Course: B.TECH
Sub_Code: RCS5C001

5th Semester Regular/Back Examination: 2022-23
SUBJECT: Formal Languages and Automata Theory
BRANCH(S): CSE,CSEAIME,CSIT,CST,ELECTRICAL & C.E,IT
Time : 3 Hour
Max Marks : 100
Q.Code : L185

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions : (2 x 10)

a) Construct a Deterministic Finite Automata (DFA) for L = {set of all strings where the number of 'a' and the number of 'b' in the string is éven} over Σ = { a, b}}.

b) State Mealy and Moore machines with suitable examples. Find the output string length of Mealy and Moore machines if the input string length is 'n'.

c) Construct the grammar to derive the language L = {wcw^r |w ϵ {a,b}* and w^r is reverse of string w.}

d) Construct finite automaton equivalent to the regular expression

$$R = (p \mid q)^*(pp + qq)(p \mid q)^*$$

e) Consider the grammar G, where the productions are

$$E \rightarrow F - E \mid E - F \mid F$$

$$F \rightarrow a \mid b$$

Prove that the Grammar is ambiguous for the string a – b

f) Construct the grammar to derive the language L = {wcw^r |w ϵ {a,b}* and w^r is reverse of string w.}

g) Differentiate between Chomsky Normal Form (CNF) and Greibach Normal Form (GNF).

h) State the halting problem of Turing machine.

i) Define K-Clique problem. State whether the problem belongs to Class P or Class NP

j) Compute A (3, 3) using Ackermann function

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6 × 8)

a) Construct the grammar to derive the language L = {wcw' |w ϵ {a,b}* and w' is reverse of string w.}

b) Construct a minimum state automaton equivalent to given automaton whose transition table is given below:

States/Input	a	b
→q0	q1	q3
q1	q2	q4
q2	q1	q4
q3	q2	q4
*q4	q4	q4

c) Use pumping lemma to prove that the language L= {a^p|p is a prime} is not regular.

d) Apply the identities of regular expressions to prove the following:
(1+00*1)+(1+00*1)(0+10*1)*(0+10*1) = 0*1(0+10*1)*.

e) Consider the grammar G given in CNF.

S→AB | BC

A→BA | a

B→CC | b

C→AB | a

Use Cook-Younger-Kasami (CYK) algorithm to determine whether the string 'baaba' is in L(G). https://www.bputonline.com

f) Construct ϵ - NFA for the regular expression R = (cd | c)*. Construct the equivalent DFA by ϵ-closure method for the given regular expression

g) State and prove Greibach Nomal Form

h) Are there any languages which are not recursively enumerable, but accepted by
a multi-tape Turing machine? Justify your answer.

i) Compare tractable and untractable problem

j) Compare context sensitive grammar and context free grammar. Can we design a PDA for context sensitive languages? Justify your answer.

k) State and prove pumping lemma for context free languages. Mention the application of pumping lemma.

Part-III
Only Long Answer Type Questions (Answer Any Two out of Four)

Q3. **a)** Differentiate between Nondeterministic Finite Automata (NFA) and (8) Deterministic Finite Automata (DFA). Construct DFA over $\sum = \{0, 1\}$ for strings having substrings either 101 or 110.

b) Find the regular expression corresponding to the automaton given below: (8)
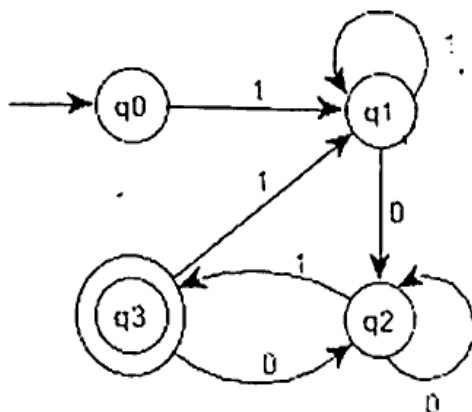
Q4 **a)** Design a Push Down Automata (PDA) accepting the language L = (8) $\{0^n1^m0^n1^m | m, n \geq 1\}$.

b) Reduce the following grammar G into Chomsky Normal Form (CNF). The (8) productions are P: $\{S \rightarrow aAD, A \rightarrow aB \mid bAB, B \rightarrow b, D \rightarrow d\}$

Q5. **a)** Define Turing Machine (TM) with its tuples. Design a TM for the language (8) $L = \{a^n b^n | n \geq 1\}$.

b) Differentiate between recursive language and recursive enumerable (8) language. Prove that recursive languages are closed under Union, Complement

Q6 **a)** Explain the meaning of polynomial time reduction. Prove that if B is in P and (8) $A \leq_P B$, then A is in P

b) Show the relationship between NP-Complete and NP-Hard problems. Prove (8) that Class P problems are closed under Union, Complement

5th Semester Regular/Back Examination 2021-22

FORMAL LANGUAGES AND AUTOMATA THEORY

Branch: CSE, CST, ELECTRICAL & C.E, IT

Max Marks: 100

Time: 3 Hours

Q Code: OF220

Answer Question No. 1 (Part 1) which is compulsory, any eight from part II and any two from part III.

The figures in the right-hand margin indicate marks

Part I

Q1 Only Short Answer Type Questions (Answer All-10) (02×10)

a. Define the transition function of a non-deterministic finite automata.

b. Find the ∈-NFA for the regular expression $0(0* + 1)1*$.

c. Draw the DFA for the language over the alphabet $\Sigma = \{0, 1\}$ having all strings that ends with either 01 or 11.

d. Define K leene closure of a language.

e. What is meant by leftmost and rightmost derivation? Give example.

f. Show that the grammar $S \to a \mid abSb \mid aAb$, $A \to bS \mid aAAb$ is ambiguous.

g. What are recursively enumerable languages?

h. Differentiate between P and NP class of problems.

i. Eliminate unit productions from the following context free grammar

  $S \to Aa/B/c$

  $B \to A/bb$

  $A \to a/bc/B$

j. What is meant by Halting Problem of a Turing Machine?

Part II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (06×08)

a. Write a regular expression for a set of strings of 0's and 1's with even number of 0's. Further, construct the DFA for the same

b. Proof that if L1 and L2 are two regular languages then

  $(L1 . L2)^* L1 = L1 . (L2 . L1)^*$

c. Construct a Mealy machine that generates 1's complement of a given binary number.

d. Construct a minimal DFA, which accepts the set of all strings over $\{0, 1\}$, which when interpreted as binary number, is divisible by '3'. (*For example: 1100 in binary is equivalent to 12 in decimal and 12 is divisible by 3*)

e. Reduce the following grammar to CNF: $S \to ASA \mid bA$, $AB \mid S$, $B \to C$

f. State and prove pumping lemma for Context free languages. Find out whether the language $L = \{x^n y^n z^n \mid n \geq 1\}$ is context free or not.

g. Consider the following productions:

  $S \to aB \mid bA$

  $A \to aS \mid bAA \mid a$

  $B \to bS \mid aBB \mid b$

  For the string "aaabbabbba",

  Find

  (i) the leftmost derivation

  (ii) the rightmost derivation

  (iii) the parse tree

h. How to convert Mealy machine to Moore machine and vice versa?

i. Consider the grammar

$S \to abScB|\lambda$

$B \to bB|b$

What language does it generate?

j. What is reducibility?

289 k. Show that $L = \{a^p \mid p \text{ is a prime}\}$ is not regular with the help of pumping lemma.

Part III

(02×16)

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3. Explain the Chomsky's hierarchy of languages with suitable example in each case.

Q4. The state transition function of a NPDA is given below which accepts the language by empty stack. Find the Context Free Grammar. (*Here q0 is the initial state of the machine*)

289 $\delta(q0, a, Z) \to (q1, XZ)$
$\delta(q1, a, X) \to (q2, Y)$
$\delta(q2, a, Y) \to (q1, XY)$
$\delta(q2, b, Y) \to (q3, \lambda)$
$\delta(q3, b, Y) \to (q3, \lambda)$
$\delta(q3, \lambda, Z) \to (q3, \lambda)$

Q5. Construct a PDA for the given CFG, and test whether $0^3 10^4$ is acceptable by this PDA.

289 $S \to 0BB$ 289
$B \to 0S \mid 1S \mid 0$

Q6. Design a Turing machine to compute $f(x) = x/2$, if x is even, and $f(x) = (x+1)/2$, if x is odd, where x is a positive integer represented in unary.

Registration No :

Total Number of Pages : 02

B.Tech.
PCS4I104

4ᵗʰ Semester Regular / Back Examination 2017-18
FORMAL LANGUAGE & AUTOMATA THEORY
BRANCH : CSE
Time : 3 Hours
Max Marks : 100
Q.CODE : C1008
Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Part-A(Answer all questions)

Q1   **Answer the following questions :**   **(2 x 10)**
a)   What do you mean by an alphabet and a string?
b)   Give the formal definition of Greibach Normal Form.
c)   Define Kleene closure of a language.
d)   If the number of states in an NFA is n, then what is the number of states in its equivalent DFA?
e)   Construct an NFA for the regular expression (aUb)*aba.
f)   What do you mean by instantaneous description of a Turing Machine?
g)   Design a DFA that accepts odd number of ones.
h)   Differentiate between P and NP class of problems.
i)   Give example of a total and a partial function.
j)   What is meant by Halting Problem of a Turing Machine?

Q2   **Answer the following questions :**   **(2 x 10)**
a)   Discuss the significance of a stack in PDA.
b)   What do you mean by Pigeonhole Principle?
c)   Distinguish between a DPDA and NPDA.
d)   What is the time complexity of CYK algorithm?
e)   Define a Post Correspondence Problem (PCP).
f)   Give two examples of NP-Complete problems.
g)   What do you mean by €-closure (epsilon closure) of a state?
h)   Define a primitive recursive function.
i)   What is meant by leftmost and rightmost derivation? Give example.
j)   What is the difference between a recursive language and a recursively enumerable language?

