[Information Technology]

SUBJECT: (IT-505) Computer And Communication Network

Examination	: Second Sessional	Seat No.	:
Date	: 04/09/2013	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.

V. IT. II-Sess. C.C.N. 04/09/2013

Q.1 Do as directed.

A Compare and contrast link-state and distance-vector routing algorithms. [12]

B A class C address has the following subnet mask 255.255.255.192.Which of the following are valid IP addresses under this network?(I)192.25.64.68(II)192.43.75.128(III)194.65.73.64(IV)194.75.74.131 [2]

C How to achieve good quality of service? [2]

D Which protocol is used to find internet errors? Which message it sends if congestion occurs? [2]

E What is multicasting? Give one example of multicast IP address. [1]

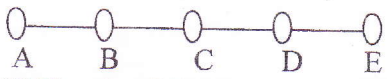
F What is the purpose of record route field in IPv4 header? [1]

G What is the difference between routing and forwarding? [1]

H Give the difference between congestion control and flow control. [1]

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

a [I] Explain count to infinity problem by solving example given below when A is getting down. After booting in routing table of B, C, D and E possesses the value are 2,4,6,8 respectively and each link cost is 2. [4]



[II]Give the differences between virtual circuit subnet and datagram subnet. [2]

b (1)Find the subnetwork address for 200.34.22.156/28 [1]

(2)50 subnetworks are to be created from 150.193.0.0 each subnet is expected to have 750 hosts. Find the subnet mask. [2]

(3)An organization want 2013 hosts.IP address 222.12.0.0 is assigned to organization. Find supernet mask. [1]

(4)For IP address 172.60.50.2/19.Find subnet address. Find the range of assignable IP address on the subnet. [2]

c Consider the network shown in the **figure-1**. Using Dijkstra's algorithm. Compute the shortest path from *s* to all network nodes. [6]

Q.3(a) Explain various congestion prevention policies [6]

Q.3(b) Assume the following hosts are present in the local network

Host A :IP-192.192.192.100, MAC-1A-23-F9-CD-06-9B **Host B** :IP-192.192.192.101, MAC-88-B2-2F-54-1A-0F

Host C:IP-192.192.192.102, MAC-48-BD-D2-C7-56-2A **Host D**:IP-192.192.192.103, MAC-5C-66-AB-90-75-B1

(1)Suppose Host A send the ARP request to find the MAC address of the Host C and Host C sends back the ARP reply. What is the destination MAC address in ARP request packet and reply packet? [3]

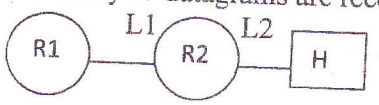
(2) Suppose Host A send the ARP request to find who owns IP address 192.192.192.103.What is the destination address in ARP request packet? Which host will give reply? What are the contents of ARP reply packet? [3]

-OR-

Q.3(a) The diagram below shows router R1 sending a datagram to Host H through router R2.Link L1 & L2 permits a MTU of 1500 bytes & 1100 bytes respectively (MTU: maximum transfer unit).A is an IP datagram which has size 4000 bytes (the size of datagram includes its header of 20 bytes).It is not using any of the option field in the header. A must be fragmented as it is sent from R1to H .Assume that all datagram s are received successfully.

(1)What are the sizes of IP datagram A is fragmented in sending it from R1 to R2 over L1? [3]

(2)How many IP datagrams are received by H? [3]



Q.3(b) Explain link state routing protocol in detail.

