-plane



**Q6:-** Large welding robots are used auto plant .the welding head is moved to different position on the auto body and rapid .accurate response is required .a block diagram of a welding head position system is shown below .it is desired to determine the range of K for which the system is stable



**GOOD LUCK**

**University of Technology**  
**Computer Engineering and IT Department**

**Class : 3<sup>rd</sup> year, IT,SW**  
**Subject: Advanced Mathematics**  
**Examiner: Dr. Salih H. Ali**

**Time: 3 Hrs.**  
**Date: 9/6/2008**

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Answer four Questions only

Q1.a. Find the work done by the force  $F(x, y, z) = 2y i + 3x j + (x + y) k$  along the path:  $R(t) = \cos t i + \sin t j + \frac{t}{6} k$   $0 \leq t \leq 2\pi$ .

b. Find and graph Legendre polynomial of degree 6 ( $P_6(x)$ ).

Q2. Solve the following D. Es. using power series method.

a.  $(1 - x^2)\bar{y} = 2xy$

b.  $(1 - x^2)y'' = 2xy' - 2y$

Q3. a. Find the Taylor series of the function  $f(z) = e^z$  with the point  $(\pi i)$  and determine the radius of convergence.

b. Find the circulation and flux of the vector fields  $F_1(x, y) = x i + y j$   
 $F_2(x, y) = -y i + x j$  along the curve  $R(t) = \cos t i + 4 \sin t j$   $0 \leq t \leq 2\pi$ .

Q4. a. Integrate the  $\frac{e^{z^2}}{2z - i}$  in the counterclockwise sense around the unit circle.

b. Find the Flow Integral of the vector field  $F(x, y, z) = (x - z) i - x k$  along the curve  $R(t) = (\cos t) i + (\sin t) k$   $0 \leq t \leq \pi$

Q5. a. Find  $\int_C y^2 dx + x^2 dy$ , where C: is the triangle bounded by  $x=0$ ,  $x+y=1$ ,  $y=0$  using Green's theorem.

b. Find the values of the root  $\sqrt[3]{1+i}$  and plot them in the complex plain.

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**Good Luck**

**University of Technology**  
**Department of Computer Engineering And Information Technology.**  
**Final Exam 2007-2008**

**Subject Communication Engineering.**

**Year : Third ( Software Engineering and Information Technology)**

**Note: Attempt Only Four Question.**

Q1A

- 1) \_\_\_\_\_ is An error detection method that consist of a party bit for each data unit as well as an entire data unit of party bits.
- 2) \_\_\_\_\_ is An error detection method that used one's complement arithmetic.
- 3) \_\_\_\_\_ is an error detection method that used single one redundant bit per data unit.

B) The following block is received by a System using Checksum, which bits are in error defend your answer?

10010101 01001111 11010000 11011011.

Q2A) ten MHz carrier frequency modulated by sinusoid signal so that the peak frequency deviation ( $\Delta f$ ) is 50 KHz, Determined the bandwidth for FM signal if the frequency of modulating signal ( $f_m$ ) is:

- a) 500KHz.
- b) 500Hz.
- c) 10KHz.

B) Design a Mobile general structure and show the basic parts of the system, and then give meaning of handoff, which part of mobile system is responsible for doing handoff and what are the types of handoff.

Q3

A) Design a Code Division Multiple Access (CDMA) multiplexing that allows four stations to share a single communication channel and then determined the chip code for each station using Walsh table. And what is the size of Walsh table if there are 16 stations need to share single communication system.

B) Define the following terms: 1) Twisted pair cable, 2) Coaxial Cable, 3) GEO Orbit 4) Mobile Switching center.

Q4

The FM signal:

$$\phi(t) = 20 \cos[(2\pi \cdot 10^3 t) + 10 \sin(2\pi \cdot 10^3 t)]$$

Is presented across a  $50 \Omega$  resistive load:

- a) What is normalized output power.
- b) Find the peak frequency deviation.
- c) Determine the approximate bandwidth of the above signal using Carson's rule.

Q5

A) Design a Non Coherent FSK communication System. And draw the timing diagrams to test the designed system by transmitting the data stream (11011001)2.

B) Draw the General block diagram of optical fiber communication system.

