

DHARMSINH DESAI UNIVERSITY  
FACULTY OF TECHNOLOGY, INFORMATION TECHNOLOGY DEPARTMENT

Sub.: Advanced Microprocessor Architecture

V[IT] EXAMINATION 2<sup>nd</sup> Sessional Date : 05-09-2011

Max.Marks:36

Instruction: No marks without justification.

Calculator is not allowed.

Q.1 State true/false and justify for 1 to 8. (12)

- (1) IVT address space of 8086 must be volatile memory. (01)
- (2) IDT can be placed anywhere in 4 Gbytes address space of 80386. (01)
- (3) Parameters are passed in CPU registers to function in 'C'. (01)
- (4) Parameters are pushed in the same order from the order they are written in the function call parentheses. (01)
- (5) Far pointer is used for code and near pointer is used for data in "Huge" memory model. (01)
- (6) GDT is a memory segment in PM of Intel 80X86 processor. (01)
- (7) If Selector 1004h is loaded in LDTR, Exception will be generated. (02)
- (8) The starting address of memory segment must have its nibble zero in PVAM of 80386. (02)
- (9) When task is switched using interrupt, VM flag in EFLAG register will be set. (02)

Q.2 Answer any two : (12)

- (A) OS kernel should be protected from corruption by user programs in multiuser-multitasking system. Explain the different mechanisms available to implement above requirement in detail.
- (B) In multiuser - multitasking OS, user tasks must be protected from each other. Explain the mechanism employed by 80386 in protected mode.
- (C) If an interrupt comes on IR4 pin of 8259 and upper five bits of ICW2 contains 00000<sub>h</sub> and IDTR=0000000000ffh, prove that it will not generate any exception to load interrupt gate descriptor from IDT.

The following is the interrupt Gate descriptor whose content is as follows :

000fh		byte
Eh	00h	6
0010h		4
0000h		2
		0

Prove that it is a valid interrupt gate descriptor.

Now if GDTR=0000800000FFh, will there be any exception by the selector of Above interrupt gate descriptor ? What will be the starting address of the Interrupt subroutine ?

Q.3 (12)

- (A) Explain in detail the "Task switching" mechanism implemented in PM of 80386 and four ways to switch the task in detail. (06)
- (B) The following program is executed in 8086 system : (06)

```
MOV AX,03ffh
MOV BL,02h
DIV BL
```

In the middle of DIV instruction, NMI occurs. Explain the response of processor after DIV BL instruction.

OR

Q.3 (12)

- (A) How one can effectively eliminate segmentation in PM of 80386 ? (01)
  - (B) What is the lifetime and scope of "Automatic" variable in 'C' ? (02)
- Explain which memory segment allocated for them in the system and how this will help to achieve above characteristics.
- (C) Explain the function of IOPL bits in EFLAG registers and IO permission bit map in TSS. (02)
  - (D) Shown below is a system with one page directory PD and three page tables PT0-PT2. Control register CR3 points to the base address of PD. Determine the effective physical address for the following linear address : 00801321h. Describe every step. Bottom entry is the starting entry Of each table. (03)

00140003h
00150003h
00130003h
PD

02500003h
0A000003h
12000003h
00110003h
PT0

02600003h
0B000003h
22A00003h
22222003h
PT1

044A0003h
0B055003h
2A100003h
23222003h
PT2

- (E) Explain how 32-bit far pointer (virtual address in program) of 80386 is translated into physical address space and how 80386 manages the virtual memory address space of 4 Gbytes. (04)

**DHARMSINH DESAI UNIVERSITY**  
**FACULTY OF TECHNOLOGY**  
**B.E SEM V CE/IT**  
**SECOND SESSIONAL EXAM 2010**  
**SUBJECT: DESIGN AND ANALYSIS OF ALGORITHM**

