/ Sem-V - CMPN / Paper / Subject Code: 31901 / Microprocessor / November- 2019
-choice based.

(Time: 3 Hours) [80 Marks]

N.B. 1) Question No. 1 is compulsory.
2) Attempt any **Three** questions out of remaining.
3) Assume suitable data wherever necessary and state them clearly.

Q.1 a) Explain memory banking in 8086 5
b) Explain VM, RF, IOPL, NT and TF flags of 80386 microprocessor 5
c) Write addressing modes of the following instructions 5
i) MOV AX, [BX+SI]
ii) AND CL,[2000]
iii) IN AL, DX
iv) JMP [BX+2]
v) ADD AX,[BX+SI+5]
d) Explain BSR mode of 8255 PPI 5

Q.2 A) Design 8086 based system for the following requirements 10
i) 8086 working in minimum mode with 8MHz.
ii) 64 KB EROM using 32 KB * 8 devices
iii) 128 KB RAM using 64 KB * 8 devices
B) Draw the block diagram of PIC8259 and discuss its operation 10

Q.3 A) Draw and explain the block diagram of PIT 8253 10
B) Draw and explain demultiplexing of address bus in 8086 10

Q.4 A) Explain how flushing of pipeline problem is minimized in Pentium architecture 10
B) Draw and explain maximum mode configuration of 8086 system 10

Q.5 A) Write a 8086 assembly language program with appropriate comments, to find if the given year is a leap year or not 10
B) Explain Strobed Bi-directional I/O Mode 2 operation of 8255 PPI with control word and timing diagram 10

Q.6 A) Differentiate real mode, protected mode and virtual mode of 80386 microprocessor 5
B) Write a short note on mixed language programming 5
C) Explain the following instructions in 8086 : LAHF and XLAT 5
D) Explain data transfer modes of DMAC 8257 5

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SEM V | CMPN | Paper / Subject Code: 31902 / Database Management System | NOV 2019
Choice |

[Time: 3 Hrs] [Marks: 80]

Please check whether you have got the right question paper.

N.B: 1. Q. 1 is compulsory.
2. Solve any three from reaming questions.
3. Draw neat diagrams wherever necessary.

Q. 1 a) Explain types of users of the database system with suitable example & responsibilities of DBA. **(10)**
b) Explain extended ER features. **(10)**

Q. 2 a) Explain types of join with suitable example. **(10)**
b) Explain constraints in SQL. **(10)**

Q. 3 a) Explain relational algebra operators. **(10)**
b) What is Log.? Explain Log based recovery. **(10)**

Q. 4 a) What is 2PL. Explain 2PL (2- phase) Locking protocol with its types. **(10)**
b) What is trigger? Write syntax and example. **(10)**

Q. 5 a) Explain view serializability with suitable examples. **(10)**
b) What is Normalization? Explain 1NF, 2NF and 3NF with suitable is example. **(10)**

Q. 6 Write note on **(Any two)** **(20)**
a) Timestamp Based Protocol
b) Transaction state diagram
c) Functional dependency in dbms

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(3 Hours) [Total Marks: 80]

Note: (1) Question 1 is compulsorys
(2) Solve any three questions out of remaining
(3) Assume suitable data wherever necessary

Q.1. (a) Explain the need of layering for communication and networking (5M)
(b) Describe in brief the concept of piggybacking. (5M)
(c) What is subnetting? What are the default subnet masks? (5M)
(d) Differentiate between TCP and UDP (5M)

Q.2. (a) Explain CSMA protocols. Explain how collisions are handled in CSMA/CD. (10 M)

(b) What is traffic shaping? Explain leaky bucket algorithm and compare it with token Bucket algorithm. (10M)

Q.3. (a) Illustrate TCP three way handshake techniques in TCP connection establishment. (10M)

(b) Explain the need for DNS (Domain Name System) and describe the protocol functioning. (10M)

Q.4. (a) Explain the difference between static and dynamic routing. Explain distance vector routing in detail. (10M)

(b) Why does data link protocol always put the CRC in a trailer rather than in a header? Given the data word "1101011011" and the divisor "10011", show the generation of cyclic redundancy check (CRC) codeword at the sender site. (10M)

Q.5. (a) Write short note on FTP. (10M)

(b) Discuss different types of guided media in detail. (10M)

Q.6. (a) What is a topology? Explain the types of topology. (10M)

(b) Explain the Go-back-N protocol. (10M)

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CMPN/SEM V/ Paper / Subject Code: 31904 / Theory of Computer Science /NOV 2019
Choice/

(3 Hours) [Total Marks: 80]

N.B. (1)Question No. 1 is compulsory
(2) Attempt any three out of remaining five questions
(3) Assumptions made should be clearly stated

