DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
SECOND SESSIONAL
SUBJECT CODE : (IT506) SUBJECT NAME : Advanced Microprocessor Architecture

Examination	: B.TECH - Semester - V	Seat No.	:
Date	: 10/09/2012	Day	: Wednesday
Time	: 10:45 to 12.00	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 State true/false and justify your answer (no marks without justification).
(a) All memory segment must start with nibble zero in Protected mode of 80386. 02
(b) If Selector in SS pointing to descriptor in GDT whose LSB 5-bits of Access Right (AR) byte is 10101b, then PUSH AX instruction will generate the exception. 02
(c) If you load the selector of a code segment which is 'marked' as readable into DS segment register, there will be an exception. 02
(d) An instruction MOV CS:[1234],AX will generate an exception in PM of 80386. 02
(e) User programs are running at the same privilege level, so one user can easily access the memory segments of other user. 02
(f) Parameters which are passed in parentheses to function in 'C', pushed in the left to right order on stack when the function is called. 02

Q.2
(a) Describe the following descriptor in detail. Selector of this descriptor must be loaded into which register of 80386 in PM? 06

0040h		6
9Bh	80h	4
0000h		2
0020h		0

Which are all the checks 80386 will do and will there be exception(s) due to this checks ?
(b) The following program is executed in 8086 system : 04

```
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.
(c) In a Protected Mode system, system sets IOPL bits as '1','1' allowing all task to access complete I/O address space. In this scenario, describe the mechanism available in 80386 protected mode to restrict certain port addresses for specific task in detail. 02

OR

Q.2 (a) Explain how 48-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 in detail. 06
(b) If an interrupt comes on IR2 pin of 8259 and upper five bits of ICW2 contains 00010_b and IDTR=000000000060h, will there be any exception ? If exception, what is the remedial action ? 03
(c) If the content of the GDTR is 0021000001FFH, what are the starting and ending addresses of the GDT table ? How many descriptors can be stored in the table ? 03

Q.3 (a) What do the 20 most significant bits of a page directory or page table entry stand for ? How the 32-bit of starting address of page table or page frame is generated ? 03
(b) What does the D bit in a page table entry stand for ? 03
(c) List the Protected mode registers and their function that are not the part of the real mode. 02
(d) What is stored in the IDT ? 02
(e) Offset part of the far pointer of call/jmp instruction to point CALL GATE Descriptor is ignored. State true/false & justify in detail. 02

OR

Q.3 (a) The size of IVT and IDT tables are same. State T/F and justify (show your calculation also) 02
(b) In 'C', when the function is called, whose responsibility to balance the stack ? 02
(c) The addressing capacity decides the maximum size of memory segment in Intel Architecture processor. 02
(d) IDT is not a memory segment, while LDT is a memory segment. Explain why? 02
(e) Near pointers are used for all code and data references in huge memory model for turbo C. 02
(f) Explain the mechanism available to run 8086 type program in Protected mode of 80386. 02

SUBJECT: (CT 506) DESIGN AND ANALYSIS OF ALGORITHM

Examination	:	**Second Sessional**	**Seat No**	:	
Date	:	**11 / 09 / 12**	**Day**	:	**Tuesday**
Time	:	**10:45 to 12:00**	**Max Marks**	:	**36**

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
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4. Draw neat sketches wherever necessary.

V - I.T. II-Sess
D. A.A.
11/09/2012

Q.1 Do as Directed

(a) Validate the statement "Greedy method may not guarantee the best solution". Justify your answer. [2]

(b) Explain subset and ordering paradigm for greedy technique. [2]

(c) Find an optimal binary merge pattern for ten files whose lengths are: 28, 32, 12, 5, 84, 53, 91, 35, 3 and 11. [2]

(d) Define Multistage Graph. [1]

(e) Find the suitable order to multiply 4 matrices (AxBxCxD) of size A=2x5, B=5x3, C=3x20 & D=20x2 using **greedy approach**. [3]

(f) State Principle of Optimality. How is it satisfied in 0/1 Knapsack problem? [2]

Q.2 Attempt *Any TWO* of The Following Questions [12]

(a) Solve the job sequencing with deadlines problem given in **Figure 1**, using greedy technique. Show each step using appropriate diagrams.

(b) Solve the tree vertex splitting problem for the tree given in **Figure 2**, using greedy technique. Show each step using appropriate diagrams.