Part-B(Answer any four questions)

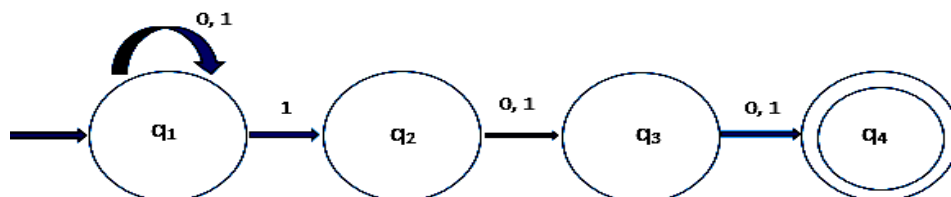**Q3** **a)** Design a PDA that recognizes the language A= {0^n1^n | n>=0}.   **(5)**
    b) Prove that the class of regular languages is closed under union operation.   **(5)**
    c) Convert the following NFA to DFA.   **(5)**

Q4 **a)** Design a minimized DFA for the regular expression (a*b)(a U b)* **(8)**

    b) State and prove pumping lemma for Regular languages. Using pumping lemma prove that the language $L=\{0^n1^n \mid n>=0\}$ is not regular. **(5)**

    c) Differentiate between a deterministic Turing Machine and a non-deterministic Turing Machine. **(2)**

Q5 **a)** Give the formal definition of Chomsky's Normal Form (CNF). Define ambiguity in grammars with a suitable example. **(5)**

    b) Design the DFA's for the language that accepts all strings **(5)**
        i) Starting with 1 and ending with 0.
        ii) Starting with 0 and having odd length or starting with 1 and having even length.

    c) Define Ackermann's function. Using the function, find out the values of A (2,1) and A (2,2). **(5)**

Q6 **a)** Design a Turing Machine to accept the language L= {w#w | w € {0,1}*}. **(10)**

    b) Convert the following context free grammar to Chomsky's Normal Form (CNF): **(5)**
    S ⟶ ASA | aB
    A ⟶ B | S
    B ⟶ B | €

Q7 **a)** Design the NFA's accepting strings over the alphabet {0,1} **(5)**
        i) Not containing the substring 110.
        ii) Containing the substring 110.

    b) Design a PDA that recognizes the language L= $\{a^ib^jc^k \mid i,j,k>=0$ and i=j or i=k}. **(5)**

    c) Show that the following functions are primitive recursive. **(5)**
        i) f (x,y)= x*y
        ii) f (x,y)= x^y

Q8 **a)** Compute the Godel number for the following sequence: **(5)**
    i) 1,1,2,0   ii) 4,0,0,1   iii) 0,0,1,1   iv) 1,0,3,0

    b) Design a DFA over the alphabet {a,b} accepting strings that does not contain exactly two a's. **(5)**

    c) Explain the Chomsky's hierarchy with a suitable diagram. **(5)**

Q9 **Write short answer on any THREE :** **(5 x 3)**
    a) Class NP-Complete
    b) Decidability
    c) Pumping Lemma for context free languages
    d) CYK algorithm

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OPERATING SYSTEMS
Branch: CSE, CST, ELECTRICAL & C.E.
ELECTRONICS & C.E, IT
Max Marks: 100
me: 3 Hours
Code: OF320

Answer Question No.1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1	Only Short Answer Type Questions (Answer All-10)	(02×10)
a)	What is Process Control Block (PCB)?	(2)
b)	What is meant by Context Switch?	(2)
c)	Distinguish between demand-paging and pre-paging?	(2)
d)	What are necessary conditions which can lead to a deadlock situation in a system?	(2)
e)	State the main difference between logical from physical address space.	(2)
f)	Explain Belady's Anomaly?	(2)
g)	What is a binary semaphore? What is its use?	(2)
h)	Define latency, transfer, and seek time with respect to disk I/O.	(2)
i)	What is the difference between Hard and Soft real-time systems?	(2)
j)	What is DRAM? In which form does it store data?	(2)

Part- II

Q2   Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)   (06×08)

a) Explain briefly about, processor, assembler, compiler, loader, linker, and the functions executed by them. **(6)**

b) Explain Memory Partitioning, Paging, Segmentation. **(6)**

c) Differentiate between multi-tasking, multi programming and multi-threading? **(6)**

d) Explain Readers-Writers problem using semaphores. **(6)**

e) Name the three types of schedulers and give functions of each. **(6)**

f) When does race condition take place? What are the three requirements that must be satisfied by any possible solution to a critical section problem? **(6)**

g) Assume we have a demand-paged memory. The page table is held in registers. It takes 8 milliseconds to service a page fault if an empty page is available or the replaced page is not modified, and 20 milliseconds if the replaced page is modified. Memory access time is 100 nanoseconds. Assume that the page to be replaced is modified 70 percent of the time. What is the maximum acceptable page-fault rate for an effective access time of no more than 200 nanoseconds? **(6)**

h) State at least five differences between static linking and dynamic linking. **(6)**

i) A snapshot of the resource information of a system is given below for processes. **(6)**

Process ID	Allocation A	B	C	D	Max A	B	C	D	Available A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0				
P2	1	3	5	4	2	3	5	6				
P3	0	6	3	2	0	6	5	2				
P4	0	0	1	4	0	6	5	6				

If a request from process P1 arrives for (0, 4, 2, 0), can the request be granted immediately?

j) Consider the two-dimensional array A: **(6)**

int A[ ] [ ] = new int [8] [8];

where A[0][0] is at location 8 in a paged memory system with pages of size 8. A small process that manipulates the matrix resides in page 0 (location 0 to 7). Thus, every instruction fetch will be from page 0. For three page frames, how many page faults are generated by the following array-initialization loops, using LRU replacement and assuming that page 1 contains the process and the other two are initially empty?

(i)   for (int j=0; j<8; j++)
        for(int i=0; i<8; i++)
          A [i] [j] = 0;

(ii)   for (int i 0; i 8; i++)
        for(int j 0; j 8; j++)
          A [i] [j] 0;

(6)

k) Disk request comes to the disk driver for cylinder 10, 22, 20, 2, 40, 6 and 38 in the same order. A seek takes 6ms per cylinder move. How much seek time is needed, if following disk scheduling algorithm is taken. In each case the disk head is parked at cylinder 20.

i) C-LOOK (initially moving towards last cylinder)
ii) Closest Cylinder Next

(6)

l) Assume we have a demand-paged memory. The page table is held in registers. It takes 8 milliseconds to service a page fault if an empty page is available or the replaced page is not modified, and 20 milliseconds if the replaced page is modified. Memory access time is 100 nanoseconds. Assume that the page to be replaced is modified 70 percent of the time. What is the maximum acceptable page-fault rate for an effective access time of no more than 200 nanoseconds?

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

(02×16)

Q3 When does race condition take place? What are the three requirements that must be satisfied by any possible solution to a critical section problem? Describe Peterson's solution for critical section problem and show that this solution meets the above requirement. Also mention the limitation of Peterson's solution.

(16)

Q4 Assume, we have the workload as shown below. All 5 processes arrive at time 0, in the order given below. The length of the CPU burst time is given in milliseconds https://www.bputonline.com

Process: P1 P2 P3 P4 P5
Burst time: 10 29 3   7   12

Considering the FCFS, SJF and RR (q=10 ms) scheduling algorithms. Prepare the Gantt-chart and find out which algorithm would give the minimum average turnaround time.

(16)

Q5 Define distributed system.List and explain the characteristics of distributed system?What are the Advantages of Distributed Systems?Mention the challenges in distributed system.

(16)

Q6 A processor uses 2-level page tables for virtual to physical address translation. Page tables for both levels are stored in the main memory. Virtual and physical addresses are both 32 bits wide. The memory is byte addressable. For virtual to physical address translation, the 10 most significant bits of the virtual address are used as index into the first level page table while the next 10 bits are used as index into the second level page table. The 12 least significant bits of the virtual address are used as offset within the page. Assume that the page table entries in both levels of page tables are 4 bytes wide. Further, the processor has a translation look-aside buffer (TLB), with a hit rate of 96%. The TLB caches recently used virtual page numbers and the corresponding physical page numbers. The processor also has a physically addressed cache with a hit rate of 90%. Main memory access time is 10 ns, cache access time is 1 ns, and TLB access time is also 1 ns. Assuming that no page faults occur, compute the average time taken to access a virtual address approximately (to the nearest 0.5 ns).

(16)

Registration No :

Total Number of Pages : 02 **B.Tech.**
PCCS4304

6th Semester Back Examination 2017-18
OPERATING SYSTEM
BRANCH : AEIE, BIOMED, CSE, ECE, EEE, EIE,
ELECTRICAL, ETC, FASHION, FAT, IEE, IT, ITE, METTA, MME
Time : 3 Hours
Max Marks : 70
Q.CODE : C538
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1   **Answer the following questions :**   **(2 x 10)**
  a) What are the main advantages of multiprogramming?
  b) What is Throughput, Turnaround time, Waiting time and Response time?
  c) Consider a system consisting of four resources of the same type that are shared by three processes, each of which needs at most two resources. Show that the system is deadlock free.
  d) Differentiate between a page and a segment
  e) Differentiate between internal and external fragmentation.
  f) What is a Process control block? Explain all its components.
  g) What is the difference between synchronization and mutual exclusion?
  h) What is swapping and what is its purpose.
  i) Differentiate between Logical and Physical file system.
  j) What do you mean by logical address and physical address?

Q2 **a)** Distinguish between multiprogramming and multiprocessing. What is the key motivation for the development of each?   **(5)**
  b) Differentiate between long-term scheduler and short-term scheduler. What is the purpose of medium-term scheduler?   **(5)**

Q3 **a)** Assume, we have the workload as shown below. All 5 processes arrive at time 0, in the order given. The length of the CPU burst time is given in milliseconds   **(5)**

Process   : P1   P2   P3   P4   P5
Burst Time : 10   29   3   7   12

Considering the FCFS, SJF and RR (time quantum=10 ms) scheduling algorithms, which algorithm would give the minimum average waiting time.
  b) State the Producer-Consumer Problem. Give a solution to the problem using Semaphore.   **(5)**

Q4   Consider the following snapshot of a system :   **(10)**

	Allocation			MAX			Available		
	A	B	C	A	B	C	A	B	C
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

Answer the following questions using the Banker's algorithm
  (a) What is the content of the matrix Need?
  (b) Is the system in safe state? If so, what is the safe sequence?
  (c) If a request from a process P1 arrives for (1, 0, 2) can the request be
       granted immediately?

Q5 a) Give an example of a simple resource deadlock involving three processes and   **(5)**
       three resources. Draw the appropriate resource allocation graph.
   b) Explain the principles of segmentation with examples.   **(5)**

Q6 a) When do page fault occurs? Describe the actions taken by the operating   **(5)**
       system, when a page fault occurs?
   b) Given the memory partitions of 600K, 200K, 250K, 500K (in order) how would   **(5)**
       each of the *first-fit, best-fit and worst-fit* algorithms place processes of 128K,
       581K, 411K, 221K(in order)? Which algorithm makes the efficient use of
       memory?

Q7 a) Suppose that the head of a moving hard disk with 200 tracks, numbered 0 to   **(5)**
       199, is currently serving a request at track 143 and has just finished a request
       at track 125. The queue of requests is kept in the FIFO order- 86, 147, 91,
       177, 94, 150,102, 175, 130.
       What is the total number of head movements needed to satisfy these requests
       for the following disk-scheduling algorithms?
        (a) FCFS Scheduling
        (b) SSTF Scheduling
        (c) SCAN Scheduling
   b) Describe the need of device management. Explain techniques used for   **(5)**
       managing and allocating devices.

Q8   Answer any TWO :   **(5 x 2)**
   a) Disk Structure
   b) RAID Structure
   c) Thrashing
   d) I-Nodes

Registration No:

Total Number of Pages: 03

B.Tech
PCS5I101

5th Semester Regular Examination 2017-18
Operating System
BRANCH: CSE
Time: 3 Hours
Max Marks: 100
Q.CODE: B311
Answer Question No.1 and 2 which are compulsory and any four from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions: multiple type or dash fill up type** **(2 x 10)**

 a) To access the services of operating system, the interface is provided by the:
  (a) system calls
  (b) API
  (c) assembly instructions
  (d) library

 b) When a page fault occurs before an executing instruction is complete :
  a) the instruction must be restarted
  b) the instruction must be ignored
  c) the instruction must be completed ignoring the page fault
  d) None of the mentioned

 c) Consider a machine in which all memory reference instructions have only one memory address, for them we need at least _____ frame(s).
  a)one
  b)two
  c)three
  d) None of the mentioned

 d) The maximum number of frames per process is defined by :
  a) the amount of available physical memory
  b) Operating System
  c) instruction set architecture
  d) None of the mentioned

 e) _____ replacement allows a process to select a replacement frame from the set of all frames, even if the frame is currently allocated to some other process.
  a) Local
  b) Universal
  c) Global
  d) Public

 f) Which one of the following is the address generated by CPU?
  physical address
  (b) absolute address
  (c) logical address
  (d)none of the mentioned

g) Program always deals with:
A. logical address
B. absolute address
C. physical address
D. relative address

h) Operating System maintains the page table for:
A. each process
B. each thread
C. each instruction
D. each address

i) In contiguous memory allocation :
A. each process is contained in a single contiguous section of memory
B. all processes are contained in a single contiguous section of memory
C. the memory space is contiguous
D. None of these

j) With relocation and limit registers, each logical address must be _____ the limit register.
A. less than
B. equal to
C. greater than
D. None of these

Q2   **Answer the following questions: Short answer type**   **(2 x 10)**
a) What is overlay? What is the use of it.
b) What is preemptive multitasking?
c) Explain Belady's Anomaly?
d) Define the term thread and process. How an operating system deals with inter processing communications.
e) Compare stateful and stateless file services.
f) What is meant by mounting? Give its advantage.
g) Give the necessary conditions for the deadlock to occur.
h) Show that mutual exclusion may be violated if the signal and wait operations are not executed automatically.
i) Define context switch.
j) What do you mean by WORM disk?

