



DHARMSINH DESAI UNIVERSITY, NADIAD

FACULTY OF TECHNOLOGY

B.TECH. SEMESTER V [IT]

SUBJECT: (IT506) ADVANCED MICROPROCESSOR ARCHITECTURE

Examination : First Sessional
Date : 28/07/2014
Time : 11.15 to 12.30

Seat No. : _____
Day : Monday
Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.
5. Calculator is not allowed.

Q.1	State true/false and justify your answer. (No marks without justification)		12
	(a)	Any Interrupt subroutine can be automatically interrupted by INTR interrupt in 8086.	02
	(b)	In 8086, starting address of memory segment could be 000A1H.	02
	(c)	Indirect FAR jump instruction has to use one of the memory addressing mode to specify the new CS and IP.	02
	(d)	If content of all segment registers are same, maximum memory available to a program will be 64 Kbytes.	02
	(e)	MOV AX,7FFFH MOV BX,0001H ADD AX,BX When ADD AX,BX is executed, OF flag will be reset.	02
	(f)	If DS=2000H, SS=1000H, BP=E000H, SI=E000H, the instruction MOV AL, BYTE PTR [BP+SI] will move the data from physical memory location 3C000H.	02
Q.2	(a) The 8086 system requires following memory map : EPROM – 8 Kbytes to be mapped to 04000H processor address space. EPROM device available is of size 4 Kbytes. Use 3625 bipolar PROM as decoder to map above devices using absolute decoding. Write down the truth table and draw the complete circuit diagram. State your assumptions, if any, very clearly.		06
	OR		
	(a)	The 8086 system requires following memory map : RAM - 00000 TO 007FFFH EPROM - FF800H TO FFFFFFH RAM & EPROM devices available are of size 1 Kbytes. Use only <u>ONE</u> 3625 bipolar PROM to decode and map above devices. Write down the truth table and draw the complete circuit diagram. State your assumptions, if any, very clearly.	06
Q.2	(b)	Write a program to separate the odd/even numbers from a given set of 100 8-bit numbers stored in a array named Mixed_array in a logical data segment DATA. Separated odd/even numbers should be stored in arrays named odd_array and even_array in another logical data segment DATA1. Draw neat flow chart and state your assumptions if any, very clearly.	06
	OR		
	(b)	Write a near procedure named AVERAGE which will compute the average of two 16-bit numbers passed on the stack by main line program. The result should be returned back to main line program through stack. Write also the main line program segment to pass the parameters to procedure AVERAGE and retrieve the results from the stack. Draw neat flow chart and state your assumptions if any, very clearly.	06

Q.3	(a)	JMP NEXT If jump is near, how do you declare NEXT? If jump is FAR, how do you declare NEXT ?	02
	(b)	Write the correct instructions with proper assembler directives for following : 1. Indirect near jump where offset is in BX register 2. Indirect near jump where offset is in two consecutive memory locations pointed by DS:BX 3. Indirect far jump (pointed by DS:BX)	03
	(c)	Which of the following instructions cause an error when TASM assembles them ? Re write the instructions with correct assembler directives with proper justification. (i) AND [BP],0001 (ii) INC [SI] (iii) JMP AX (iv)CALL [BX]	03
	(d)	PUSHF MOV BP,SP OR WORD PTR [BP+0],0100H POPF MOV AX,7FFFEH MOV BX,02H ADD AX,BX INTO Describe the response of 8086 for all instructions after POPF instruction. Assume single step interrupt subroutine saves all registers	04
	OR		
Q.3	(a)	It is advisable to align word array to an ODD address. State true/false and justify.	02
	(b)	Determine the addressing modes for following 8086 instructions. (i) ADD BX, 59H[DI] (ii) XCHG CH, ES:[BX] (iii)OR [BP+SI+ 1234H],AL (iv)SUB [2048],DH	04
	(c)	MOV AX,0000 MOV DS,AX MOV BX,0084H MOV WORD PTR [BX],0000 MOV WORD PTR [BX+2],1000H STI In the above program, IVT is initialized for particular interrupt type. Assume 8259 is programmed with proper ICW2. If after the execution of the above program, on which pin of the 8259 interrupt should come and what could be the ICW2 such that it should send the type number required for the interrupt subroutine initialized in the IVT to be executed by above program ? What will be the type number required and what is the address of the interrupt subroutine ?	06