DATE:06/09/2011

MAX MARKS:36

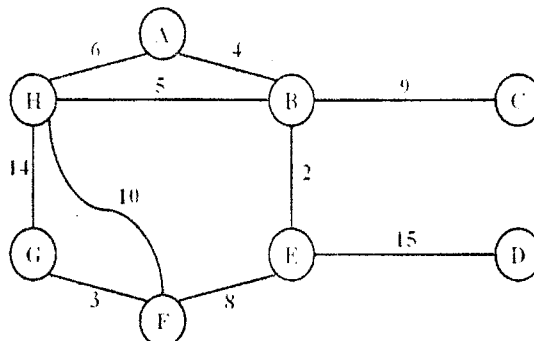
SEAT NO : \_\_\_\_\_

**Q1 Answer The following questions:**

- a) Classify the following problems according to the selection function they use.( [2]  
i.e. according to ordering paradigm or subset paradigm)  
Knapsack , dijkstra's method, job sequencing with deadlines, kruskal's  
algorithm , Huffman codes
- b) Find the optimal binary merge pattern for 5 files whose lengths are given [2]  
below.  
28,32,12,5,84
- c) "During Solving the Dijkstra's algorithm, if we consider the edge length as [2]  
negative also it does not work correctly." – Justify your answer.
- d) "A state highway network is represented using a graph. Find the fastest way [2]  
to go from city X to city Y".Can dynamic approach be used to solve this  
problem? Justify your answer.
- e) "In all pair shortest path problem if given graph is sparse, it is preferable to use [2]  
Floyd's algorithm and if graph is Dense then it is preferable to use Dijkstra's  
algorithm n times."- State True or False and Justify.
- f) If graph G has N vertices and E edges and if adjacency matrices are used to [2]  
represent it then what will be the total Running time and total space required  
for BFS algorithm?

**Q2 Answer the following questions**

- a) Find Minimum spanning tree for graph shown in fig. (1) using Prim's [6]  
algorithm. Also find out total running time of Prim's algorithm for sparse and  
dense graph.



- b) Prove that - "In Greedy Fractional Knapsack, if objects are selected in order [6]  
of decreasing  $v_i/w_i$  then algorithm finds the optimal solution."

**OR**

- b) Write Greedy algorithm for job sequencing with deadlines problem and [6]  
discuss its running time.

**Q3 Answer the following questions**

- a) For the following matrix chain multiplication problem find out minimum no of scalar multiplications using Dynamic Programming and also find out the way of parenthesizing the multiplication of matrices for optimal way. [6]  
A(5x4), B(4x6), C(6x2), D(2x7)

- b) Find the optimal tour for TSP for 4 cities using Dynamic Programming method. Use node 1 as starting node. [6]

	1	2	3	4
1	0	1334	1559	809
2	1334	0	1343	1397
3	1559	1343	0	921
4	809	1397	921	0

OR

**Q3 Answer the following questions**

- a) Find LCS of the following two sequences using Dynamic Programming method. [6]  
P = "XMJYAUZ"  
Q = "MZJAWXU"

- b) Solve the following problem using Dynamic Programming method: "Given n objects and a knapsack with capacity W=10 kg. Fill the knapsack with the objects such as to maximize the total value." [6]

i	1	2	3	4
$v_i$	10	40	30	50
$w_i$	5	4	6	3

**Dharmsinh Desai University Faculty of Technology**  
**Second Sessional Examination**  
**B.Tech –Semester: V (IT)**  
**Subject: Computer and Communication Network**

Date: 7/9/2011  
Duration: 1 Hr.

Max Marks: 36  
Seat No. \_\_\_\_\_

Instructions: 1. Assume the data if necessary and mention it.  
2. Figure to the right indicate full marks.

- Q.1 Answer the following questions: [12]
- A Fill in the blanks with appropriate options.
- (1) RIP is based on \_\_\_\_\_ and OSPF is based on \_\_\_\_\_. (Link state routing/multicast routing/distance vector routing /broadcast routing). [2]
- (2) If \_\_\_\_\_ hostid part of a given address has all 1's then it is [1]  
called \_\_\_\_\_ address. (unicast/broadcast/multicast)
- B How many networks are possible in class A, B, C using classfull addressing? [2]
- C Which network layer protocol is use to know the hardware address of the other machines [1]  
in the network?
- D Identify the class and give the default mask for the following IP address 189.156.157.2 [2]
- E What do you mean by flooding? [1]
- F What is the purpose to divide a network in subnets? [2]
- G What is optimality principle? [1]
- Q.2 Answer the following questions (Attempt any two). [12]
- A (1) Differentiate: Datagram subnet and Virtual circuit subnet. [3]  
(2) Explain Hierarchical routing with example. [3]
- B Explain the header format of IPv4. [6]
- C Find the shortest path between nodes O-T using D'ijkstra shortest path algorithm. Refer Fig.-1. [6]
- Q.3 Answer the following questions: [12]
- A (1) You are given the following address 153.50.6.27/25 (where /25 indicate masking of first 25 bits). Determine the subnet mask, address class, subnet address and broadcast address. [2]  
[2]  
[1]
- (2) Find the Mask that create 30 subnets in class A
- (3) What is the maximum number of subnets in class C using the mask 255.255.255.240
- (4) What is the subnetwork address for a host with IP address 130.15.67.13/20? (where /20 indicate masking of first 20 bits). [1]
- B Explain various congestion prevention policies. [6]  
-OR-
- Q.3 Answer the following questions: [12]
- A Explain the techniques for achieving good quality of service. [6]
- B Find the shortest path between nodes O-T using Bellman-Ford shortest path algorithm. [6]  
Refer Fig.-1.