Q3 a) Explain the different page replacement algorithm with examples.   **(10)**

b) Explain the use of semaphores in concurrent system.   **(5)**

Q4 a) Explain the concept of demand paging in detail with neat diagrams.   **(10)**

b) Explain the file system along with its different components.   **(5)**

Q5 a) What is IPC? Explain the requirements and implementations of IPC.   **(10)**

b) Explain the following sets of processes, with the length of CPU burst time given in ms. **(5)**

Process	Burst time
P1	10
P2	1
P3	2
P4	5

Find the turn-around time and waiting time of each process using FCFS,SJF and Round robin (quantum=1) scheduling algorithm.

Q6 a) How are static and dynamic linking handled in memory management. **(10)**

b) Discuss the execution of remote procedure call and remote method innovation with supporting diagrams. **(5)**

Q7 a) Discuss how scheduling algorithms are selected for a system. What are the criteria considered ? Explain different evaluation methods. **(10)**

b) Consider the following page reference string: 1,2,3,4,2,1,5,6,1,2,3,7,6,3,2,1,2,3,6. How many page faults would occur for the LRU,FIFO,LFU and optimal page replacement algorithms assuming two and five frames? **(5)**

Q8 a) Explain how two process and multiprocessor solutions are used for critical section problem. **(10)**

b) Explain the file access methods used in operating design. **(5)**

Q9 a) Explain the banker's algorithm for deadlock avoidance. **(10)**

b) What is demand paging? Explain. **(5)**

Registration no:

Total Number of Pages: 02   **B.Tech.**
PCS5G001
5th Semester Regular Examination 2017-18
Operating Systems
BRANCH : CSE
Time: 3 Hours
Max Marks: 100
Q.CODE: B305
Answer Question No.1 and 2 which are compulsory and any four from the rest.
The figures in the right hand margin indicate marks.

Q1   **Answer the following questions:**   **(2x10)**
a)   The interval from the time submission of a process to the time of completion is termed
          as _____.
          (a). Throughput (b). Turnaround Time (c). Waiting Time (d). Response Time
b)   Each process in a system has a segment of code, called _____, in which the
          process may be changing common variables, updating a table, writing a file.
          (a). Critical section (b). semaphore (c). race condition (d). segment table
c)   A solution to the problem of indefinite blockage of low-priority process is _____.
          (a). Priority Scheduling (b). Paging (c). aging (d). None Of These
d)   Which page replacement algorithm is not practically possible?
          (a). FIFO (b). LRU (c). Optimal (d). None Of These
e)   The hole created within a block of memory is fragmentation.
          (a). External (b). Internal (c). Immediate (d). None of These
f)   Which section is shared by a Process and its thread?
          (a). stack (b). register (c). code (d). both a and b.
g)   Which scheduler is responsible for selecting a good process mix of I/O-bound and
          CPU-bound?
          (a). short-term (b). long-term (c). medium-term (d). average-term
h)   Which one mapthe logical address to physical address?
          (a). processor (b). MMU (c). memory address register (d). none of these
i)   Which makes possible transfer of data from and to the memory without help of main
          CPU?
          (a). Bus (b). DMA (c). IDE (d). none of these
j)   Which of the scheme describe that the IO device are accessed by generating a
          memory address?
          (a). Shared memory (b). IPC (c). Memory-Mapped IO (d). IO-Mapped Memor

Q2   **Answer the following questions:**   **(2×10)**
a)   What is the difference between binary and counting semaphores?
b)   What is the purpose of medium-term-scheduler and short-term-scheduler?
c)   What are the basic functions of an operating system?
d)   What is belady'sanamoly ?
e)   Define Thrasing.
f)   A computer has 6 tape drives among n programs. Each need two tape drives. For a
          system to be deadlock free what is maximum value of n
g)   What is spooling?
h)   What is the difference between multiprogramming and multitasking?
i)   What is a process? What is a PCB?

j) What is the advantage of using threads compared to processes?

Q3 **a)** Discuss the Multilevel feedback Scheduling and write its advantages. For the three processes P1,P2,P3 with CPU burst time of 30 ms, 6 ms, and 8 ms respectively, find the average TAT, average waiting time and average ressopnse time with time quantum 5ms.Assume all the jobs are available at the same time. **(10)**

b) Write about Segmentation with example. Discuss basic difference between paging and Segmentation. **(5)**

Q4 **a)** What is deadlock? What are the necessary and sufficient conditions for deadlock to occur in a system? **(10)**
For the following data

	Allocation	Max
P0	0 1 0	7 5 3
P1	2 0 0	3 2 2
P2	3 0 2	9 0 2
P3	2 1 1	2 2 2
P4	0 0 2	4 3 3

Is the system safe? If so find the safety sequence.

b) What do you mean by inter-process communication mechanism? Describe different models associated with IPC? **(5)**

Q5 **a)** Write about Fragmentation, types of Fragmentation and their solution. **(10)**
Given memory partitions of 100k, 500k, 200k, 300k and 600k (in order),how would each of the First-fit, Best-fit, and Worst-fit algorithms place processes of 212k, 417k, 112k and 426k (in order)? Which algorithm makes the most efficient use of memory?

b) If hit ratio to a TLB is 80% and it takes 15 ns to search the TLB and 150 ns to access main memory, then what must be the effective memory access time in ns? **(5)**

Q6 **a)** What is the basic operational difference between SCAN, C-SCAN and LOOK scheduling algorithm? **(10)**
What will be the total head movement if disk queue with request for I/O is in order 98,153,37,122,14,124,65,67 and uses SSTF disk scheduling algorithm?

b) Define RAID and describe their levels. **(5)**

Q7 **a)** What is Pure Demand Paging and how it differs from Demand Paging? **(10)**
Consider the following page reference string:1,2,3,4,5,6,1,2,3,4,5,1,2,3,4,1,2,3,1,2,1.If the process is allocated four frames how many page faults would occur if page replacements are done using FIFO and LRU algorithms.

b) Write about Paging with TLB by a suitable example? **(5)**

Q8 **a)** Explain different file allocation method. Write about different file access method with example. **(10)**

b) Explain the role of Storage Area Network. **(5)**

Q9 **a)** **Write short answer on any TWO :** **(10)**
   i)   Swap-Space Management
   ii) VM ware
   iii) Domain Name Systems
   iv) Kernel I/O Subsystem

b) Explain Distributed systems and Real-time systems. **(5)**

Registration No :

Total Number of Pages : 02
B.Tech
PCS5G001

5ᵗʰ Semester Regular / Back Examination 2019-20
OPERATING SYSTEMS
BRANCH : CSE
Max Marks : 100
Time : 3 Hours
Q.CODE : HRB457
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1   **Only Short Answer Type Questions (Answer All-10)**   **(2 x 10)**
a) What is the main purpose of an operating system?
b) To access the services of operating system, the interface is provided by the _____.
c) Define Dispatcher, dispatch latency.
d) How many types of fragmentation occur in Operating System? How they can overcome?
e) The bounded buffer problem is also known as _____.
f) Which facility dynamically adds probes to a running system, both in user processes and in the kernel?
g) Specify the benefits of multithreaded programming?
h) Differentiate between mutex and semaphore.
i) Enlist the different RAID levels.
j) Define Belady's Anomaly.

Part- II

Q2   **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)**   **(6 x 8)**
a) What is the main advantage of the layered approach to system design? Explain with diagram.
b) Design the structure of process control block.
c) Define system calls. Describe about the different operations done by several system calls.
d) Which are the necessary conditions to achieve a deadlock?
e) Given a memory partition having hole of 100k, 500k, 200k, 300k, 600k in order. How process of 212k,417k, 112k, 420k. Can be fit into those holes in order by using 4 partition selection algorithm.
f) Consider Logical Address Space is 256mb, Physical Address is 25 bits, offset field contains 13 bits. Find out page size, no of frames, no of pages.
g) State and explain Banker's algorithm.
h) Explain paging technique with TLB. Find out the hit ratio required to reduce the effective memory access time of 200 ns without TLB to 140 ns with TLB. Assume TLB access time is 25 ns.
i) Write short answer on: Linux system, VM ware.
j) Enlist the various File Access methods.
k) Suppose main memory has 3 frames & page nos which are going to be referenced are 5,0,3,9,4,7,6,0,1,0,4. Then find out total page fault & page hit.
l) Explain cycle stealing method and IPC mechanism.

Part-III
Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What are the different scheduling algorithms? Calculate the average waiting time of the given processes P1, P2, P3, P4, P5 with arrival time 5, 6, 4, 0, 9 and burst time 5, 10, 2, 6, 5. Design a Gantt chat. **(16)**

Q4 Discuss about the deadlock prevention and avoidance techniques. **(16)**

Q5 For what types of operations is DMA useful? Justify your answer. Describe how DMA controller works. **(16)**

Q6 Required blocks which are going to be accessed from a disk driven are on the cylinder. 98, 183, 37, 122, 14, 124, 65, 67. Disk head is initially at cylinder 53. Find out total no of head movements using different types of scheduling algorithm. **(16)**

Registration No :

Total Number of Pages : 02

B.Tech
PCS5I101

5ᵗʰ Semester Regular / Back Examination 2019-20
OPERATING SYSTEMS
BRANCH : CSE
Max Marks : 100
Time : 3 Hours
Q.CODE : HRB071
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1   Only Short Answer Type Questions (Answer All-10)   (2 x 10)

   a)   Which process can be affected by other processes executing in the system?

   b)   When several processes access the same data concurrently and the outcome of the execution depends on the particular order in which the access takes place, is called?

   c)   Give some benefits of multithreaded programming.

   d)   What are necessary conditions which can lead to a deadlock situation in a system?

   e)   What factors determine whether a detection-algorithm must be utilized in a deadlock avoidance system?

   f)   Define overlays?

   g)   List out the disadvantages of paging and segmentation?

   h)   When does thrashing occur?

   i)   When designing the file structure for an operating system, what attributes are considered?

   j)   What is the purpose of an I/O status information?