Final Examination

**(Answer only 5 questions)**

**Q-1:** An 8-point, radix -2, decimation in time, in-place, FFT may be defined by the following index-map equations:-

$$n=4n_1 + 2n_2 + n_3$$

$$k=k_1+2k_2+4k_3 \quad \text{rang (0 to 1)}$$

- 1) Construct index maps for  $n$  &  $k$ , assuming a natural-order output specify the shuffled input sequence.
- 2) Drive the FFT equations. (14 mark)

**Q-2:** An analog band pass filter has transfer function:-

$$H(s) = \frac{s}{(s+1)(s+2)}$$

Where  $(s)$  is the Laplace variable. Design a recursive-Impulse-Invariant filter based on a sampling interval of  $(0.1 \text{ s})$ ; specify a suitable set of difference equation. (14 mark)

**Q-3:** Tabulate the sample values of a Von Hann window with  $(11)$  terms 'estimate one half of window' (14 mark)

**Q-4:** Explain & sketch the meaning of the following terms as applied to an FFT algorithm:

Shuffled-input, Twiddle factor, Butterfly, Decimation in-time. (14 mark)

**Q-5:** Two digital signals are as follows:

$$X_1[n] = \delta[n] - \delta[n-1] + \delta[n-3].$$

$$X_2[n] = 2\delta[n-1] + \delta[n-2] - \delta[n-3].$$

Find the Z-transforms  $X_1[z]$  &  $X_2[z]$ . Convolve the two signals to form a third signal  $X_3[z]$ . Hint:  $\delta[n]$  z-transform  $\rightarrow 1$  (14 mark)

**Q-6:** 1) Draw a block diagram for a digital processor with the following recurrence formula. Distinguish clearly between its non-recursive & recursive parts.  $Y[n] = 1.6y[n-1] - 0.9y[n-2] + 0.5x[n] - 0.1x[n-2]$ .

2) Plot the Z-plane pole & zeros of the:-

$$X(z) = (z^5 - 1)(z^2 + 1) \quad (14 \text{ mark})$$

**Good luck**

Lecture: -Sahar Al-Aubaidy



**University of Technology**

**Computer Engineering & Information Technology Department**

Examiner: Dr. Bassim Abdulbaki Jumaa      Class: 3<sup>rd</sup>      Time: 3 Hours

Subject: Microcomputer System Design      Date: 22-06-2008

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Note: Answer only **FOUR** questions.

- Q1:** a) The 8086 Microprocessor employs parallel processing. Explain it.  
b) What is the maximum memory space that can be used at any time in the 8086 system? Explain it.  
c) We use two memory banks in the 8086's memory system. Why? Explain it.

- Q2:** a) The 8086 has 16 data bus lines which are multiplexed with address lines  $A_0$  through  $A_{15}$ . Explain how they are used.  
b) What clock outputs are produced by the 8284. What would be their frequencies if a 30 MHz crystal were used? What is the duration of the bus cycle when it is used to deliver 8086 Microprocessor.  
c) Give an overview of how a word of data is read from memory address  $A00D_{16}$ .

- Q3:** a) Explain the operation of the circuit which can be added to the data storage memory interface to improve the reliability of data transfers over the data bus.  
b) Show how the (8KByte X 4 bit) ROM memory chip can be used to form (64KByte X 8 bit) memory (two banks).  
c) What do EPROM and DRAM stand for?

- Q4:** a) What is the mode and I/O configuration for ports A, B, and C of an 82C55A after its control register is loaded with  $82_{16}$ ?  
b) Assume that you want to read 12 bits input signal and comparing it with the set point. The difference is output as 12 bit signal. Design an interface (using 82C55A) and write a program which configures and implements the above operations.  
c) Draw the block diagram of the 82C54 interval timer.

- Q5:** a) Write an instruction sequence to set up the three counters of the 82C54 as follows:  
Counter 0: BCD counter operating in mode 2 with an initial value of ABCAH.  
Counter 1: Binary counter operating in mode 4 with an initial value of 9001H.  
Counter 2: Binary counter operating in mode 1 with an initial value of 5400H.  
Assume that the base address of the 82C54 is 88H.  
b) Summarize the 82C37A's DMA request/acknowledge sequence.  
c) List the DMA's operation modes and explain one of them.

*University of Technology*  
*Computer Engineering and Information Technology Dept*  
*IT & Software Engineering Section*

Subject: Software Eng.