(c) Write pseudo code for Prim's algorithm to solve MST problem. Point out the difference between Prim's algorithm and Kruskal's algorithm in terms of the construction of the MST tree.

Q.3 (a) Write a suitable algorithm for Matrix Chain Multiplication Problem [6]

(b) Solve the **0/1 knapsack problem with <u>unlimited quantity</u> of each item is available.** Maximum capacity of knapsack is =10. Details of the problem are as per the **Figure 3.** [6]

OR

Q.3 (a) Solve the given instance of Travelling Sales Person Problem in **Figure 4. Consider the Source Node is 4** [6]

(b) Write an algorithm that calculates length of Longest Common Subsequence. [6]

Figure 1.

Job	Profit	Deadline
A	10	3
B	34	4
C	67	3
D	45	1
E	23	5
F	99	2

Figure 2

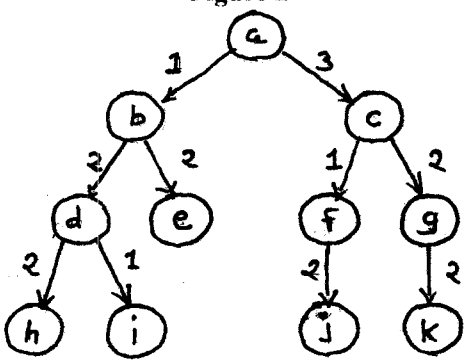
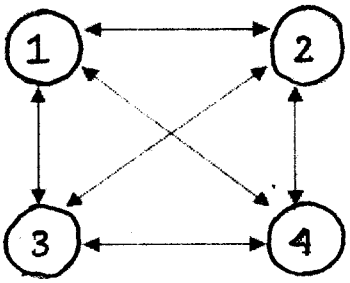


Figure 3

Item	Weight	value
1	6	30
2	3	14
3	4	16
4	2	9

Figure 4



Node → / ↓	1	2	3	4
1	0	10	15	20
2	5	0	9	10
3	6	13	0	12
4	8	8	9	0

2. The symbols used carry their usual meanings.
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T. I.T. II-SEM-CCN

12/09/2012

Q.1 Do as directed. [12]

(a) (I) Which one of the following are true regarding distance vector routing and link state routing : [2]

(1)Link state sends its complete routing table out all active interfaces on periodic time intervals.
(2)Distance vector sends its complete routing table out all active interfaces on periodic time intervals.
(3)Link state sends updates containing the state of its own links to all routers in the internetwork.
(4)Distance vector sends updates containing the state of its own links to all routers in the internetwork.
(A) 1 ONLY (B) 3 ONLY (C) 2 and 3 only (D) None of the above

(II) Network address prefixed by 1110 is a
(A)Class A address (B) Multicast address (C) Class B address (D) Reserve address

(b) Assuming classfull addressing, find the subnet mask, subnet address, no of subnets and the no of hosts per subnet for 122.45.77.32/20. [2]

(c) List out the main responsibilities of the network layer. [2]

(d) What is NIC? When you move the NIC cards from one PC to another PC, does the MAC address gets transferred as well? Justify. [2]

(e) Why do we need subnet mask? [1]

(f) What protocols fall under the TCP/IP Internet Layer? [1]

(g) What do you mean by reverse path forwarding? [1]

(h) What do you mean by loop back address? Give an example. [1]

Q.2 Attempt ***Any Two*** from the following questions. [12]

(a) (I) What is the difference between virtual circuit subnet and datagram subnet? [3]
(II)Explain routing in mobile host [3]

(b) Given IP address: 201.222.5.0. Need to have 20 subnets with 5 hosts per subnet. [6]
(I)Find the subnet mask
(II)Find address of First subnet.
(III) Find address of second host of first subnet.
(IV) Find address of last subnet.
(V) Find address of 4th host of 5th subnet.