Part- II

Q2   Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)   (6 x 8)

   a)   What are the differences between Batch processing system and Real Time Processing System?

   b)   Define a process scheduler? State the characteristics of a good process scheduler?

   c)   What is a thread. Distinguish between thread and process.

   d)   Illustrate the segmentation technique and why is it needed?

   e)   Explain how contiguous and non-contiguous memory are being allocated?

   f)   State virtual memory concept. How demand paging is done through it?

   g)   Describe Banker's algorithm with an example.

   h)   Specify about the IPC mechanism.

   i)   How many types of semaphores are there? Explain about it.

   j)   Differentiate between mutex and semaphore.

   k)   Design the hard disk structure.

   l)   Write short notes on DNS and VM ware and LINUX system.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3   Consider 5 no of processes P1,P2,P3,P4,P5 which gives arrival time 5,6,4,0,9 and brust time 5,10,2,6,5. Calculate average waiting time by using FCFS,SJF,SRTF and RR algorithm with time quantum of 4 ms.   **(16)**

Q4   Discuss how deadlock can be avoided and prevented.   **(16)**

Q5   When does a page fault occurs? Explain various page replacement strategies/algorithms. Consider a memory with 3 frames. The reference string is 7,0,1,2,0,3,0,4,2,3,0,3,2,1,2,0,1,7,0,1. Find out no of page faults.   **(16)**

Q6   Design and explain the working principle of DMA controller.   **(16)**

Registration No :

Total Number of Pages : 02   **B.Tech.**
                                                                                 PCS6J008

6th Semester Regular Examination 2017-18
ADVANCED OPERATING SYSTEM
BRANCH : CSE
Time : 3 Hours
Max Marks : 100
Q.CODE : C431
Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 **Answer the following questions :** *multiple type or dash fill up type :*   **(2 x 10)**
  a) _____ is the command of copy in Unix
  b) The Sigaction() system call is used to change the action taken by a process on receipt of a specific signal. Mention Right/Wrong.
  c) Compaction is:
      (a) A technique for overcoming internal fragmentation
      (b) A paging technique
      (c) A technique for overcoming external fragmentation
      (d) A technique for overcoming fatal error
  d) Hash Function is:
      (a) It creates a small flexible block of data
      (b) It creates a small, fixed block of data
      (c) It creates a encrypted block of data
      (d) None of the mentioned
  e) _____ is the work of abort() function in Unix.
  f) _____is the address generated by CPU.
  g) _____is the commands to open a file in Unix.
  h) Signals that occur at the same time, are presented to the process :
      (a) One at a time, in a particular order
      (b) One at a time, in no particular order
      (c) All at a time
      (d) None of the mentioned
  i) The process termination is ___
  j) Signals of a given type :
      (a) Are all sent as one
      (b) Cannot be queued
      (c) Are queued
      (d) None of the above

Q2 **Answer the following questions :** *Short answer type :*   **(2 x 10)**
  a) Which algorithm used to determine the order of events? Define it.
  b) How Virtual memory implemented in an operating system?
  c) Define Livelock condition.
  d) Write shot notes on the opportunistic allocation strategies in Unix.
  e) How to represent bit vector? What is its importance?
  f) Differentiate between forward error and backward error recovery.
  g) Define global atomicity with proper an example.
  h) What are the functions of agreement protocols in distributed operating system?
  i) What is the significance meaning of a cycle in Resource Allocation Graph?
  j) Compare between network operating system and distributed operating system

Part – B (Answer any four questions)

Q3	**a)**	Explain necessary conditions for a Deadlock.	**(8)**
	b)	Define network operating system. Discuss different goal and benefits of it.	**(7)**
Q4	**a)**	What is MMU in operating system? Explain the memory mapping procedures.	**(8)**
	b)	Discuss different operations associated with processor of memory management unit	**(7)**
Q5	**a)**	Differentiate between Synchronous and Asynchronous operations in operating system with proper examples.	**(10)**
	b)	Explain Fault tolerance in distributed file system.	**(5)**
Q6	**a)**	How to manage the signal in an operating system? Explain it in details with proper examples.	**(8)**
	b)	What is a Unix Shell? Explain with a visual representation.	**(7)**
Q7	**a)**	Discuss the various data structures used for memory management in operating system. Explain the role of dynamic memory allocation with examples.	**(10)**
	b)	Write a short notes on "SIGCLD Semantics"	**(5)**
Q8	**a)**	What is Payload? Explain the procedure of sending a signal with payload.	**(8)**
	b)	Explain Hierarchical deadlock detection algorithm in distributed file system.	**(7)**
Q9		**Write short notes on (Any TWO) :**	**(7.5 x 2)**
		(i) Locking memory	
		(ii) Job Control Signals	
		(iii) Processor affinity	

5th Semester Regular/Back Examination: 2022-23
SUBJECT : Operating Systems
BRANCH(S): CSE, CSEAIME, CSIT, CST, ELECTRICAL & C.E, ELECTRONICS & C.E, IT
Time : 3 Hour
Max Marks : 100
Q.Code : L315
Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1   Answer the following questions: (2 x 10)

a) What is a time-sharing operating system?

b) List out any four information management system calls?

c) What does PCB contain?

d) Define race condition.

e) What is the basic method of Segmentation?

f) What is Demand Paging?

g) Define deadlock?

h) Differences between Logical address space and physical address space.

i) What is the purpose of system programs?

j) When does thrashing occur?

Part-II

Q2   Only Focused-Short Answer Type Questions- (Answer Any Eight out of   (6 × 8)
      Twelve)

a) List five services provided by an operating system and explain how each creates convenience for users. In which cases would it be impossible for user-level programs to provide these services? Explain your answer.

b) Explain the purpose of system calls and discuss the calls related to device management and communications in brief.

c) Define a Thread? Give the benefits of multithreading. What resources are used when a thread is created? How do they differ from those used when a process is created?

d) Consider the following set of processes, with the length of the CPU burst given in milliseconds:

Process	Burst Time	Priority
P1	2	2
P2	1	1
P3	8	4
P4	4	2
P5	5	3

The processes are assumed to have arrived in the order P1, P2, P3, P4, P5, all at time 0.

a) What is the average turnaround time for these processes with the SJF scheduling algorithm?

b) What is the average turnaround time for these processes with the PRIORITY scheduling algorithm?

e) Define Deadlock. State and explain conditions that are necessary for deadlocks to occur deadlock. How can it be prevented. Discuss with example?

f) Describe dining-philosopher problem? Device an algorithm to solve the problem, using semaphores.

g) Discuss the Peterson's solution for the race condition with algorithm.

h) Consider page reference string 1, 3, 0, 3, 5, 6 with 3-page frames. Find number of page faults in FIFO, LRU and Optimal Page Replacement Techniques.

i) What is Internal and External fragmentation? In which memory management technique internal fragmentation occurs, Explain the solution for it.

j) Explain swap space management in detail. https://www.bputonline.com

k) Explain different Disk scheduling algorithms SCAN, CSCAN, CLOOK.

l) Write short notes on DNS and VM ware and LINUX system.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Explain the FCFS, preemptive and non-preemptive versions of Shortest-Job First and Round Robin (time slice = 2) scheduling algorithms with Gantt charts for the four processes given. Compare their average turnaround and waiting time.   **(16)**

PROCESS	ARRIVAL TIME	BURST TIME
P1	0	8
P2	1	4
P3	2	9
P4	3	5

Q4 Explain in detail about Banker's algorithm with example in deadlock. (16)
Consider a system that contains five processes P1, P2, P3, P4, P5 and the three resource types A, B and C. Following are the resource types: A has 10, B has 5 and the resource type C has 7 instances.

Process	Allocation A B C	Max A B C	Available A B C
P1	0 1 0	7 5 3	3 3 2
P2	2 0 0	3 2 2	
P3	3 0 2	9 0 2	
P4	2 1 1	2 2 2	
P5	0 0 2	4 3 3	

Answer the following questions using the banker's algorithm:
a) What is the reference of the need matrix?
b) Determine if the system is safe or not.
c) What will happen if the resource request (1, 0, 0) for process P1 can the system accept this request immediately?

Q5 Explain the concept of demand paging in detail with neat diagram. (16)
Consider the following page-Reference string:
1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6. How many page faults occur for the LRU, FIFO and optimal page replacement algorithms, assuming 3 frames and initially all frames are empty?

Q6 Discuss the objectives for file management systems. Suppose the head of a (16)
moving- head disk with 200 tracks, numbered 0 to 199, is Currently serving a request at track 143 and has just finished a request at track 125. If the queue of requests is kept in FIFO order: 86, 147, 91, 177, 94, 150, 102, 175, 130. What is the total head movement to satisfy these requests for the following Disk scheduling algorithms.
(a)FCFS (b) Random (d) SCAN (e) SSTF (f) C- SCAN

Registration no :

Total Number of Pages: 01

B.Tech.
PCCS4401

7th Semester Regular / Back Examination 2017-18
Computer Graphics
BRANCH (S): AEIE, BIOMED, CSE, ECE, EIE, ETC, FASHION, FAT, IEE, IT, ITE, TEXTILE
Time: 3 Hours
Max Marks: 70
Q.CODE: B225
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**
a) What do you mean by emissive and non-emissive displays?
b) What is the importance of homogeneous co-ordinate system in computer graphics?
c) What do you mean by animation and morphing?
d) Write the difference between flood fill and boundary fill algorithm?
e) Explain the properties of B spline. Differentiate from Bezier.
f) What is meant by virtual reality?
g) Define dithering.
h) Compare perspective with parallel projection.
i) Mention some text clipping technique.
j) What do you mean by interactive computer graphics?

Q2 a) Compare the computation done in DDA algorithm with Bresenham's line drawing algorithm. **(5)**
b) Write a boundary fill procedure to fill an 8-connected region. **(5)**

Q3 a) Given control points (10,100),(50,100),(70,120),and (100,150). Calculate coordinates of any 4 points lying on Bezier curve. **(5)**
b) Derive the transformation matrix for window to view port mapping transformation. **(5)**

Q4 a) What is clipping? Explain Sutherland-Hodgeman algorithm of polygon clipping. **(5)**
b) What is Halftoning? **(5)**

Q5 a) Describe fractal classification. **(5)**
b) Obtain the perspective projection of a line segment AB={(3,2,4),(3,2,8)} which is parallel to z axis on to the z =0 plane with the COP at (0,0,-2). Also find the vanishing point. **(5)**

Q6 a) Describe Scan Line algorithm for visible surface detection method. **(5)**
b) Name the major component of a graphical interface. What are its components. **(5)**

Q7 What is Transformation? Describe 2-D Transformation operations such as Translation, scaling, rotation, reflection and shearing with proper examples. **(10)**

Q8 **Write short answer on any TWO:** **(5 x 2)**
a) MIDI vs Digital Audio
b) Hypermedia vs Hypertext
c) Illumination model
d) Aliasing and anti aliasing

Registration no:

Total Number of Pages: 02

B.Tech
PCCS4401

7th Semester Back Examination 2019-20
COMPUTER GRAPHICS
BRANCH: AEIE, BIOMED, CIVIL, CSE, ECE, EIE, ETC, FASHION, FAT, IEE, IT, ITE,
TEXTILE
Max Marks: 70
Time: 3 Hours
Q.CODE: HB192
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:**   **(2 x 10)**
 a) Consider a raster system with screen size of 6-inch by 9 –inch and a
  resolution of 50 pixels per cm in each direction. Find the size of the frame
  buffer if it requires 8 bits to store one pixel information.
 b) Differentiate between raster scan device and random scan device.
 c) What is antialiasing? Name a method used for antialiasing.
 d) What is dither noise? Mention the importance of dither matrix.
 e) Name any algorithms for polygon filling.
 f) What is Bezier curve?
 g) Define 3-D shear transformation.
 h) Explain diffuse reflection. Write the mathematical formula associated with
  this.
 i) What is area-subdivision method?
 j) Write different types of animation.

Answer any five out of seven questions

Q2 **a)** Write Bresenham's circle drawing algorithm. Draw a circle of radius 5cm   **(5)**
  using this algorithm.
   b) Explain window-to-viewport coordinate transformation.   **(5)**
Q3 **a)** Derive a transformation matrix for rotating a two dimensional object   **(5)**
  around a pivot point.
   b) What is clipping? Describe the working of Sutherland- Hodgeman   **(5)**
  Algorithm for polygon clipping with a suitable example.
Q4 **a)** What is fractal object? Explain different types of fractals. Define and   **(5)**
  discuss fractal dimension.

b) Explain how Painter's algorithms can be used as a visible surface **(5)**
detection method.