Examiner :Hayder H.Safi Aljbory

June 2008

Time:3 hours

Class: 3<sup>rd</sup> year

**Q1/**

**Answer five only?**

- A\_ what are meaning Requirements Elicitation ?**
- B\_ what are meaning Requirements Specification ?**
- C\_ what are requirements management ?**
- D\_ what are problem to waterfall model ?**
- E\_ what is use case Diagram**
- F\_ what is problem of scope ?**

**(10 marks )**

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**Q2/Answer two only : every one (10 marks)**

- A\_ Design Electronic office model ?**
- B\_ What are types of software ?**
- C\_ What are Elements of software Engineering ?**

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**Q3/Answer flowing: every one (10 marks)**

- A\_ Explain Rapid Application Development (RAD) model ?**
- B\_ Explain the prototyping ?**

-----  
**Q4/Answer two only: every one (10 marks)**

- A\_ Draw Diagram of the use case diagram ?**
- B\_ Draw Package Diagrams ?**
- C\_ Draw the software development cycle ?**

**Good luck**

**University of Technology**  
**Computer Engineering and IT Department**

**Class : 3<sup>rd</sup> year, IT, SW**

**Time: 3 Hrs.**

**Subject: Advanced Mathematics**

**Date: /11/2008**

**Examiner: Dr. Salih H. Ali**

Answer four Questions only

Q1.a. Find the work done by the force  $F(x, y, z) = 3yi - xj$  along the path:  $R(t) = ti + tj + tk \quad 0 \leq t \leq 1$ .

b. Prove and graph Legendre polynomial of degree 4

$$P_4(x) = \frac{1}{8}(35x^4 - 30x^2 + 3).$$

c.

Q2. Solve the following D. Es. using power series method.

a.  $(x-3)\bar{y} = xy$

b.  $y'' = y' + x$

Q3. a. Find the Taylor series of the function  $f(z) = \sin z$  with the point  $-\frac{\pi}{2}$  and determine the radius of convergence.

b. Find the Flow Integral of the vector field  $F(x, y, z) = (x+y)i - (x^2 + y^2)j$  along the path line segment from (1,0) to (-1,0)

Q4. a. Integrate the  $\frac{e^z}{z^2 + 1}$  in the counterclockwise sense around the circle  $|z+i|=1$ .

c. Find the flux of the vector fields  $F(x, y) = xi + yj$  along the curve  $R(t) = \cos t i + 4 \sin t j \quad 0 \leq t \leq 2\pi$ .

Q5. a. Find  $\int_C (xy + x)dx + (xy - y)dy$ , where C: is the square bounded by  $x=0$ ,  $x=1$ ,  $y=0$ ,  $y=1$  using Green's theorem.

b. Find the values of the root  $\sqrt[4]{-i}$  and plot them in the complex plain.

الدراسات

**Good Luck**

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**(Answer only 4 questions)**

**Q-1:** Two real signal have the following sample values:-

1) 1, -1.

2) 1, 2, 1, 3.

Estimate the real & imaginary parts of their DFT coefficients  $x[k]$ .

(25 mark)

**Q-2:** A Butterworth low-pass filter is required with a cut-off frequency

( $\Omega_1 = 0.2\pi$ ). Its response should be at least (30 db down) at ( $\Omega = 0.4\pi$ ).

Estimate the minimum order of filter required.

(25 mark)

**Q-3:** Tabulate the sample values of a hamming window with (13) term.

Estimate one half of window.

(25 mark)

**Q-4:** Define the following terms as applied to an FFT algorithm:-

1) Radix-2.

2) Decimation in-time.

3) Twiddle factor.

(25 mark)

**Q-5:** Plot the Z-plane poles & zeros of the following Z-transfers:-

1) 
$$X(z) = \frac{z^2(z - 1.2)(z + 1)}{(z - 0.5 + j0.7)(z - 0.5 - j0.7)(z - 0.8)}$$

2) 
$$X(z) = (z^5 - 1)(z^2 + 1)$$
 (25 mark)

**Good luck**

Lecture: -Sahar Al-Aubaidy



**University of Technology**  
**Department of Computer Engineering And Information Technology.**  
**Final Exam 2007-2008**

**Subject Communication Engineering.**

**Year : Third ( Software Engineering and Information Technology)**

**Note: Attempt Only Four Question.**

Q1

If a total of 25 MHz of bandwidth is allocated to a particular cellular telephone system which uses two 20 KHz simplex channels to provide a full duplex voice channels, compute the number of channels available per cell if  $i$  and  $j$  used to determined cluster size is

- 1-  $i=2$  and  $j=1$ .
- 2-  $i=3$  and  $j=2$ .

B) define the following terms: 1) Base station, 2) Mobile Switching Center, 3) Frequency Reuse, 4) cluster, 5) soft handoff.

Q2

- 1) \_\_\_\_\_ is An error detection method that consist of a parity bit for each data unit as well as an entire data unit of parity bits.
- 2) \_\_\_\_\_ is An error detection method that used one's complement arithmetic.
- 3) \_\_\_\_\_ is An error detection method that used single one redundant bit per data unit.