1. (a) Explain post correspondance problem. 5
   (b) Differentiate between FA and PDA. 5
   (c) Define Regular Expression and obtain a regular expression such that 5
   $L(R) = \{ w \mid w \in \{0, 1\}^* \}$ with at the most three zeros
   (d) What is ambiguous grammar? Check whether following grammar is ambiguous or not 5
   $E \rightarrow E+E \mid E*E \mid (E) \mid id$

2. (a)Design a Finite State Machine to accept following language over the alphabet {0, 1} 10
   L (R) = { w | w starts with 0 and has odd length or starts with 1 and has even length }

   (b) Give and explain formal definition of Pumping Lemma for Regular Language and prove that following language is not regular. 10
   $L = \{ 0^i \mid i \text{ is prime number} \}$

3. (a) Construct PDA accepting the language $L=\{a^{2n}b^n \mid n \geq 0\}$ 10
   (b) Consider the following grammar 10

   $S \rightarrow i\,C\,t\,S \mid i\,C\,t\,S\,e\,S \mid a$

   $C \rightarrow b$

   For the string 'ibtaeibta' find the following:

   (i) Leftmost derivation
   (ii) Rightmost derivation
   (iii) Parse tree
   (iv) Check if above grammar is ambiguous.

4. (a) Construct PDA to check {wcw^R | w {a,b}*} where w^R is reverse of w & c is a constant. 10
   (b) Convert following CFG to CNF 10
   S-> 0A0|1B1|BB
   A->C
   B->S|A
   C->S|Є

5. (a) Convert (0+1) (10)*(0+1) into NFA with ε-moves and obtain DFA. 10
   (b) Construct Moore and Mealy Machine to convert each occurrence of 101 by 111. 10

6. Write short note on following **(any 2)** 20
   (a) Chomsky Hierarchy
   (b) Halting Problem
   (c) Rice's Theorem
   (e) Universal Turing Machine

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CHPN/SEM5/ Paper / Subject Code: 31906 / Elective - I Advance Operating System / NOV 2019
Choice/

Duration: 3 Hrs. **Total Marks:80**

NB: (1) Question no.1 is compulsory.

(2) Attempt any three out of remaining five questions.

(3) Assume data if required.

Q1. a.) Explain Co-schedulingfor multiprocessor OS. **[5]**

b.) Enlist the fields of Super block. **[5]**

c.) What is meant by static and dynamic part of process context? **[5]**

d.) Give advantages and disadvantages of clock driven scheduling for RTOS. **[5]**

Q2 a.) Explain different design approaches of operating System **[10]**

b.) Discuss techniques used to overcome scalability related issues in Distributed OS. **[10]**

Q3 a.)Describe the structure of buffer pool. **[10]**

b.)Explain different Distributed computing models in detail **[10]**

Q4 a.)Discuss various issues of cloud OS. **[10]**

b.)What is page table?How to map virtual address to physical address in UNIX OS? **[10]**

Q5 Write short notes on : **[20]**

a.) Conversion of path name to an i-node in UNIX system.

b.) Virtual OS.

Q6 a.)Bring out the design issues of multiprocessor OS **[10]**

b.)Explain Unix file system in detail. **[10]**

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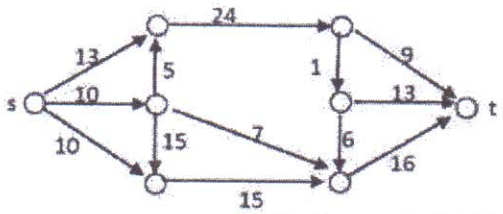
(3 Hours) [Total Marks: 80]

N.B. (1) Question No. 1 is compulsory
(2) Attempt any three out of the remaining five questions
(3) Assumptions made should be clearly stated

1. (a) Differentiate between P, NP, NP Complete and NP-Hard classes of Complexity. 05
(b) Define Red-Black tree. 05
(c) Write short note on bipartite matching. 05
(d) Explain recurrences with example. 05

2. (a) Define Maximum flow and Minimum-Cut. Apply Ford Fulkerson algorithm on following. 10



(b) What is convex hull? Explain Jarvis March in detail. 10

3. (a) Prove that Vertex Cover is NP-Complete. 10
(b) Explain Master theorem, and apply on the following examples. 10

i)$T(n)= 2T(n/2)+ n$

ii)$T(n)= 4T(n/2)+ n^2$

4. (a) Explain steps to prove any problem as NP Complete problem. 10
(b) Define Binomial Heap, Explain its operations with example. 10

5. (a) Explain DELETE operation in Red-Black Tree. Discuss its time complexity. 10
(b) Prove that TSP is NP-Complete. 10

6. Write a short note on following **(any 4)** 20
(a) Amortized Analysis
(b) Randomized Algorithm
(c) Relabel to Front algorithm
(d) Line segment properties
(e) NP-Completeness

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