Q5 a) Compare and contrast between Gouraud Shading and Phong Shading. **(5)**

b) Explain the use of morphing for computer animation. **(5)**

Q6 Explain each of the following 3-D geometric/modeling transformation: **(10)**

    I.   Translation
    II.   Rotation
    III.   Scaling
    IV.   Reflection

Q7 Explain the following in context of spline representation: **(10)**

    i.   Interpolation and approximation splines
    ii.   Parametric continuity condition
    iii.   Geometric continuity condition
    iv.   Spline specification

Q8 Write short answer on any Two: **(2 x 5)**

a) 2-D composite transformation

b) Parallel projection

c) Illumination models

5th Semester Regular Examination 2017-18
Computer Graphics
BRANCH: CSE
Time: 3 Hours
Max Marks: 100
Q.CODE: B312
Answer Question No.1 and 2 which are compulsory and any four from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions: multiple type or dash fill up type** **(2 x 10)**
  a) Each screen point is referred to as ....
      a) Resolution b)Pixel c)Persistence d)Dot Pitch.
  b) In CRT, the electron intensity is adjusted using ....
      Accelerating anode b) Control grid c) Electron gun d) Focusing anode
  c) The transformation in which an object is moved from one position to another
      in circular path around a specified pivot point is called
      Rotation b) Shearing c) Translation d) Scaling
  d) The region against which an object is clipped is called a ....
      Clip window b) Boundary c) Enclosing rectangle d) Clip square
  e) The result of logical AND operation with endpoint region codes is a nonzero
      value. Which of the following statement is true?
       a) The line is completely inside the window
       b) The line is completely outside the window
       c) The line is partially inside the window
       d) The line is already clipped .
  f) Sutherland Hodgeman algorithm works well for...........
      a) Concave polygon b) Convex polygon d)Smooth curves d) Line segment
  g) Coordinates of viewport are known as ....
      a) World coordinates b)Polar coordinates c) Screen coordinates d)Cartesian
      coordinates
  h) A transformation that slants the shape of an object is called ....
      a) Reflection b) Shear c) Distortion d) Scaling
  i) Identify the data structures used to store the data about polygon surfaces
      a) Vertex table b) Polygon table c) Edge table d) All of the above
  j) Identify odd one out
      a) Vector based b) Hardware based c) Bitmap based d) Scanline based

Q2 **Answer the following questions: Short answer type** **(2 x 10)**
  a) Define computer graphics.
  b) Define persistence, resolution and aspect ratio .
  c) Mention the types of line caps.
  d) What is ant aliasing by post filtering and pre filtering?
  e) What are the different ways of specifying spline curve?
  f) How will you clip a point?
  g) Distinguish between view port and window port.
  h) What is polygon mesh?
  i) Define rendering.
  j) What is random fractal and geometric fractal ?

Q3 **a)** Explain about the simple raster scan display system. **(10)**
  b) Explain the basic operations of direct view storage tube. **(5)**

Q4 **a)** Discuss in detail about parallel line algorithms. **(10)**
  b) Write a note on viewing function. **(5)**

Q5 **a)** Determine a sequence of basic transformations that are equivalent to the Y-direction shearing matrix. **(10)**

b) Show that the two successive rotations about the origin are commutative. **(5)**

Q6 **a)** Determine the equation of Bezier curve for five control points. Evaluate the point at u= 0.5 where u is the normalized parameter. **(10)**

b) Discuss the nature of blending functions a Hermites cubic spline. **(5)**

Q7 **a)** List out and explain various polygon rendering methods. **(10)**

b) Define blending function for B-Spilne curve. **(5)**

Q8 **a)** Implement the depth-buffer method to display the visible surfaces of a given polyhedron. How can the storage requirements for the depth buffer be determined from the definition of the objects to be displayed? **(10)**

b) Explain about 3D viewing pipeline. **(5)**

Q9 **a)** Write a procedure to perform a one-point perspective projection of an object. **(10)**

b) Write a brief note on computer animation function. **(5)**

Registration No :

Total Number of Pages : 02   **B.Tech**
                                                                                       PCS5I102

5th Semester Regular / Back Examination 2019-20
COMPUTER GRAPHICS
BRANCH : CSE
Max Marks : 100
Time : 3 Hours
Q.CODE : HRB162
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1   **Only Short Answer Type Questions (Answer All-10)**   **(2 x 10)**
a)   Differentiate raster scan and random scan systems.
b)   List the disadvantages of DDA.
c)   Mention the importance of homogeneous coordinate system.
d)   What is dither noise? Mention the importance of dither matrix.
e)   Define window-to-viewport transformation.
f)   Define shear transformation.
g)   Define self-affine fractal.
h)   Write the different types of animation.
i)   Define flat surface rendering.
j)   What is virtual reality?

Part- II

Q2   **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**
a)   Illustrate Bresenham's line drawing algorithm to draw a line with endpoint (5, 15) and (15, 25).
b)   A triangle has its vertices at A(1, 1), B (3, 1) and C(2, 2). It is translated by 7 units along –ve X –direction and then rotated clockwise by 45^0 about P (0,2). Determine the new vertex positions of the triangle.
c)   Derive a transformation matrix for reflection about the diagonal y= -x.
d)   Consider the clipping window with vertices A(2,1), B(4,1), C(4,3) and D(2,3). Use Cohen-Sutherland algorithm to clip a line A(-4, -5) B(5,4) against this window (show all intermediate steps).
e)   Write Scan line polygon fill algorithm. Explain each step of this algorithm by taking a suitable example.
f)   Define aliasing. Mention problems associated with aliasing. Discuss anti-aliasing techniques with their relative merits and demerits.
g)   Derive a transformation matrix for a scaling transformation with respect to any fixed point (x_f, y_f, z_f).
h)   What is parallel projection? Categorize parallel projection with respect to different view planes. Derive a transformation matrix for oblique parallel projection.
i)   Make a classification of visible surface detection methods. Discuss how Painter's algorithm is helpful for visible surface detection. List its advantages and disadvantages.
j)   Describe a basic illumination model (considering ambient light, diffuse reflection and specular reflection).
k)   Explain the working of Gouraud surface rendering method.
l)   What is animation? Name the different techniques used for animation. Make comparison between key frame and procedural animation.

Part-III
Only Long Answer Type Questions (Answer Any Two out of Four)

Q3   Derive the incremental computation on which the mid-point circle algorithm is based. **(16)**
Write the different steps of this algorithm. Use this algorithm to draw a circle with
radius 4 cm and center located at (5,10)

Q4   What is Bezier curve? Write the basic equations for generating Bezier curve. Discuss **(16)**
its properties. Derive Bezier matrix for cubic Bezier curve.

Q5   Define perspective projection. Derive perspective projection transformation matrix. **(16)**
Discuss the special cases associated with this.

Q6   Explain the working of the following algorithms : **(16)**
        a. Depth buffer
        b. A-buffer
List out their relative advantages and disadvantages.

5th Semester Regular/Back Examination: 2022-23
SUBJECT: COMPUTER GRAPHICS
BRANCHE(S): CSE,CSEAIME,CSIT,CST,IT
Time: 3 Hours
Max Marks: 100
Q Code L449
Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (02x10)

a) What is raster scan and random scan systems?
b) What is DDA? What are the disadvantages of DDA algorithm?
c) Define pixel and resolution.
d) What do you mean by animation?
e) How CMY is converted to RGB?
f) Mention the importance of homogeneous coordinate system.
g) What is transformation? What are the steps involved in 3D transformation?
h) List two polygon filling methods.
i) State four properties of light.
j) State the concept of vanishing point.

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (06x08)

a) Explain 2D transformations with its basic types.
b) Write scan line polygon fill algorithm. Explain each step of the algorithm with appropriate example.
c) Explain back-face removal algorithm,for hidden surface elimination.
d) Explain what do you mean by augmented reality?
e) Explain perspective projection with its types.
f) Explain what do you mean by dithering? How is it overcome?
g) What is animation? Compare key frame and procedural animation.
h) Use the Cohen Sutherland algorithm to clip two lines P1(40,15)-P2(75,45) and P3(70,20)-P4(100,10) against a window A(50,10),B(80,10),C(80,40),D(50,40).
i) Explain the working principle of Gouraud surface rendering algorithm.
j) Consider the line from (5, 5) to (13, 9).Use the Bresenham's algorithm to rasterize this line
k) Consider the line from (0, 0) to (4, 6). Use DDA algorithm to rasterize this line.
l) What is the use of ray tracing methods? Describe basic ray tracing algorithm in detail.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)   (02X16)

Q3 What is Bezier curve? Write the basic equations for generating Bezier curve.   **(16)**
Discuss its properties. Derive Bezier matrix for cubic Bezier curve.

Q4   a. Derive the expression for decision parameter used in Bresenham's Circle   **(16)**
algorithm.
b. Apply the Shearing transformation to square with A(0,0),B(1,0),C(1,1) and
D(0,1) as given below : (i) Shear parameter value of 0.5 relative to the line
Yref= -1;
(ii) Shear parameter value of 0.5 relative to the line Xref= -1;

Q5 Why illumination models are used? Explain the various kinds of illumination   **(16)**
models.

Q6 Write short notes on the followings: **(16)**
a. Bazier curve
b. Window-to-viewport transformation
c. Half toning
d. YIQ colormodel

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Total Number of Pages : 02

B. Tech
RCS5D006

5th Semester Regular / Back Examination: 2021-22
COMPUTER GRAPHICS
BRANCH(S): CSE, CST, IT

289   289   289   Time : 3 Hour
Max Marks : 100
Q. Code : OF413

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1   **Answer the following questions :**   (2 × 10)
a)   What is interactive computer graphics?
b)   Differentiate half toning vs. dithering.
c)   Define viewing transformation and composite transformation.
d)   What do you mean by animation and morphing?
e)   Define hypermedia.
f)   Differentiate raster scan display vs. random scan display.
g)   State four applications of computer graphics.
h)   Differentiate window vs. view port.
i)   State four properties of light.
j)   What do you mean by affine transformation?

Part-II

Q2   **Only Focused-Short Answer Type Questions- (Answer Any Eight out of   (6 × 8)
Twelve)**
a)   What is a Bezier curve? Given $P_0(1,1)$, $P_1(2,3)$, $P_2(4,3)$, $P_3(3,1)$ as vertices of
Bezier curve. Determine three points on Bezier curve and draw the curve.
b)   Explain back-face removal algorithm for hidden surface elimination.
c)   What is a B-spine curve? List the properties of B-spine curve.
d)   What is scan conversion? Draw a line from (0,0) to (6,6) using DDA line drawing
algorithm.
e)   A polygon has four vertices A(20,10), B(60,10), C(60,30), D(20,30). Calculate the
vertices after applying a transformation matrix to double the size of polygon with
point A located at the same place.
f)   Write short notes on fractal geometry classification.
g)   Explain Z-buffer and A-buffer algorithms.
h)   Find out the reflection of the point P(10,20) about the line x=4.
i)   Describe Bresenham's line drawing algorithm.
j)   What is the use of ray tracing methods? Describe basic ray tracing algorithm in
detail.
k)   Discuss Cohen-Sutherland line clipping algorithm with a suitable example.
l)   Differentiate Gouraud Shading vs. Phong Shading.