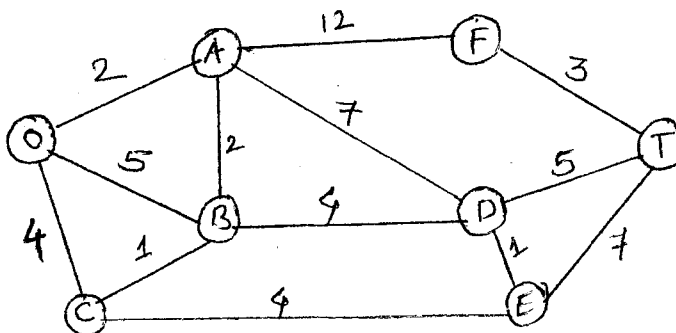


fig. (1)



**DHARMSINH DESAI UNIVERSITY, NADIAD**  
**Faculty of Technology**  
**Department of Instrumentation & Control Engg.**  
**Subject: - Industrial Instrumentation**

B.E. III, Semester: - V[IT]  
No. Of hours: 01

Date : - 08/09/2011  
Max. Marks: 36

**Second Sessional Examination**

- Instructions: - 1. Figures to the right indicate maximum marks for that question.  
2. Make suitable assumption wherever necessary & mention them clearly.

**Q-1. State whether the following statements are true or false.**

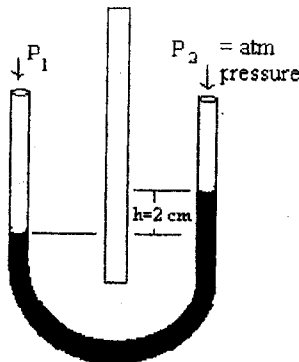
1. Pressure readings can be negative if measurements are taken in gauge pressure scale.
2. Inclined manometers have the disadvantage of less sensitivity.
3. Ionization gauges work on the principle of changes in thermal conductivity of gases.
4. Water is used as the filling liquid in manometers when pressure of air is to be measured.
5. Capsule gauge is an elastic type of pressure transducer.

[10]

**Q-2. Answer the following(Any TWO).**

[08]

1. A U-tube manometer filled with mercury is shown in the figure below. Find the applied pressure  $P_1$  in pounds per square inch if  $g = 9.8 \text{ m/s}^2$  and density of mercury is  $13,600 \text{ kg/m}^3$ .



2. Explain working of a McLeod gauge with a neat diagram.
3. For a capacitance type of pressure transducer if the distance between the diaphragm and stationary plate changes from 1 cm to 1.8 cm, what would be the change in capacitance if the diameter of the diaphragm plate is 2 cm,  $\epsilon_0 = 8.854 \times 10^{-12} \text{ F/m}$  and the dielectric constant is 1.

**Q-3. Fill in the blanks with most appropriate phrase.**

[06]

1. Seismic transducers are used for the measurement of \_\_\_\_\_.
2. Working of linear variable differential transducer is based upon principle \_\_\_\_\_.
3. Principle of working of variable head flow meter is \_\_\_\_\_.
4. The tube material of rotameter, commonly used \_\_\_\_\_.
5. \_\_\_\_\_ measures mass flow rate.
6. Pitot tubes are used mainly for the measurement of \_\_\_\_\_.

- Q-4.(A)** Discuss turbine type flow meter in detail with suitable diagram and equations.  
**(B)** Discuss linear velocity transducer in detail with suitable diagram and equations.

[06]

[06]

**OR**

- Q-4.(A)** Discuss thermal flow meters in detail with suitable diagram and equations.  
**(B)** Prove that measurement of displacement using resistance potentiometer has nonlinear characteristic.  
**(C)** Discuss displacement measurement with multiple resistor device. Explain its application.

[06]

[03]

[03]

Instructions: 1. All questions are compulsory.

2. Write correct option of the multiple choice Question in the given space of the Answer sheet.
3. Figures to the right indicate maximum marks for that question.
4. No negative marking applicable.
5. Write the answer of descriptive type in the space provided in the answer sheet.
6. partial credit is allow for descriptive answer only.
7. Calculator is allowed.
8. For rough work use space provided in the answer sheet.