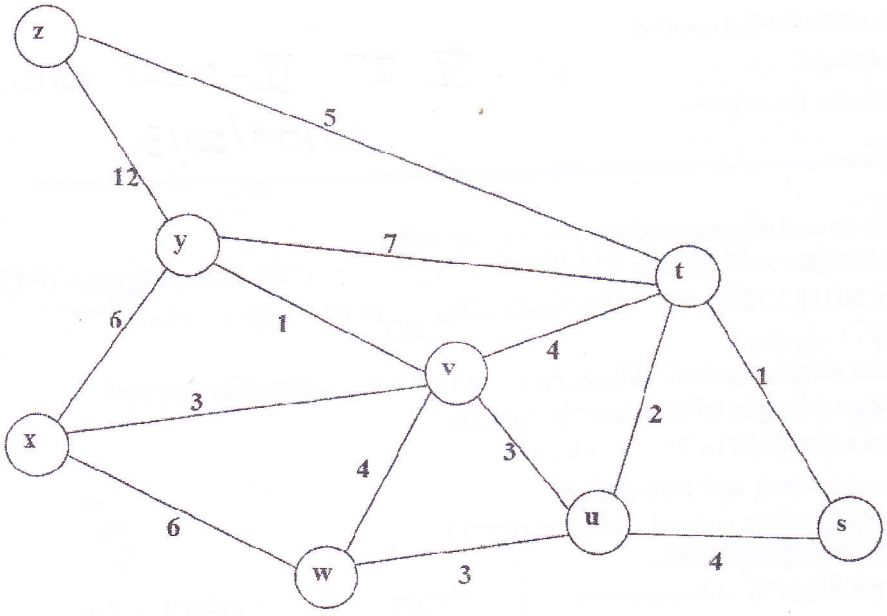


FIGURE-1

FACULTY OF TECHNOLOGY
SECOND SESSIONAL

SUBJECT CODE : (IT506) SUBJECT NAME : Advanced Microprocessor Architecture

Examination	: B.TECH - Semester - V	Seat No.	:
Date	: 02/09/2013	Day	: Monday
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.
5. Calculator is not allowed.

V. I.T. II. SESS. A.M.A
2/09/2013

Q.1 State true/false and justify your answer (no marks without justification).

(a) When task switching is done through FAR JMP instruction, 386 will set NT flag bit 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) A descriptor has defined a code segment as 'executable' only. Instruction MOV EAX,CS:[EBX] will generate an exception. (assume offset contained in EBX is within this code segment) 02

(d) An instruction MOV CS:[00001234],EAX will generate an exception in PM of 80386. 02

(e) 'C' uses processor registers to pass parameters to the function. 02

(f) The restriction on starting address of memory segment in real address mode (ie must start with nibble zero) is removed in PVAM of 80386. 02

Q.2 Answer any two

(a) Describe the following descriptor in detail. If this descriptor is accessed by the program during execution, what kind of action will be performed by 80386 in PM? 06

FFFFh		6
E9 ~~E009h~~	FFh	4
000Ch		2
FFFFh		0

Which are all the checks 80386 will do and will there be any exception(s) due to these checks ?

(b) (i) The following is valid data segment descriptor and already cached in invisible portion of the DS : 04

		Byte
00h	CFh	6
91h	00h	4
0080h		2
FFFFh		0

Now if following instruction is executed in PM of 80386 :
MOV [000FFFF0h],12345678h
Will there be any exception ? Justify your answer. If any exception, suggest the modification in the descriptor to avoid that exception.

(ii) What is the default memory model in 'C' compiler. ? State the size of the pointers used to refer data and code segments. 02

(c) LDTR is loaded with LDT selector 000Ch. Will there be any exception ? Justify your answer. If yes, modify the content of LDTR to avoid exception. If GDTR contains 00008000003Fh, will there be any exception ? Justify your answer. If yes, modify the content of GDTR to avoid exception. The 5th byte of LDT descriptor pointed by LDT selector contains 82h. Will there be any exception ? Justify your answer. If yes, modify the content of 5th byte of the LDT descriptor to avoid exception. 06

Q.3 (a) Explain how 48-bit far pointer (virtual address in program) of 80386 in PM is translated into physical address space in detail and how 80386 manages the 32 Tbytes local virtual memory and 32 T bytes global virtual memory address space in detail. 06

(b) List the Protected mode registers and their function that are not the part of the real mode. 02

(c) If an interrupt comes on IR4 pin of 8259 and upper five bits of ICW2 contains 00000_b and IDTR=800000000027h, will there be any exception ? If exception, modify the content of IDTR to avoid exception. 02

(d) What is "TSR" ? How it differs compare to normal program? 02

OR

Q.3 (a) In multitasking system, OS should be protected from user program and user program should be isolated from each other. Explain in detail the support provided by 80386 in PM to implement the above requirements. 06

(b) 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 ? 02

(c) If the content of the GDTR is 000000280027h, what are the starting and ending addresses of the GDT table ? How many descriptors can be stored in the table ? 02

(d) Explain the mechanism available to run 8086 type program in Protected mode of 80386. 01