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 What is projection? Discuss various types of projection. **(16)**

Q4 Discuss the following color models with suitable diagram and equations: RGB, XYZ, YIQ and CMY models. **(16)**

Q5 What is transformation? Describe 2D transformation operations such as translation, scaling, rotation, reflection and shearing with proper examples. **(16)**

Q6 Write short notes on the followings: **(16)**
   a. Graphic input devices
   b. Diffuse reflection
   c. Prospective transformation
   d. Homogeneous coordinates

What is projection? Discuss various types of projection.

7ᵗʰ Semester Regular/Back Examination 2017-18
Artificial Intelligence
BRANCH : AEIE, BIOMED, CSE, ECE, EIE, ETC, IEE, IT, ITE, TEXTILE
Time: 3 Hours
Max Marks: 70
Q.CODE: B348
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions :** (2 x 10)
  a) Describe the four categories under which AI is classified with examples.
  b) Differentiate prepositional & predicate logic.
  c) Describe Bayes theorem.
  d) Define a well-formed formula (wff).
  e) What are resolution /refutation?
  f) What is script? What is its use?
  g) Define forward and backward chaining. Differentiate the same.
  h) What is inference?
  i) What is fuzzy logic? What is its use?
  j) List the characteristic features of a expert system.

Q2 **a)** Find out about the Mars rover. (5)
    1. What are the precepts for this agent?
    2. Characterize the operating environment.
    3. What are the actions the agent can take?
    4. How can one evaluate the performance of the agent?
    5. What sort of agent architecture do you think is most suitable for this agent?
  b) What are the issues in syntax in NLP? Explain with example. (5)

Q3 **a)** Consider the following problem: If a perfect square is divisible by a prime p, (5) then it is also divisible by square of p. every perfect square is divisible by some prime. 36 is a perfect square. Does there exist a prime q such that square of q divides 36?
  b) Formulate the block world planning problem. (5)

Q4 **a)** Consider the following graph given below. Starting form start A, execute DFS. (5) The goal node is G. Show the order in which the nodes are expanded. Assume that the alphabetically smaller node is expanded first to break ties.
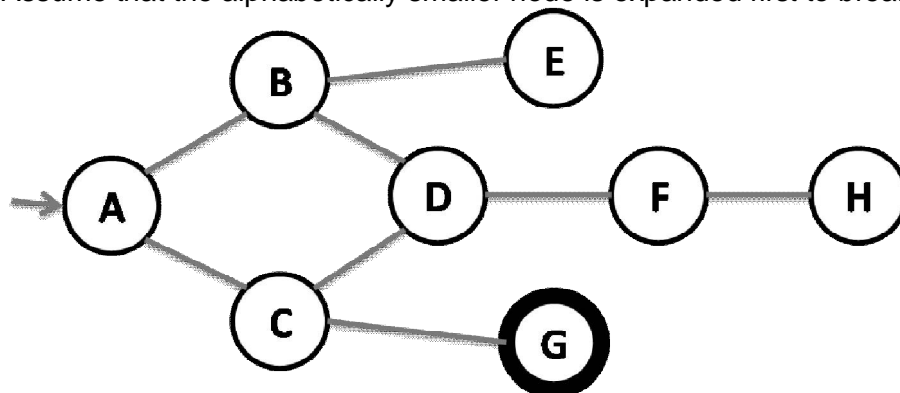
  b) What is an expert system shell? Discuss in detail. (5)

Q5 **a)** Consider the following sentences : **(5)**
a) Mammals drink milk
b) Man is mortal
c) Man is a mammal
d) Tom is a man
e) Prove Tom drink(s) milk
f) Prove Tom is mortal.
 i) Represent all the sentences in clausal form
ii) Prove (v) and (vi) using modus ponens
iii) Prove (v) and (vi) using resolution.

(5)

b) State gradient decent algorithm and why it is called so?

Q6 **a)** Consider the problem of trying to recognize handwritten digits. Formulate this **(5)**
as a concept learning problem.
i) Clearly specify what can be the possible features.
ii) How do you get the training set and the test set?
iii) How will you measure the performance of your learning algorithm?

b) What are the different types of learning algorithm what are use? And state the **(5)**
algorithm what is best in real-time problems?

Q7 **a)** Consider a 2-class learning problem having 4 boolean attributes: {A1, A2,…, **(5)**
A4}. The following examples are available for training. Assume a bias n favour
of simpler hypothesis, propose a hypothesis for the concept Q.

A1	T	F	F	T	F	F	T
A2	T	T	T	T	T	T	T
A3	F	F	T	T	T	F	F
A4	F	T	T	F	T	F	T
Q	-	-	+	+	+	-	-

b) What is frame based formalism in machine learning? Explain in detail. **(5)**

Q8 **a)** Explain a fuzzy set along its attributes with help of a neat labeled diagram. **(5)**

b) Discuss about **any two:** **(2.5x2)**
a)Genetic Algorithm
b)Solemnization
c)Bounded rationality

Registration No :

Total Number of Pages : 01   **B.Tech**
                                                                                               PECS5401

7th Semester Back Examination 2019-20
ARTIFICIAL INTELLIGENCE
BRANCH : AEIE, BIOMED, BIOTECH, CIVIL, CSE,
ECE, EIE, ETC, IEE, IT, ITE, TEXTILE
Time : 3 Hours
Max Marks : 70
Q.CODE : HB262
Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1   **Answer the following questions :**   **(2 x 10)**
  a) Describe agent along with its function.
  b) State the various properties of environment.
  c) Differentiate blind search and herustic search.
  d) List various informed search strategy.
  e) Explain in detail about knowledge engineering process in FOL.
  f) Define an inference procedure.
  g) State the reason why first order, logic fails to cope with that the mind like medical diagnosis.
  h) What is meant by belief network?
  i) What are the principles that are followed by any learning procedure?
  j) What are the different types of planning?

Q2 **a)** What is Intelligence? Discuss types of problems requiring Intelligence to solve it. Define AI.   **(5)**
  b) Differentiate the DFS and BFS with merits and demerits.   **(5)**

Q3 **a)** Explain A* algorithm.   **(5)**
  b) What is hill climbing? Explain Steepest ascent Hill climbing algorithm.   **(5)**

Q4 **a)** Explain the Minimax Procedure with example.   **(5)**
  b) Solve 8 Puzzle problem by any AI Technique.   **(5)**

Q5 **a)** Explain Non-Monotonic reasoning and discuss the logics for Non-Monotonic reasoning.   **(5)**
  b) Explain Expert System Architecture In Artificial Intelligence.   **(5)**

Q6   Write a detailed note on Expert Systems including representation, usage of domain knowledge, reasoning and explaining.   **(10)**

Q7   Explain multilayer feed forward neural networks with an algorithm.   **(10)**

Q8   **Write short answer on any TWO :**   **(5 x 2)**
  a) Bayesian network
  b) Semantic and Syntactic analysis in NLP.
  c) Alpha-Beta Cutoffs Procedure in Game Playing.

Registration No:

Total Number of Pages: 03   **B.Tech**
                                                                              PCS3D001

3rd **Semester Regular/Back Examination 2017-18**
Artificial Intelligence
BRANCH: CSE
Time: 3 Hours
Max Marks: 100
Q.CODE: B1212
Answer Question No.1 and 2 which are compulsory and any four from the rest.
The figures in the right hand margin indicate marks.

Q1   **Answer the following questions:** *multiple type or dash fill up type*   **(2 x 10)**
  a)   The first view of AI is about duplicating what the human brain does is_____.
         i.   Cognitive science
         ii.   Simulation
         iii. Emulation
         iv.   Reasoning
            a) Only i
            b) Both i & ii
            c) iii & iv
            d) i, ii, iii & iv
  b)   The second view of AI is about duplicating what human brain should do is
         doing things _____.
         i.   Cognitive science
         ii.   Simulation
         iii. Rationally
         iv.   Reasoning
            a) Only i
            b) Both i & ii
            c) Only iii
            d) Both iii & iv
  c)   _____ networks were used to stimulate brain functioning.
  d)   A* algorithm is based on
            a) Breadth-First-Search
            b) Depth-First –Search
            c) Best-First-Search
            d) Hill climbing.

  e)   What are taken into account of state-space search?
            a) Postconditions
            b) Preconditions
            c) Effects
            d) Both b & c
  f)   Which form is called as conjunction of disjunction of literals?
            a) Conjunctive normal form
            b) Disjunctive normal form
            c) Normal form
            d) All of the mentioned
  g)   What is probability density function?
            a) Probability distributions
            b) Continuous variable
            c) Discrete variable
            d) Probability distributions for Continuous variables

h) The room temperature is hot. Here the hot (use of linguistic variable is used)
   can be represented by _____ .
       a) Fuzzy Set
       b) Crisp Set
       c) both a and b
       d) none of the above

i) Which of the following is the model used for learning?
       a) Decision trees
       b) Neural networks
       c) Propositional and FOL rules
       d) All of the mentioned

j) Morphological Segmentation
       a) Does Discourse Analysis
       b) Separate words into individual morphemes and identify the
          class of the morphemes
       c) Is an extension of propositional logic
       d) None of the mentioned

Q2   **Answer the following questions:** *Short answer type*   **(2 x 10)**
a) Differentiate forward chaining and backward chaining.
b) Mention the criteria for the evaluation of search strategy. List the various
   search strategies.
c) Define Depth First Search (DFS). Write the drawbacks of DFS.
d) Define the term procedural knowledge. State any one application where
   procedural knowledge be used.
e) Find the property of the Proposition $((A{\to}B){\wedge}(A{\wedge}{\sim}B))$?
f) Write the conceptual dependency structure for the statement "Rajni is eating
   her soup with a spoon"
g) Differentiate Supervised and Unsupervised learning.
h) What are the different types of planning?
i) List any two NLP systems.
j) List the characteristic features of an expert system.

Q3 **a)** Represent the following sentences in FOPL   **(10)**
   a) Some students took French in spring 2010.
   b) Every student who takes French passes it.
   c) Only one student took Greek in spring 2010.
   d) The best score in Greek is always higher than the best score in French.
   e) Every person who buys a policy is smart.
b) Verify each of the following pairs of equivalent formulas by transforming   **(5)**
   formulas on both sides into the same normal form.

       i) $(A{\to}B){\to}(A{\wedge}B) = ({\sim}A{\to}B){\wedge}(B{\to}A)$
       ii) $A{\wedge}B{\wedge}({\sim}A{\vee}{\sim}B) = {\sim}A{\wedge}{\sim}B{\wedge}(A{\vee}B)$

**Q4** **a)** Explain any two Informed Search strategies.   **(10)**
b) Discuss about Constraint satisfaction problem.   **(5)**

Q5 **a)** Express the following concepts as Semantic nets structure with   **(10)**
   interconnected nodes and labelled arcs.
   "Company XYZ is a software development company. Three departments
   within the company are Sales, Administration and programming. Ram is the
   manager of programming department. Mohan and Shyam are programmers.
   Shyam is married to Leela. Leela is an editor of weekly news magazine. They
   have two children and they live in Delhi. Leela wears glasses and is very tall."