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY

FIRST SESSIONAL

SUBJECT: (CT 506) Design And Analysis of Algorithm

Examination : B.TECH Semester - V

Seat No. :

Date : 30/07/2014

Day : Wednesday

Time : 11:15 to 12:30

Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

- (a) Determine the solution of the following recurrence relation with $T(1) = 1$? [2]
 $T(n) = 2T(n/2) + \log n$.
- (b) Let P be the quick sort program to sort numbers in ascending order using the first element as the pivot. Let t_1 and t_2 be the number of comparisons made by P for the inputs [1,2, 3, 4, 5] And [4, 1, 5, 3, 2] respectively. Which one of the following is true? [2]
(A) $t_1 = 10$ (B) $t_1 < t_2$ (C) $t_1 > t_2$ (D) $t_1 = t_2$
- (c) In Merge sort, If we divide array into equal size partitions then What is the worst case time Complexity? Explain your answer. [2]
- (d) What is Asymptotic Analysis? Why it is important for comparing the running time of an algorithm? [2]
- (e) What is the difference between prior and posterior analysis of algorithm to find time complexity [2]
- (f) Find the asymptotic relation between function $f(n) = \sqrt{n}$ and $g(n) = n \log n$ [2]

Q.2 Attempt *Any TWO* of the following questions. [12]

- (a) Write and analyze QuickSort algorithm using suitable method to find the time complexity.
- (b) Write and analyze recursive and iterative Fibonacci algorithm to find the time complexity. Also compare the results.
- (c) Analyze the algorithm given below to find time complexity

```
ALGO: Euclid(m,n) /*m and n are two positive integers s.t. m < n */
    WHILE m>0 do
        t ← m
        m ← n mod m
        n ← t
    END WHILE
    return n
END
```

Q.3 (a) Solve following recurrence relation. [6]

$$T_n = n \quad \text{if } n=0,1,2$$
$$T_n = 5T_{n-1} - 8T_{n-2} + 4T_{n-3} \quad \text{otherwise}$$

- (b) Consider variation of the binary search algorithm so that it splits the input not only into two sets of almost equal sizes, but into two sets of sizes approximately one-third and two-thirds. Write down the recurrence for this search algorithm and find the asymptotic Complexity of this algorithm using recurrence tree method? [6]

OR

Q.3 (a) Solve following recurrence relation. [6]

$$T_n = 2 * T_{n-1} + n$$

- (b) Find 12th smallest element of given numbers using Kth-smallest element selection algorithm. [6]
[15, 7, 12, 45, 99, 51, 63, 44, 75, 28, 79, 34, 18, 39, 81]. (Clearly show the algorithm steps).



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [Information Technology]
SUBJECT: (IT-505) Computer And Communication Network

Examination : First Sessional
Date : 31/07/2014
Time : 11:15 to 12:30

Seat No. :
Day : Thursday
Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

A Match the following:

- | | |
|--------------|---------------------|
| (1) Hub | (a) Network Layer |
| (2) Repeater | (b) Transport layer |
| (3) Bridge | (c) Physical Layer |
| (4) Router | (d) Data link Layer |
| (5) Switch | |
| (6) Gateway | |

[2]

B A computer is using the following sequence numbers 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 0, 1, Then what is the size of sender and receiver window using go-back-n and selective repeat protocol? [2]

C In the GO-BACK-N sliding window protocol, if the window size is 31, what is the range of sequence number? [2]

D A bit-stuffing based framing protocol uses an 8-bit delimiter pattern of 01111110. If the output bit-string after stuffing is 01111100101, then what was the input bit-string? [2]