(VI) What is the subnetwork address for a host with IP address 165.100.5.68/28

(c) (I)What do you mean by multidestination routing? [1]
(II)What do you mean by selective flooding? [1]
(III)Differentiate: ARP & RARP. [2]
(IV)Differentiate: Adaptive and nonadaptive routing algorithm with example. [2]

Q.3 **(a)** Consider a directed graph shown in fig.1 there are multiple shortest path between vertices S and T. Which one will be reported by Dijkstra's shortest path algorithm? Assume that, in any iteration, the shortest path to vertex v is updated only when strictly shorter path to v is discovered. [6]

(b) (I)Explain count-to-infinity problem with example [3]
(II)Explain quality of service with example at network layer. [3]

OR

Q.3 **(a)** Consider a directed graph shown in fig.1 there are multiple shortest path between vertices S and T. Which one will be reported by Bellman Ford's algorithm? Assume that, in any iteration, the shortest path to vertex v is updated only when strictly shorter path to v is discovered. [6]

(b) Explain Link state routing protocol in detail. [6]

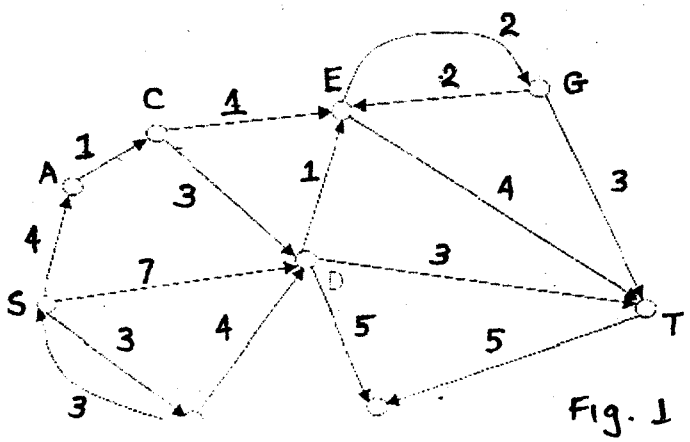

Fig. 1

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
SECOND SESSIONAL
SUBJECT: (IT 507) Industrial Instrumentation

Examination	**: B.TECH IT - Sem V**	**Seat No.**	**:**
Date	**: 13/09/2012**	**Day**	**: Thursday**
Time	**: 10:45 to 12 pm**	**Max. Marks**	**: 36**

INSTRUCTIONS:
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Q.1 Do as directed.

(a) State Peltier effect. Are Joule heating effect and Peltier effect same? [2]

(b) Define noise. Classify noise signals. [2]

(c) State the working principle of resistance thermometer. Mention two types of thermometer bulb design. [2]

(d) State Stefan Boltzmann law and define total emissivity. [2]

(e) State True or False: [2]
(1)Radiation type of temperature measurement are non contact type of measurement techniques
(2)Black bodies ideally have an emissivity of one.

(f) Do as directed: [2]
(1)Gauge pressure , $P_g = P_a + P_s$. State true or false.
(2)Define hydrostatic pressure.

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

(a) State three laws of thermoelectric circuits viz.
1)Law of Homogeneous circuits
2)Law of Intermediate metals
3)Law of Intermediate temperatures

(b) Explain Lens & Mirror type radiation pyrometers.

(c) Explain Null bridge resistance thermometer circuits and Deflectional resistance thermometer circuits.

Q.3 (a) State five most commonly used thermocouples with their metal composition and list out all the desirable properties of a thermocouple [6]

(b) Explain any three methods for noise reduction with neat labeled diagram. [6]

OR

Q.3 (a) What are manometers? Explain any three modified manometers. [6]

(b) Draw a tree diagram for classification of level measurement methods. Explain Bubbler type (Air purge system) of level measurement in detail. [6]

DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [IT]
IInd SUBJECT: DISCRETE MATHEMATICS

Examination : Sessional **Seat No.** : _____
Date : 14/9/12 **Day** : Thursday
Time : 10.45 to 12.00 **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) Sketch Hamiltonian graph which is not Eulerian graph. [2]

(b) Prove that $K_{3,3}$ is non planar graph. [2]

(c) A Tree has two vertices of degree 2, one vertex of degree 3 and three vertices of degree 4 . How many vertices of degree 1 does it have? [2]

(d) Find a deterministic finite state machine that recognizes the set: [2]

$$L = \{0^i 10^j \mid i \geq 1,\ j \geq 1\}$$

(e) Find a deterministic finite state machine that recognizes the set: [2]
The set of strings of 0's and 1's in each of which the number of 1s is not a multiple of 4.

(f) Evaluate time complexity of algorithm LARGESMALL. [2]

Q.2 Attempt ***Any Three*** from the following questions. [12]

(a) Design a finite state machine with {0,1} as its input alphabet and {0,1,2} as its output alphabet such that for any input sequence the corresponding output sequence will consist of two 2s followed by the input sequence delayed by one time unit.