b) For the search tree given below, use depth-first search and list the elements **(5)**
of the queue just before selecting and expanding each next state until a goal
node is reached. (Goal node designated with *)
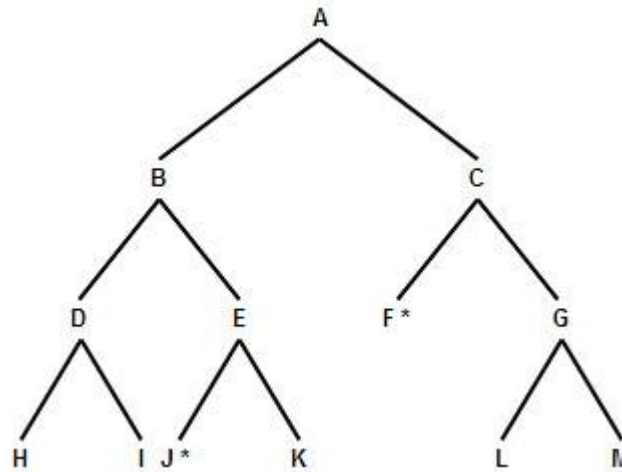
Q6 **a)** Explain the concept of planning with state space search using suitable **(10)**
example.
b) Explain Min-Max Algorithm and Alpha-Beta pruning. **(5)**

Q7 **a)** Explain the use of planning graph in providing better heuristic estimation with **(10)**
suitable example.
b) Discuss in detail the syntactic analysis (PARSING). **(5)**

Q8 **a)** Give the advantages of expert system architecture based on decision tree **(10)**
over those of production rules. What are the main disadvantages?
b) Explain the Chomsky's Hierarchy of Languages with suitable example. **(5)**

Q9 **a)** Explain with an example learning in decision trees. **(10)**
b) Describe multilayer feed-forward networks. **(5)**

Registration No :

Total Number of Pages : 01

B.Tech
PCS3D001

3rd Semester Back Examination 2019-20
ARTIFICIAL INTELLIGENCE
BRANCH : CSE
Max Marks : 100
Time : 3 Hours
Q.CODE : HB940
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1   **Only Short Answer Type Questions (Answer All-10)**   **(2 x 10)**
- **a)** What is Tower of Hanoi?
- **b)** Define Artificial Intelligence
- **c)** What is a uniform cost search algorithm?
- **d)** What is a breadth-first search algorithm?
- **e)** What is an A* algorithm search method?
- **f)** What is a bidirectional search algorithm?
- **g)** How are game theory and AI related?
- **h)** Define NLP
- **i)** Compare between Best-first Search and Depth-first Search
- **j)** What is NNL.

Part- II

Q2   **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)**   **(6 x 8)**
- **a)** What is an expert system? What are the characteristics of an expert system?
- **b)** Discuss on Statistical Natural Language Processing
- **c)** Explain Semantic Nets with example
- **d)** Compare between Procedural Versus Declarative Knowledge
- **e)** Discuss on Heuristic Search Techniques
- **f)** Discuss about Constraint satisfaction problem.
- **g)** Differentiate Supervised and Unsupervised learning.
- **h)** Discuss the use of CYC in AI
- **i)** Compare between knowledge and data.
- **j)** Explain Nonlinear Planning Using Constraint Posting.
- **k)** Write short notes on Nonlinear Planning Using Constraint Posting
- **l)** Why Constraint Satisfaction is required? explain in detail.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3   **a)**   Discuss the issues of knowledge representation.   **(8)**
      b)   Then discuss the knowledge in expert system i details with proper examples.   **(8)**

Q4   **a)**   Define and explain the component of planning graph.   **(8)**
          example.
      b)   Explain the use of planning graph in providing better heuristic estimation with suitable   **(8)**

Q5   **a)**   Explain learning in decision trees with an example. How it is used to take decision.   **(8)**
      b)   Describe multilayer feed-forward networks.   **(8)**

Q6   **a)**   Discuss in detail the syntactic analysis (PARSING) with suitable examples.   **(8)**
      b)   Compare between Forward Versus Backward Reasoning.   **(8)**

5th Semester Regular/Back Examination: 2022-23
SUBJECT: Artificial Intelligence and Machine Learning
BRANCH(S): CSE, CSEAIME, CSIT, CST, ELECTRICAL & C.E, ELECTRONICS & C.E, IT
Time : 3 Hour
Max Marks : 100
Q.Code : L363
Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions :   (2 × 10)

a) What are the examples of AI in real life?
b) Difference between Neural Net Learning and Genetic Learning.
c) Define Unification and Lifting.
d) What is Heuristic search?
e) Differentiate forward and backward chaining.
f) Compare Greedy best-first search and A * search. Which one is better?
g) Sate Alpha Beta pruning? Write the condition for it.
h) Define Artificial in terms of rational thinking.
i) How to choose an algorithm for a problem?
j) Difference between Artificial Intelligence and Machine Learning? What are the methods of Machine Learning?

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out   (6 × 8)
of Twelve)

a) What is AI? Define Artificial intelligence on the basis of " System that think rationally " and " System that act like humans"
b) What is Bayesian Network and Its Semantics?
c) What are the various techniques of knowledge representation?
d) What are the phases involved in designing a problem-solving agent?
e) What is inference in first-order logic? What are inference rules for quantifier explain with example?
f) Differentiate between Natural (Human) Intelligence & Artificial Intelligence.
g) What is games? How is it important in AI?
h) Give the steps for A* algorithm?
i) Difference between forward and backward chaining explain this with example.

j) What are expert systems? What are the characteristics and capabilities of expert systems?

k) Describe Bayes' rule with example.

l) Write the motivations of Knowledge-Based Agents.

Part-III
Only Long Answer Type Questions (Answer Any Two out of Four)

Q3   What is learning? Why Rote Learning is Essential? What are the advantages and disadvantages of rote learning?   (16)

Q4   What is uncertainty? Explain the causes of uncertainty? What is probabilistic reasoning? Need of probabilistic reasoning?   (16)

Q5   What is Alpha-Beta Pruning? Explain the Working of Alpha-Beta Pruning? What are the rules to find good ordering in alpha-beta pruning?   (16)

Q6   What are the characteristics of intelligent agent? What is agents and explain its types? Write the properties of environment?   (16)

Registration No :

Total Number of Pages : 02

B.Tech
BECS2208

3ʳᵈ Semester Back Examination 2019-20
DATABASE MANAGEMENT SYSTEM
BRANCH : BIOMED, BIOTECH, CHEM, ENV, FASHION, FAT, MECH,
METTA, MINERAL, MINING, MME, PLASTIC, TEXTILE
Max Marks : 70
Time : 3 Hours
Q.CODE : HB962
Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions :** **(2 x 10)**
 a) Compare primary key, candidate key, super key.
 b) Why & where "Is-A" relationship is used?
 c) What do you mean by transparent DBMS?
 d) Find the difference between 'Cluster' and 'Non-cluster' index.
 e) State metadata.
 f) Since every conflict-serializable schedule is view serializable, why do we emphasize conflict serializability rather than view serializability?
 g) Specify the rules for converting E-R diagram into relational model.
 h) Explain the difference between an exclusive lock and a shared lock?
 i) What does join operator do and enlist its types?
 j) Which file organization provides very fast access to any arbitrary record of a file?

Q2 **a)** What are the factors of DBMS? Explain data independence in 3-levels of data abstraction. **(5)**
 b) Design an E-R diagram for keeping track of the exploits of your favorite sports team. You should store the matches played, the scores in each match, the players in each match, and individual player statistics for each match. Summary statistics be modeled as derived attributes. Find out the entities. **(5)**

Q3 **a)** Illustrate CODD's 12 rule with explanation. **(5)**
 b) Given a relation R(A,B,C,D,E) with F = {A->B, AC->D, D->E, E->A} **(5)**
 Check whether the relation is in 3NFor not. If not decompose into 3NF. Find out the decomposition is loss-less or lossy.

Q4 **a)** Consider the insurance databases: **(5)**
 Person(driver_id, name, address)
 Car(license, model, year)
 Accident(report_no, date, location)
 Owns(driver_id, license)
 Participated(report_no, license, driver_id, damage_amount)
 Construct expressions in relational calculus for each query:
 a. Find the people who owned cars that were involved in accidents.
 b. Find the drivers who made accident and their report no and damage amount
 c. Find the person details and car details who did the accident at "ParkStreet"
 d. Find the person name & license details & report no of the accidents.
 b) Analyze how different states of a transaction define that it is being executed or not? **(5)**

Q5 **a)** What do you understand by query optimization? Formulate the steps needed **(5)**
to optimize a high level query?

b) Explain cascade less schedule with an example. **(5)**

Q6 Discuss why concurrency control is needed in RDBMS. Explain the problems **(10)**
that would arise when concurrency control is not provided by the database
system?

Q7 Briefly describe about the different types of data base recovery techniques. **(10)**

Q8 **Write short answer on any TWO :** **(5 x 2)**
a) OLAP vs OLTP
b) Transaction Log
c) Data Base failure

Registration No :

Total Number of Pages : 02　　　　　　　　　　　　　　　　　B.Tech
　　　　　　　　　　　　　　　　　　　　　　　　　　　　　BECS2208
4th Semester Back Examination 2018-19
DATABASE MANAGEMENT SYSTEM
BRANCH : BIOMED, BIOTECH, CHEM, ENV, FASHION, FAT, METTA, MINERAL,
MINING, MME, PLASTIC, TEXTILE
Time : 3 Hours
Max Marks : 70
Q.CODE : F620
Answer Question No.1 which is compulsory and any FIVE from the rest.
The figures in the right hand margin indicate marks.

Q1　　**Answer the following questions :**　　　　　　　　　　　　　　**(2 x 10)**
　a)　What is cardinality ratio? How can you find out the arity of a table?
　b)　Determine integrity rules exist in DBMS.
　c)　Differentiate between generalization and specialization.
　d)　Define System Catalog.
　e)　Find the difference between 'Cluster' and 'Non-cluster' index.
　f)　State metadata.
　g)　Why BCNF is known as relaxed form of 3NF?
　h)　Since every conflict-serializable schedule is view serializable, why do we emphasize conflict serializability rather than view serializability?
　i)　Why concurrency control is needed?
　j)　What is Query evaluation engine?

Q2　a)　What are the factors of DBMS? Explain data independence in 3-levels of data abstraction.　　**(5)**
　　b)　Compare hierarchical and network database model? Write the steps needed to convert E-R model into Relational table.　　**(5)**

Q3　a)　Design an E-R diagram for banking system. Find out all the relations, strong entity, weak entity, Primary Key.　　**(5)**
　　b)　Explain types of keys and disjoint, overlapping constraints used in E-R model.　　**(5)**

Q4　a)　Analyze how different states of a transaction define that it is being executed or not?　　**(5)**
　　b)　What are the various locking methods used in Data Security?　　**(5)**

Q5　a)　What do you understand by query optimization? Formulate the steps needed to optimize a high level query?　　**(5)**
　　b)　Explain cascade less schedule with an example.　　**(5)**

Q6   Enlist the advantages of normalizing database. Consider the following relation   **(10)**
R (A,B,C,D,E) and functional dependencies F= { A->BC, C->A,D->E, F->A,
E->D } & decomposed R into R1(A, C, D), R2(B, C, D) and R3(E,F,D). Is it
lossless or not?