(e) Which memory model effectively nullify the segmentation in 80386 PM ? 01

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FACULTY OF TECHNOLOGY
B.TECH. SEMESTER V [IT]
SUBJECT: DISCRETE MATHEMATICS

Examination	**: Second Sessional**	**Seat No.**	**: _____**
Date	**: 09/09/2013**	**Day**	**: ~~Friday~~ Tuesday**
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 G be a graph with 7 vertices and 10 edges. Calculate how many fundamental circuits lies in the system of fundamental circuit contains? Also calculate how many fundamental cut sets belongs to system of fundamental cut set? **[2]**

(b) Can we sketch graph with odd number of vertices having odd degree? Justify your answer. **[2]**

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

(d) Prove that there is a unique path between every pair of vertices in a tree. **[2]**

(e) State sufficient condition for the existence of Hamiltonian path in the graph and explain why condition is not necessary? **[2]**

(f) Find a deterministic Finite state machine that recognizes the set: **[2]**

$L = \{0(01)^i \ / \ i \geq 0\}$

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} as its output alphabet such that output 1 will be produce beginning with the fourth 0 in any block of four or more 0s in the input sequence.

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

(c) A man hiked for 10 hours and covered a total distance of 45 miles. It is known that he hiked 6 miles in the 1st hour and only 3 miles in the last hour. Show that he must have hiked at least 9 miles within a certain period of two consecutive hours..

(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) Find a deterministic Finite state machine that recognizes the set: **[4]**

$L = \{0^i 1 0^j / \ i, j \geq 1\} \cup \{0^k / k \geq 3\}$

(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 $L = \{a^k b^k / \ k \geq 1\}$ is not a finite state language. **[4]**

(c) Prove that: The value of any flow in a given transport network is less than or equal to the Capacity of any cut in the network. **[4]**

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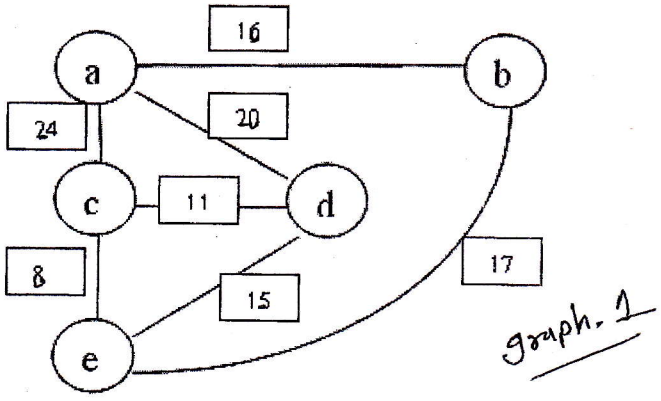
B.TECH. SEMESTER V [I.T]
SUBJECT: (C.T-506) DESIGN & ANALYSIS OF ALGORITHM

Examination	**: Second Sessional**	**Seat No.**	**: _____**
Date	**: 03/09/2013**	**Day**	**: Tuesday**
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.

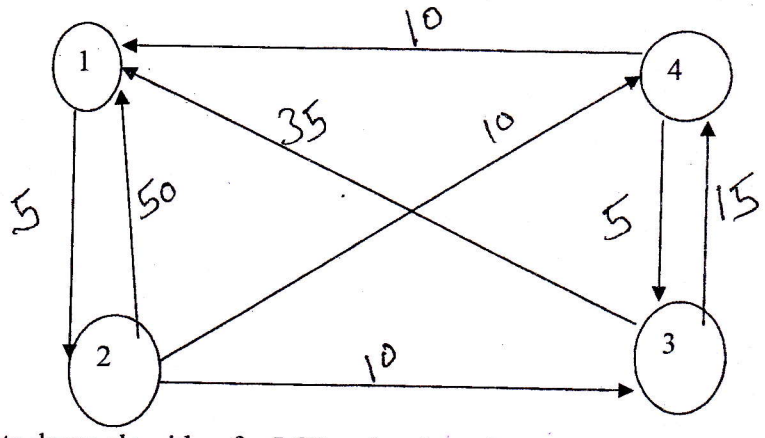
Q.1 Do as directed.
(a) What is an "Optimization Problem"? Explain in brief [2]
(b) Show that the Knapsack problem is solvable using Greedy method [2]
(c) Why Greedy Algo. are not always optimum? Explain with reasons [2]
(d) Explain principle of optimality. [2]
(e) Differentiate between divide & conquer and dynamic programming. [2]
(f) Problem designed by dynamic programming has more time complexity. Justify [2]