- (1) Let  $a$  be a numeric function such that  $a_r$  is equal to the remainder when the integer is divided by 17. Let  $b$  be a numeric function such that  $b_r$  is equal to 0 if the integer  $r$  is divisible by 3 and is equal to 1 other wise. [2]

Let  $C_r = a_r + b_r$ . For what value of  $r$  is  $C_r = 1$ ?

- A.  $r = 18, 69, 120, 171, \dots$  B.  $r = 17, 34, 68, 85, \dots$   
C.  $r = 17, 18, 34, 68, 69, 85, \dots$  D.  $r = 120, 121, 171, \dots$

- (2) What is the general form of particular solution of the difference equation  $a_r - 4a_{r-1} + 4a_{r-2} = (r+1)2^r$  [2]

- A.  $(P_1r + P_2)2^r$  B.  $(P_1r + P_2)r^2 2^r$  C.  $(P_1r + P_2)r 2^r$  D. None of this

- (3) Let  $a_r = 2^r, r \geq 0$  and  $b_r = 2^r, r \geq 3; 0$  otherwise [2]  
if  $C_r = a_r + b_r$  then  $C_r = ?$
- A.  $C_r = 2^{r-2}, r \geq 0$  B.  $C_r = 2^{r+2}, r \geq 3; 0$  otherwise  
C.  $C_r = (r+2) 2^r, r \geq 0$  D.  $C_r = (r-2) 2^r, r \geq 3; 0$  otherwise

- (4) What is the numeric function of the generating function  $\frac{z^4}{1-2z}$  [1]

- A.  $2^{r-4}, r \geq 0$  B.  $2^{r-4}, r \geq 4; 0$  otherwise  
C.  $2^{r+4}, r \geq 0$  D.  $2^{r+4}, r \geq 4; 0$  otherwise

- (5) If  $a$  is numeric function then [1]
- A.  $|a| \in O(a)$  B.  $|a| \in \Theta(a)$  C.  $|a| \in \Omega(a)$  D. none of this.

- (6) What is the recurrence relation of Fibonacci sequence? [1]

A.  $a_r = a_{r-1} + a_{r-2}$     B.  $a_r = a_{r-1} + 1$     C.  $a_r = 2a_{r-1} + 1$     D.  $a_r = a_{r-1} + 2a_{r-2}$

(7) Solve:  $a_r + 6a_{r-1} + 12a_{r-2} + 8a_{r-3} = 0$  [2]

A.  $a_r = (A_1r + A_2)(-2)^r$     B.  $a_r = (A_1r^2 + A_2r + A_3)r^2(-2)^r$

C.  $a_r = (A_1r^2 + A_2r + A_3)r(-2)^r$     D.  $a_r = (A_1r^2 + A_2r + A_3)(-2)^r$

(8) What is the coefficient of the term  $z^{23}$  in  $(1 + z^5 + z^9)^{100}$  [2]

A. (100)(98)    B. (5)(9)(9)    C. (50)(98)    D. (50)(98)(99)

(9) What is the general form of the particular solution of the difference equation [2]

$a_r - 2a_{r-1} + a_{r-2} = 7$

A.  $P$     B.  $Pr$     C.  $Pr^2$     D.  $Pr^3$

(10) If  $a_r = 1, r = 0$  and  $c_r = 1, r = 0$  [2]

$2, r = 1$      $0, \text{ otherwise}$

$0, \text{ otherwise}$

Also  $c_r = a_r$   $b_r$  then  $b_r = ?$

A.  $2^r, r \geq 0$     B.  $2^{r+2}, r \geq 0$     C.  $(-2)^r, r \geq 0$     D.  $(-2)^{r-2}, r \geq 2; 0 \text{ otherwise}$

$7z^2$

(11) If  $A(z) = \frac{7z^2}{(1-2z)(1+3z)}$  then what is  $a_r = ?$  [2]

A.  $\frac{14}{5}2^{r-2} + \frac{21}{5}(-3)^{r-2} \quad r \geq 2; \quad 0 \quad 0 \leq r \leq 1$

B.  $\frac{14}{5}2^{r+2} + \frac{21}{5}(-3)^{r+2} \quad r \geq 2; \quad 0 \quad 0 \leq r \leq 1$

C.  $\frac{14}{5}2^{r+2} + \frac{21}{5}(-3)^{r+2} \quad r \geq 0$

D.  $\frac{14}{5}2^{r-2} + \frac{21}{5}(-3)^{r-2} \quad r \geq 0$

(12) Find particular solution of the difference equation [3]