B) Suppose the following block of 16 bits to be sent using a checksum of 8 bits

10110110 01110001

What is the pattern will be sent, and explain how the receiver know that the received data unit is undamaged?

Q3 Design a Coherent PSK Communication System. Draw the timing diagrams to test the designed system by transmitting the data stream (101101)<sup>2</sup>.

Q4

- A) Design a Code Division Multiple Access (CDMA) multiplexing that allows four stations to share a single communication channel and then determined the chip code for each station using Walsh table.
- B) What are the size of Walsh table if there are 8 stations shared a communication channel and determined the chips code for each station.

Q5

Ten MHz carrier frequency modulated by sinusoid signal so that the peak frequency deviation ( $\Delta f$ ) is 40 KHz, Determined The bandwidth for FM signal if

- a)  $F_m = 400\text{KHz}$ .
- b)  $F_m = 400\text{Hz}$
- c)  $F_m = 20\text{KHz}$ .
- d) Repeat if  $\Delta f$  changed to 30 KHz and  $f_m = 400\text{ KHz}$ .

الدور الثالث

University Of Technology  
Computer Engineering & Information Technology Dept.  
Third Attempt  
2008

Subject: Operating System  
Class: Third

Time: 3 Hours  
Lecturer: Dr. Muna Al-Nayar

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NOTE: ATTEMPT ONLY FIVE.

**Q1:** Define the following

Time sharing, multi-level queue, fragmentation, batch system, context switch, swapping, peer-to-peer system.

**Q2:**

- a- Define a process and what are the main operations can be done with it?
- b- Write an algorithm for producer-consumer problem using semaphore.

**Q3:**

- a- What is a multi-level feed back queues and how to use it?
- b- How to use hardware for synchronization?

**Q4:**

- a- How to prevent hold and wait condition to prevent deadlock?
- b- What is meant by address binding ,when can be done?

**Q5:**

- a- Why to combine paging and segmentation together?
- b- Consider the following system, draw the Gantt chart and find average turn around time and waiting time using FCFS, SJF and Round Robin (quantum=2)

Process	Burst time
P1	15
P2	20
P3	10
P4	12
P5	8

**Q6:**

Consider a system with 4 processes and three resources R1=9, R2=3 and R3=6, find 2 safe sequence.

Process	Max-need			Allocated		
	R1	R2	R3	R1	R2	R3
P1	3	2	2	1	0	0
P2	6	1	3	6	1	2
P3	3	1	4	2	1	1
P4	4	2	2	0	0	2

**GOOD LUCK**

University of technology  
Software and information technology department  
3<sup>rd</sup> attempt 2008

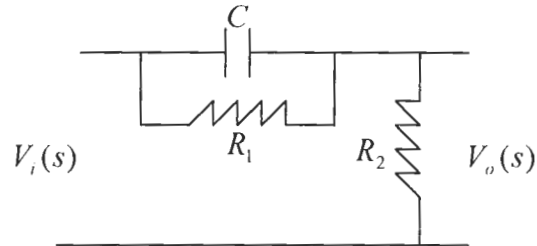
Examiner:-Hanady abbas  
Class: - 3<sup>rd</sup> year

Subject: - computer control  
Time: - 3 hours

**Note: - answer seven questions only**

**Q1:-** For the lead network is shown below, determine the transfer function

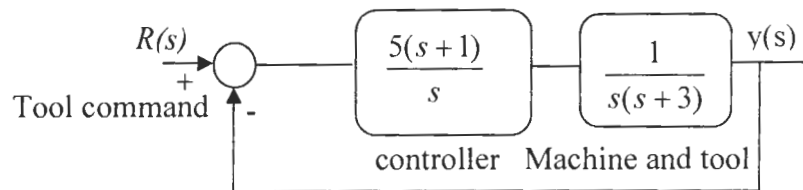
$$\frac{V_o(s)}{V_i(s)}$$



**Q2:-** Consider the closed loop system  $T(z) = \frac{z^2 + z}{z^2 + 0.1z - 0.2}$  Check if the system is stable using

1. jury test method
2. closed loop poles

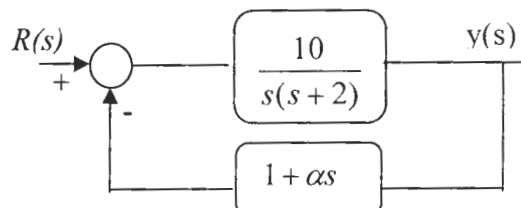
**Q3:-** A machine tool is designed to follow a desired path so that  $r(t) = 2 - t + 0.5t^2$  the machine tool is shown below, determine the steady state error when r is the desired path