Q.2 Attempt ***Any Two*** from the following questions. **[12]**
(a) Give the Generalize algorithm for Greedy, also discuss the complexity same [6]
(b) Find the minimum spanning tree for following graph using Kruskal algorithm for graph 1. [6]



(c) Using Dijkstra's algo. Find the minimum distance of all nodes from node C for graph 1. [6]

Q.3 (a) Find shortest path from vertex 1 to vertex 4 using Floyd's algorithm for given graph. [6]



(b) Write down algorithm for LCS and make a time analysis. [6]

OR

Q.3 (a) Find the minimum numbers of multiplications are required for matrix multiplication of A*B*C*D [6]
A = 13 * 89 B = 89 * 5 C = 5 * 34 D = 34 * 3
(b) Write down algorithm for making change and make a time analysis. [6]

SUBJECT: (IT502) DATABASE MANAGEMENT SYSTEM

Examination	**:Second Sessional**	**Seat No.**	**:** _____
Date	**: 7/9/2013**	**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.

V. IT II-SESS. D.B.M.S
7/9/2013

Q.1 Do as directed. **[12]**

(a) If attribute A determines both attributes B & C, then it is also true that, **[1]**
(A) A → B (B) B→ A (C)C→ A (D)BC→ A

(b) _____ Index improves the performance of queries that use other than the search key of the primary index. **[1]**

(c) Which of the following statements about normal forms is false? **[1]**
(A) BCNF is stricter than 3NF.
(B) Loss less, Dependency preserving decomposition in 3NF is always possible.
(C) Loss less, Dependency preserving decomposition in BCNF is always possible.
(D) Any relation with two attributes is in BCNF.

(d) State the difference between dense and sparse indices. **[2]**

(e) Following data structure is preferable for data retrieval in queries which specifies a range of values. **[1]**
(A) B tree (B) Hashing (C) B+ tree (D) All

(f) State the advantages of variable length records over fixed length records. **[2]**

(g) Find the equivalence of two sets. **[2]**
F={A→ C, AC→ D,E→ AD, E→ H} G={A→ CD, E→ AH}

(h) Given the following set of FDies R= {A→ BC, CD→ E, B→ D, E→ A}, compute minimal cover. **[2]**

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

(a) Explain different types of organization of records in Files. **[6]**

(b) I. Consider following library database. **[3]**
Book(title, author, catalog_no, title, author, price)
Collection (title, author, catalog_no) and given the following FDies.
1. {title, author }→ catalog_no
2. catalog_no → title, author, publisher, year
3. {publisher, title, year} → price
Key is: - {author, title}. Find the highest normal form satisfied by both the schemas.

II. Explain steps in query processing. Perform materialization for the following expression.

$$\pi_{ssn}(\text{Student} \times \text{Registered} \times (\sigma_{title='Database\ Systems'}\ \text{Course})) \cup \pi_{ssn}(\text{Student} \times \text{Registered} \times (\sigma_{title='Analysis\ of\ Algorithms'}\ \text{Course}))$$ **[3]**

(c) Explain the various types of indices with appropriate example. **[6]**

Q.3 (a) Construct B+ tree for following data. Fan-out of B+ tree is 4. **[8]**
3,5,11,30,35,100,110,101,120,130,42,9,165,170
After construction Delete **110**, Delete **130**

(b) Consider schema R(ABCDE) with decomposition into R1(ABC) and R2(ADE) and following set of FDies in F = {A→ BC, CD→ E, B→ D, E→ A} **[4]**
I. Show whether that the decomposition is Lossy or Loss less. **[2]**
II. Show whether that Is it dependency preserving or not. **[2]**

OR

Q.3 (a) Create an Extendable Hash structure for the following key values: **[8]**
x={12, 03, 52,45, 68, 75, 19, 26, 83, 64, 57, 37, 72, 46 }
Assume that one bucket can store maximum 3 keys at a time where the hash function is H(x) = x mod 3.

(b) Explain Data Dictionary storage. **[4]**