E In the following pairs of OSI protocol layer/sub-layer and its functionality, the **INCORRECT** pair is [2]
(A) Network layer and Routing
(B) Data Link Layer and Bit synchronization
(C) Transport layer and End-to-end process communication
(D) Medium Access Control sub-layer and Channel sharing

F The Hamming distance between 001111 and 010011 is [1]

G In Stop and Wait ARQ with piggybacking if Frame1 Ack0 is sent by receiver then what the sender sends? [1]

Q.2 Attempt Any TWO of the following questions. [2]

a Host A is sending a 10,000-byte file to Host B using a sliding window protocol. Packets are limited to 1000 bytes each, packets are numbered by packet number starting at 1, and the Window size is 5 packets. Packet 3 is lost. [6]

- a. Which packets are retransmitted if Host A and Host B are using the Go-Back-N protocol?
- b. Which packets are retransmitted if Host A and Host B are using the Selective Repeat protocol?

b A 12-bit hamming code whose hexadecimal value is 0xE4F arrives at a receiver. What was the original data value in hexadecimal? Assume that not more than one bit is in error. (number the bits from left to right) [6]

c Six stations A through F communicate using MACA protocol. Is it possible that two transmissions take place simultaneously? Explain your answer. [6]

Q.3(a) Explain OSI reference model in detail. [6]

Q.3(b) What are the difficulties to establish a bridge between 802.X to 802.Y? Also explain transparent bridge with figure. [6]

-OR-

Q.3(a) Explain collision free protocols in detail. [6]

Q.3(b) Explain 802.5 LAN standard in detail. [6]



DHARMSINHDESAIUNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
FIRST SESSIONAL
SUBJECT: (IT 507) INDUSTRIAL INSTRUMENTATION

Examination : B.TECH IT- Semester –V
Date : 01/08/2014
Time : 11:15am to 12:30pm

Seat No. :
Day : Friday
Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

- (a) When can transducer be termed as a transformer? Give example. [2]
- (b) State true or false with justification: A transducer should be amenable to modifications. [2]
- (c) Define Standard of measurement. State various types of standards. [2]
- (d) Explain in brief External Estimate of Uncertainty. [2]
- (e) How are Backlash and Dead-Band different from each other? [2]
- (f) State the transfer function of a temperature sensor. Draw the response of the same system to a step input. [2]

Q.2 Attempt Any TWO of the following questions. [12]

- (a) State and explain various applications of instrumentation systems. [6]
- (b) Explain impedance loading and matching with required derivation. [6]
- (c) A temperature measuring element displaying the temperature $\theta(t)$ is dipped in a measuring medium at temperature $\theta_i(t)$. Formulate the system equation and state the time constant. [6]

Q.3 (a) The decay constant of a galvanometer can be obtained from the following equation: [6]

$$\theta_2 = \theta_1 e^{-kT}$$

Where θ_2, θ_1 are the deflections of damped oscillation, T the period of vibration and k is the decay constant. In an experiment performed T was measured to be $6.8 \pm 0.1s$, θ_1 and θ_2 observed as $28.1^\circ \pm 0.2^\circ$ and $18.3^\circ \pm 0.2^\circ$. Determine the value of k and its uncertainty in the given measurements.

- (b) Classify the instruments and explain each classification in brief with examples. [6]

OR

Q.3 (a) Impedance of an R-L circuit having an AC source (230V, 50Hz) is given as: $Z = \sqrt{R^2 + \omega^2 L^2}$. The [6]

resistance R is known to be 100Ω with an uncertainty of $\frac{5}{100}$ times the measured value, while L is known to be 2H with an uncertainty of 10% while the remaining measurements/parameters are exact. Determine the percentage uncertainty in measurement of Z.