**Q4:-** Solve the following difference equation by-z transform

$$x(k) = 3x(k-1) - 2x(k-2) + e(k) \text{ Where } e(k) = \begin{cases} 1 & k = 0,1 \\ 0 & \text{otherwise} \end{cases}$$

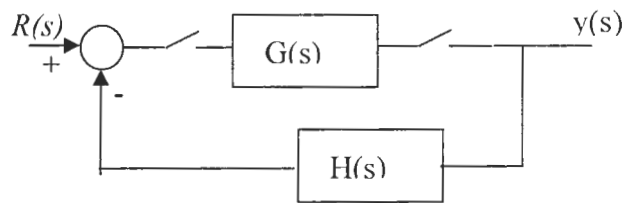
**Q5:-** Consider the control system as below; determine the value of  $\alpha$  so that the step response has maximum overshoot of 10%



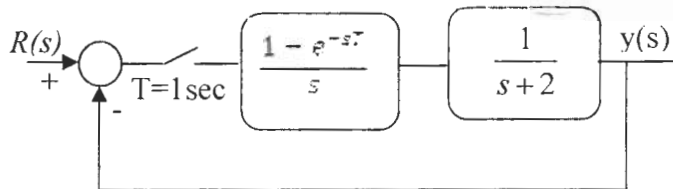
**Q6:-** A unit step response of a unity feedback control system is given as

$$c(t) = 1 - \frac{5}{4}e^{-t} + \frac{1}{4}e^{-5t} \quad ; \text{ find the closed loop control system}$$

**Q7:-** Derive the pulse transfer function of the following system



**Q8:-** Obtain the unit step response of the sampled data system shown below



GOOD LUCK

الدراس الثالث

University Of Technology

Computer Engineering and Information Technology Department

Examiner: Dr. Bassim A. Jumaa

Subject: Microcomputer System

Design

Class: 3<sup>th</sup>

Date: / 11/ 2008

Time: 3 Hours

Answer ONLY four questions including question FIVE.

- Q1:** a) Explain the operation of 8086's Segment registers.  
b) What is the bus cycle? How many clock states are in 8086 bus cycle that has no wait states? How are these states denoted?
- Q2:** a) Give an overview of how a word of data is written to memory starting at address B0001<sub>16</sub> of an 8086-based MP, and list the memory control signals together with their active logic levels that occur during the memory write cycle.  
b) What is the operation /purpose of BHE, LOCK, READY, and ALE signals.
- Q3:** a) Draw the circuit diagram of the data bus transceiver (74f245).  
b) Give two benefits of DRAMs over SRAMs.
- Q4:** a) How is an 82C55 configured if its control register contains B9H?  
b) Answer the following questions:  
1- What are the word lengths of the 8086's address bus and data bus?  
2- What does PROM stand for?  
3- How many address lines must be decoded to generate five chip select signals?
- Q5:** a) Design a memory system that has 16KByte SRAM starting at 80000H and 64KByte EPROM starting at B0000H, using (8\*8K) SRAM and (8\*32K) EPROM respectively. (two banks)  
b) Design a circuit used 82C55A PPI which is required to implement the following instructions. Write the sequence of instructions needed to initialize it.

MOV BL, [402H] ; read port B

MOV AL, [404H] ; read port C

AND AL, BL

MOV [400H], AL ; write to port A

University of Technology  
Computer Engineering and Information Technology Dept  
IT & Software Engineering Section

Subject: Software Eng.  
Examiner :Hayder H.Safi Aljbory

June 2008

Time:3 hours  
Class: 3<sup>rd</sup> year

**Q1/**

**Answer five only?**

- A\_ Can you Design any project with used any Diagram ?**
- B\_ what are steps analysis and Design ?**
- C\_ what is computer Based system ?**
- D\_ what is RAD ?**
- E\_ what is use case diagram ?**
- F\_ what is problem of scope ?**

**(10 marks )**

**Q2/Answer two only : every one (10 marks)**

- A\_ Draw the software development ?**
- B\_ What are problem to waterfall model ?**
- C\_ What are Describe system model ?**

**Q3/Answer flowing: every one (10 marks)**

- A\_ Explain UML ?**
- B\_ How to execute a loop a given number of times it has general form with example ?**

**Q4/Answer two only: every one (10 marks)**

- A\_ Explain prototyping ?**
- B\_ Explain doing engineering understood and what is need to do it ?**
- C\_ Draw the package Diagram ?**

**Good luck**