(b) Prove that lower bound of the time complexity of the problem of finding largest among n numbers is proportional to n-1

(c) Prove that an undirected graph possesses an Eulerian path if and only if it is Connected and has either zero or two vertices of odd degree.

(d) Prove that: The number of vertices is one more than the number of edges in a tree.

Q.3 (a) State and prove Euler's condition for the planar graph. [4]

(b) Design a finite state machine with {0,1} as both its input and output alphabet such that output 1 will be produced beginning with the third 1 in any block of three or more 1s in the input sequence. [4]

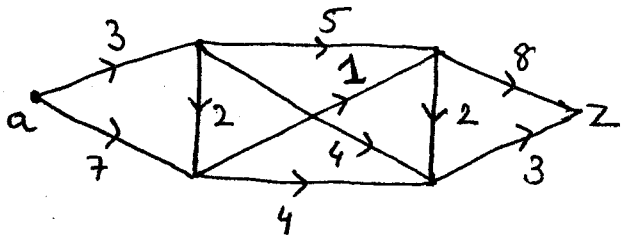
(c) Prove that every circuit has an even number of edges in common with every cut set. [4]

OR

Q.3 (a) Explain algorithm of sorting n numbers by giving an example. [4]

(b) Prove that the language $L = \{a^k b^k \mid k \geq 1\}$ is not a finite state language. [4]

(c) Use labeling procedure to find a maximum flow in the transport network and determine the minimum cut. [4]



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [IT]
SUBJECT: (IT502) DATABASE MANAGEMENT SYSTEM

Examination	**:Second Sessional**	**Seat No.**	**: _____**
Date	**: 15/9/2012**	**Day**	**: Saturday**
Time	**: 10.45 to 12**	**Max. Marks**	**: 36**

INSTRUCTIONS:
1. Figures to the right indicate maximum marks for that question.
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Q.1 Do as directed. **[12]**

(a) Find all candidate key for following relation. **[2]**
R(ABCDEG) F: {AB→C, AC→B, AD→E, B→D, BC→A, E→G}

(b) Every FD is MVD but their exists MVDies that are not FDies. Justify with appropriate Example. **[2]**

(c) Find the Irreducible set of following functional dependencies. **[3]**
F: {A → B, ABCD → E, EF → GH, ACDF → EG }

(d) Define multi value dependency and 4NF. **[2]**

(e) Explain view with an example. What are the advantages of view? **[2]**

(f) Whenever two independent one-to-many relationships are mixed in the same relation, a _____ arises. (functional dependency, Multi-valued dependency, Transitive dependency, Partial dependency) **[1]**

Q.2 Answer the following questions. **[12]**

(a) Explain the types of organizations of records in files. **[6]**

(b) Consider the Relation CHARGE(Proj_no, Emp_no, Proj_name, Emp_name, Job_class, Chg_hours, Hours) and following FD: **[6]**
Proj_no → Proj_name
Emp_no → Emp_name, Job_class, Chg_hours, Hours
Proj_no, Emp_no → Proj_name, Emp_name, Job_class, Chg_hours, Hours
Job_class → Chg_hours
Normalize up to Highest Normal Form.

OR

(a) Explain Primary index and Secondary index with Example. **[6]**

(b) What are the Desirable Properties of Decomposition? Explain with example. **[4]**

(c) Perform Materialization for the following Expression. **[2]**
Πnumber (σscountry = India (FLIGHT ⋈ from airport_code=codeAIRPORT))

Q.3 (a) Construct B+ tree for following data Fanout of B+ tree is 3 **[8]**
B,D,P,M,RE,RO,C,MO,PQ,I,X
After construction Delete **RO**, Delete **I**, Delete **X**.

(b) Given R {ABCD} and a set F of functional dependencies on R given as **[4]**
F = {AB→C, AB→D, C→A, D→B}. Find any two candidate keys of R. Show each step. In what normal form is R? Justify.

OR

Q.3 (a) Create an Extendable Hash structure for the following key values: **[8]**
x={50, 58, 100,106, 158, 250, 310, 355, 397, 444, 596, 778}
Assume that one bucket can store up to 4 keys at a time where the hash function is H(x) = x mod 15.

(b) Explain the steps of query processing with example. **[4]**