- (b) Classify errors and explain them with causes in brief. [6]



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
FIRST SESSIONAL EXAM
DISCRETE MATHEMATICS (CT 504)

Examination : B.TECH - Semester - V Seat No. :
Date : 02/08/2014 Day : Saturday
Time : 11:15 to 12:30 Max. Marks : 36

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

- (a) Let (A, \leq) be poset. Where $A = \{2, \dots, 16\}$ and ' \leq ' is divides. Then find lub and glb of 4 and 10 and write set of maximal and set of minimal elements. [2]
- (b) Two dice are tossed. How many ways the total score is a prime number? [2]
- (c) Determine $\{\Phi\} \oplus \{\{\Phi\}, \{\{\Phi\}\}\}$ [2]
- (d) If $\Pi_1 = \{\overline{ab}, \overline{cde}, \overline{f}\}$ and $\Pi_2 = \{\overline{ab}, \overline{cd}, \overline{ef}\}$ induced by equivalence relation R_1 and R_2 then graphically find $R_1 \cap R_2$ and $R_1 \cup R_2$ [2]
- (e) A man can hit a target once in 4 shots. If he fires 4 shots in succession, what is the probability that he will hit his target? [2]
- (f) Write grammar that specifies the language $L = \{a^{2i}b^{2j+1} / i \geq 1, j \geq 1\}$ [2]

Q.2 Attempt Any THREE of the following questions.

- (a) Let (A, \leq) be poset. Let \leq_R be a binary relation on A such that for a and b in A, $a \leq_R b$ if and only if $b \leq a$. Prove that if (A, \leq) is lattice, then (A, \leq_R) is also lattice. [12]
- (b) In a class of 120 students numbered 1 to 120, all even numbered students opt for Physics, whose numbers are divisible by 5 opt for Chemistry and those whose numbers are divisible by 7 opt for Math. How many opt for none of the three subjects?
- (c) Ten men went to a party and checked their hats when they arrived. The hats were randomly returned to them when they departed. Find the probability that no man gets his own hat back.
- (d) Give a grammar that specifies the language:
"Every sentence in the language is a string of equal number of a's and b's"

Q.3

- (a) Let (P, \leq) be a partially ordered set. Suppose the length of the longest chains in P is 6. Then Prove that the elements in P can be partitioned in to 6 disjoint antichains. [12]
- (b) If no three diagonals of a convex decagon meet at the same point inside the decagon, into how many line segments are the diagonals divided by their intersections?
- (c) Give a grammar that specifies the language:
"Every sentence in the language is a string of a's and b's with the number of a's being a multiple of 4"

OR

Q.3

- (a) Show that for any integer n, $(11)^{n+2} + (12)^{2n+1}$ is divisible by 133 [12]
- (b) The circumferences of the two concentric disks are divided in to 100 sections each. For the outer disk 50 of the sections are painted white and 50 of the section painted are black. For the inner disk the sections are painted white or black in an arbitrary manner. How many ways it is possible to align the two disks so that sections on the inner disk have their colours match with the corresponding sections on the outer disk?
- (c) In how many ways can $2n+1$ seats in a congress be divided among 3 parties so that the union of any 2 parties will ensure them of majority?



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [INFORMATION TECHNOLOGY]
SUBJECT: (IT 502) DATABASE MANAGEMENT SYSTEM

Examination : First Sessional
Date : 04/08/2014
Time : 11.15 to 12.30

Seat No. :
Day : Monday
Max. Marks : 36

INSTRUCTIONS:

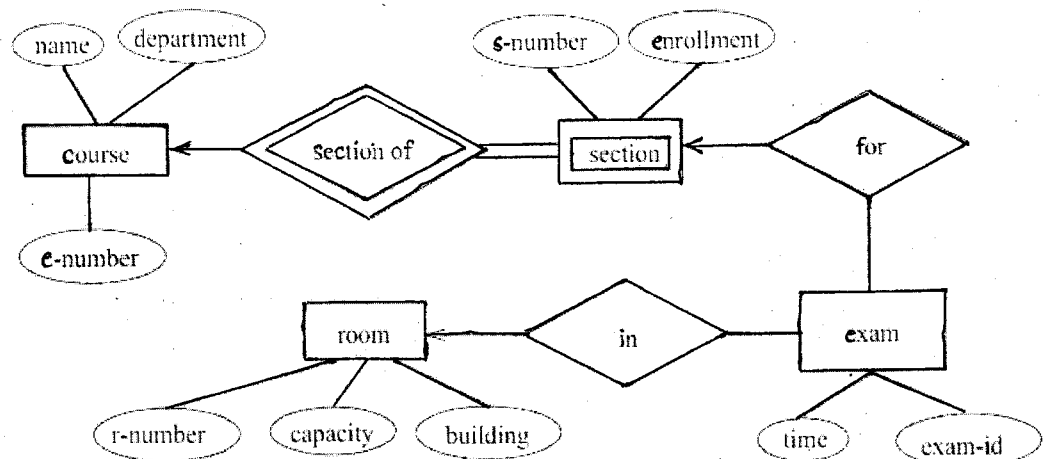
1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

Q.1 Do as directed.

- (a) Explain disadvantages of DBMS, if any. [2]
- (b) State different types of integrity constraint with example. [2]
- (c) What is the difference between procedural and declarative language. [2]
- (d) Differentiate between Strong entity set and weak entity set. [2]
- (e) What is a view in SQL? Explain its types. [2]
- (f) The natural join is equal to: [1]
 - (A) Cartesian Product
 - (B) Combination of Union and Cartesian product
 - (C) Combination of selection and Cartesian product
 - (D) Combination of projection and Cartesian product
- (g) Which of the following is correct: [1]
 - (A) SQL query automatically eliminates duplicates.
 - (B) SQL permits attribute names to be repeated in the same relation.
 - (C) SQL query will not work if there are no indexes on the relations
 - (D) None of these

Q.2 Attempt *Any Two* from the following questions.

- (a) Draw an E-R diagram for Airline Ticket Reservation System. (Min. 4 Entity Sets) [12]
- (b) (i) Explain participation constraints with how to represent it in the E-R Model. [6]
(ii) What is aggregation? Explain clearly with example. [2]
(iii) Explain this oracle error: integrity constraint (SCOTT.SYS_C006568) violated – Parent key not found. [2]
- (c) (i) What is the purpose of Triggers explain with appropriate example. [3]
(ii) Convert following E-R Diagram into relational table structure. Clearly state the Keys and Assumptions taken. [3]



- Q.3 (a) Answer the following questions. Consider the following relational *SCHEMA 1* with key underlined. [6]**
- Sailors**(sid: integer, sname: string, rating: integer, age: real)
Boats(bid: integer, bname: string, color: string)
Reserves (sid: integer, bid: integer, day: date)
- Write the following queries in SQL:**
- (i) Apply a constraint on relation Boat that bid should start with capital 'B'. [1]
 - (ii) Retrieve all the information from Sailors where age is not specified. [1]
 - (iii) Modify rating of a Sailor 'S110' to '7'. [1]
 - (iv) Find all information of sailors who have reserved boat number 'B103'. [1]
 - (v) Find the names of sailors who have reserved a red boat, and list in the order of age. [2]
- (b) Write the Tuple Relational Calculus for the following queries: [6]**
- (i) Find all information of sailors who have reserved boat number 'B103'. [2]
 - (ii) Find the names of sailors who have reserved at least one boat. [2]
 - (iii) Find the ids of sailors who have reserved a red boat or a green boat. [2]

OR

- Q.3 (a) Answer the following questions. [6]**
- (Consider above relational *SCHEMA 1*)**
- Write the Relation Algebra for following queries:**
- (i) Find the average age of sailors for each rating level. [2]
 - (ii) Find the name and the age of the youngest sailor. [2]
 - (iii) Find the name of sailors with their age above '30' and rating with '10'. [2]
- (b) Write Domain Relational Calculus for the following queries: [6]**
- (i) Find all information of sailors who have reserved boat number 'B103'. [2]
 - (ii) Find the names of sailors who have reserved at least one boat. [2]
 - (iii) Find the ids of sailors who have reserved a red boat or a green boat. [2]