$a_r + a_{r-1} = 3r2^r$

- (13) Design a finite state deterministic machine with 0,1 as input letters and 0, 1, 2 as Output letters such that for any input sequence the corresponding output sequence consist of two 2s followed by the input sequence delayed by one time unit. [4]
- (14) Solve:  $a_r - 2a_{r-1} = 1; \quad a_1 = 1$  [3]
- (15) Find a deterministic machine that recognizes the set of all strings of 0s and 1s in each of which the number of 1s is not a multiple of 4 [3]
- (16) Find a deterministic machine that recognizes the set [4]  
 $L = \{0^i 10^j \mid i \geq 1, j \geq 1\} \cup \{0^k \mid k \geq 3\}$



**DHARMSINH DESAI UNIVERSITY, NADIAD**  
**FACULTY OF TECHNOLOGY**  
**SECOND SESSIONAL EXAMINATION**  
**B.E. INFORMATION TECHNOLOGY**  
**SEMESTER V**  
**SUBJECT: DATABASE MANAGEMENT SYSTEM**

Date: 10/09/2011

Time: 11:00 to 12:00

Max Marks: 36

Seat No: - \_\_\_\_\_

**Q1. Answer the following questions:-**

- (1) Find all candidate key for following relation. [12]  
 $R(A\ B\ C\ D\ E\ F\ G\ H\ I\ J)$  AND  
 $F: ABD \rightarrow E, AB \rightarrow G, B \rightarrow F, C \rightarrow J, CJ \rightarrow I, G \rightarrow H, H \rightarrow C$  [2]
- (2) Explain Insert and Update anomalies with example. [2]
- (3) Find the Irreducible set of following set of functional dependency. [3]  
 $F: A \rightarrow BC, ABE \rightarrow CDGH, C \rightarrow GD, D \rightarrow G, E \rightarrow F$
- (4) Give difference between sparse and dense index. [2]
- (5) List and explain various file organizations. [2]
- (6) Order of B+ tree is 100 and total search key value are 1000000 then at most how many blocks from disk need to access for lookup? [1]

**Q2. Answer the following questions:-**

- (1) Explain Fixed length representation for variable length record. [12]
- (2) A. Explain MVD and 4NF with example. [6]  
 B. Consider the set of functional dependency [4]  
 $F: (AB \rightarrow C, A \rightarrow B, D \rightarrow AB, D \rightarrow E)$  [2]  
 $G: (A \rightarrow BC, D \rightarrow AE)$   
 Find the two set are equivalent or not.

**OR**

- (1) Explain Primary Index and Secondary Index with Example. [6]
- (2) Relation  $R(\text{carReg}, \text{hireDate}, \text{make}, \text{model}, \text{custNo}, \text{custName}, \text{outletNo}, \text{outletLoc})$  and Set of FD: [6]  
 $Fd1: \text{carReg}, \text{hireDate} \rightarrow \text{custNo}, \text{custName}$   
 $Fd2: \text{carReg} \rightarrow \text{make}, \text{model}, \text{outletNo}, \text{outletLoc}$   
 $Fd3: \text{model} \rightarrow \text{make}, Fd4: \text{custNo} \rightarrow \text{custName},$   
 $Fd5: \text{outletNo} \rightarrow \text{outletLoc}$   
 Normalize up to BCNF.

**Q3. Answer the following questions:-**

- (1) Construct B+ tree for following data Fanout of B+ tree is 3 [12]  
 12, 3, 52, 45, 68, 75, 19, 26, 83, 64, 57, 37, 72, 46 [8]  
 After construction Delete 83, Delete 19
- (2) A Relation  $R(ABCDE)$  with Set of FD ( $A \rightarrow BC, C \rightarrow DE, D \rightarrow E$ ) [4]  
 Is decomposed into  $R1(ABCD)$  and  $R2(DE)$  then explain this decomposition is Lossy or Lossless and Dependency Preservation or Not.

**OR**

**Q3. Answer the following questions:-**

- (1) Create an Extendable Hash structure for the following key values: [12]  
 $x = \{12, 03, 52, 45, 68, 75, 19, 26, 83, 64, 57, 37, 72, 46\}$  [8]  
 Assume that one bucket can store maximum 3 keys at a time where the hash function is  $H(x) = x \bmod 3$ .
- (2) Explain Data Dictionary storage [4]