Q7   Briefly describe about the different types of data base recovery techniques.   **(10)**

Q8   **Write short answer on any TWO :**   **(5 x 2)**
   a) Explain the types of data ware house and the steps needed to build a data
ware house.
   b) Determine the properties of a transaction.
   c) OLAP vs OLTP

Registration no: ☐☐☐☐☐☐☐☐☐☐

Total Number of Pages: 02

B.Tech
FEEC6301

5th Semester Back Examination 2017-18
Data Base Management Systems
BRANCH : AEIE, ECE, EEE, EIE, ELECTRICAL, ETC, IEE
Time: 3 Hours
Max Marks: 70
Q.CODE: B143
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) Define the following terms: primary key, candidate key, foreign key and super key.

b) Draw an E-R diagram to depict the features of specialization and generalization.

c) For the relations R and S given below compute the following relational algebra operations: (i) $\Pi_{A,C}(R)$ (ii) $\sigma_{B=2}(S)$ (iii) Natural Join (iv) Cartesian Product

R

A	B	C
1	2	3
4	5	6
7	8	9

S

B	C	D
2	3	10
2	3	10
6	7	12

d) Suppose that we decompose the schema R =(A, B, C, D, E) into (A, B, C) and (A, D, E). Show that this decomposition is a lossless-join decomposition if the following set F of functional dependencies holds:
$F = \{A \rightarrow BC, CD \rightarrow E, B \rightarrow D, E \rightarrow A\}$

e) Explain the relevance of System Catalogue in a Database System.

f) Differentiate between DDL and DML along with some examples of both.

g) List all possible sequences of states through which a transaction may pass during its lifetime.

h) What is a recoverable schedule? Why is recoverability of schedules desirable?

i) What is timestamp ordering based concurrency-control scheme?

j) What is checkpoint mechanism? How often should checkpoints be performed?

Q2 **a)** Differentiate between logical database design and physical database design. Show how this separation leads to data independence. **(5)**

b) Compare the three data models namely relational, network and hierarchical along with their advantages and disadvantages. **(5)**

Q3 **a)** Draw and explain the three level architecture of the database system. **(5)**

b) Construct an E-R diagram for a hospital with a set of patients and a set of medical doctors. Associate with each patient a log of the various tests and examinations conducted. The hospital tables are as follows : **(5)**
patients(patient-id, name, insurance, date-admitted, date-checked-out)
doctors(doctor-id, name, specialization)
test(testid, testname, date, time, result)
doctor-patient(patient-id, doctor-id)
test-log(testid, patient-id)

performed-by(testid, doctor-id)
Tables mentioned in italics indicate the various relationships among the three entities patients, doctors and test. The underlined attributes signify the primary key in each table.

Q4 **a)** Consider the following relations: **(5)**
    S (S#, SNAME, STATUS, CITY)
    SP (S#, P#, QTY)
    P (P#, PNAME, COLOR, WEIGHT, CITY)
Give an expression in SQL for each of queries below:
(i) Get supplier names for supplier who supply at least one red part
(ii) Get supplier names for supplier who do not supply part P2.

b) Consider the following relational schema: **(5)**
    PERSON (SS#, NAME, ADDRESS)
    CAR (REGISTRATION_NUMBER, YEAR, MODEL)
    ACCIDENT (DATE, DRIVER, CAR_REG_NO)
    OWNS (SS#, LICENSE)
Construct the following relational algebra queries:
(i) Find the names of persons who are involved in an accident.
(ii) Find the registration number of cars which were not involved in any accident.

Q5 **a)** What are inference rules for functional dependencies? Discuss the Armstrong's Inference rules. Use Armstrong's axioms to prove the soundness of the decomposition rule. **(5)**

b) Consider the relation schema R = (A, B, C, D, E) with the following set of functional dependencies F = {A → BC, CD → E, B → D, E → A}. Suppose R is decomposed into R1(A, B, C) and R2(A, D, E). Check whether this decomposition satisfy the properties of lossless-join decomposition and dependency-preserving. **(5)**

Q6 **a)** Explain the concept of conflict serializability with example of an conflict serializable schedule. **(5)**

b) Compare the deferred-modification and immediate-modification versions of the log-based recovery scheme with suitable examples. **(5)**

Q7 What is two-phase locking protocol? Discus the different variants of the protocol. Show that the two-phase locking protocol ensures conflict serializability and transactions can be serialized according to their lock points. **(10)**

Q8 **Write short answer on any TWO :** **(5 x 2)**
    a) Tuple Relational Calculus vs. Domain Relational Calculus
    b) ER Model to Relational Model Mapping
    c) Precedence Graph
    d) Types of Database Failure

Registration no: ☐☐☐☐☐☐☐☐☐☐

Total Number of Pages: 02   **B. TECH**
                                                                    FEEC6301

5th Semester Back Examination : 2019-20
Data Base Management Systems
BRANCH : , AEIE, ECE, EEE, EIE, ELECTRICAL, ETC, IEE
Max marks: 70
Time: 3 Hours
Q.CODE: HB495
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1   **Answer the following questions:**   **(2 x 10)**
  a)   Differentiate between composite key and composite attribute.
  b)   Differentiate between schema, subschema and instances.
  c)   Why can't a hierarchical model represent a many-to-many (M : N) relationships among records?
  d)   Differentiate between Natural-join and Equi-join.
  e)   Why Armstrong's axioms are sound and complete?
  f)   Show that a relation having two attributes is in BCNF.
  g)   What is Parser? What is the basic function of a parser?
  h)   State the advantages and disadvantages of 2PL?
  i)   State different states and actions of a transaction?
  j)   Differentiate between conflict serializability and view serializability?

Q2 **a)** What are three levels of abstractions supported by the ANSI/SPARC architecture?   **(5)**
      b) What do you mean by a data model? Describe the different types of data models used.   **(5)**

Q3 **a)** Define the two principal integrity rules for the relational model. Discuss why it is desirable to enforce these rules.   **(5)**
      b) What do you mean by the term query processing? What are the typical phases of query processing?   **(5)**

Q4   Explain the mapping procedure of ER model to relational data model. Draw an ER diagram of your own and then apply the above procedure to transform it to relations.   **(10)**

Q5   **Consider the following Schema:**   **(10)**

      Employee (Emp#, Name)

      Assigned-to (Project#, Emp#)

      Project (Project#, Project-name, Chief)

Express the following queries either in relational algebra or in SQL.

    i)   Print the details of the employees working on project "Animation".

    ii) Print the name of all employees who do not work on "Animation" project.

    iii) Print the details of all employees working on both the projects "Animation" and "Data base".

    iv) Print the emp# of all employees who work on all projects.

Q6   Consider the relation $R(A, B, C, D, E, F, G, H)$ with functional dependency   **(10)**
set as FD = $\{A \rightarrow C;\ B \rightarrow CG;\ AD \rightarrow EH;\ C \rightarrow DF;\ A \rightarrow H\}$
On the basis of the given details, perform following tasks.
    i)   Determine key(s) for relation R
    ii) Decompose R into 2NF, 3NF and finally in BCNF.
    iii) Decompose R into 3NF relations directly by using synthesis algorithm.

Q7 **a)** What is two-phase locking (2PL)? How does it work? List the advantage   **(5)**
       and problems of 2PL?
  b) The consistency and reliability aspects of transactions are due to the   **(5)**
       ACID properties of transactions. Discuss each of these and how they
       relate to the concurrency control and recovery mechanisms.

Q8   **Write short notes on (Any Two):**   **(5 x 2)**
  a) Database Failure.
  b) Database Recovery
  c) Basic Timestamp ordering.

Registration No :

Total Number of Pages : 02
B.Tech.
PCS4G001

4th Semester Regular / Back Examination 2017-18
DATABASE SYSTEM
BRANCH : CSE
Time : 3 Hours
Max Marks : 100
Q.CODE : C1148
Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Part – A (Answer all the questions)

Q1   **Answer the following questions:** *multiple type or dash fill up type:*   **(2 x 10)**

a) A view of database that appears to an application program is known as:
a. Schema   b. Subschema   c. virtual table   d. none of the above

b) An abstraction concept for building composite object from their component object is called:
a. Specialization   b. Normalization   c. Generalization   d. Aggregation

c) The number of entities to which another entity can be associated via a relationship set is expressed as:
a. Entity   b. Cardinality   c. Schema   d. Attributes

d) In ER model the details of entities are hidden from the user, is called:
a. Generalization   b. Specialization   c. Abstraction   d. none of these

e) The file organization that provides very fast access to any arbitrary record of a file is:
a. Ordered file   b. Unordered file   c. Hashed file   d. B-tree

f) 4NF is designed to cope with:
a. Transitive dependency   b. Join dependency
c. Multi valued dependency   d. None of these

g) Every Boyce-Codd normal form is in
a. 1NF   b. 2NF   c. 3NF   d. All of the above

h) Rollback of transactions is normally used to:
a. recover from transaction failure   b. update the transaction
c. retrieve old records   d. repeat a transaction

i) A super key is a set of one or more attributes that, allow us
a. to identify uniquely an entity in the entity set
b. to make the key most powerful for faster retrieval
c. to increase effectiveness of database access
d. none of the above

j) Prevention of access to the database by unauthorized users is referred:
a. Integrity   b. Productivity   c. Security   d. Reliability

Q2   **Answer the following questions:** *Short answer type:*   **(2 x 10)**

a) What is data independence?
b) What is transparent DBMS?
c) What is time stamping?
d) What is deadlock? How can it be avoided? How can it be resolved once it occurs?
e) Enlist the advantages of normalizing database.
f) What is meant by query optimization?
g) What is transitive Dependency?
h) What is a transaction? What are ACID properties?

i) What is 5NF or PJNF (Project Normal Form)?

j) What is RAID Technology?

Part – B (Answer any four questions)

Q3 **a)** Explain the advantages of data base management system over file management system. **(10)**

b) Define various data base users. Explain. **(5)**

Q4 **a)** A university registrar's office maintains data about the following entities: **(10)**
Courses (number, title, credits, syllabus, and prerequisites);
Course offerings (course_no, year, semester, section_no, instructor(s), timings, classroom);
Student (student_id, name, program);
Instructor (identification_no, name, dept, title);
Further, the enrollment of students in each course they are enrolled for must be appropriately modeled.
Construct an E-R diagram for the registrar's office. Construct appropriate tables for the above E-R diagram.

b) Explain QBE with an example? **(5)**

Q5 **a)** Specify the different types of file accessing method. **(10)**

b) Write short note on hashing technique. **(5)**

Q6 **a)** Consider the following relation R (A,B,C,D,E) and functional dependencies F= { A->BC, C->A,D->E, F->A, E->D } & decomposed R into R1(A, C, D), R2(B, C, D) and R3(E,F,D). Is it lossless or not? **(10)**

b) Differentiate between relational algebra and relational calculus. **(5)**

Q7 **a)** Explain the types of data ware house and the steps needed to build a data ware house. **(10)**

b) Differentiate between OLAP and OLTP. **(5)**

Q8 **a)** What is lock? Explain types of locks. Why dead lock arises? **(10)**

b) Consider two transactions : T1 & T2 **(5)**

Transaction T1:= read-item(A)	T2:= read-item(A)
A=A-50;	temp=A * 0.1;
Write-item(A)	A=A-temp;
Read-item(B)	write-item(A)
B=B+50;	read-item(B)
Write-item(B)	B=B+temp;
	Write-item(B)

Find out which no serial schedule is a serializable schedule?

Q9 **a)** Explain the different types of data base recovery techniques. **(10)**

b) What is transaction ? Define the properties & life cycle of a transaction? **(5)**

Registration No :

Total Number of Pages : 02

B.Tech
PCS4I103

4th Semester Regular / Back Examination 2018-19
DATA BASE SYSTEM
BRANCH : CSE
Time : 3 Hours
Max Marks : 100
Q.CODE : F483
Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Short Answer Type Questions (Answer All-10)** (2 x 10)
a) What is Data Independence of DBMS?
b) What is SQL Dependency?
c) Write a short note on relational algebra.
d) Explain why 4NF is more desirable than BCNF with the help of an example.
e) What are Triggers?
f) Define Embedded SQL.
g) What are applets in XML?
h) How XQuery is used in XML?
i) What is difference between SQL and NoSQL?
j) What is meant by transaction management?

Part- II

Q2 **Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** (6 x 8)
a) Give the introduction of database interfaces. What are its types?
b) What is an ER-diagram? Construct an ER diagram by taking a suitable example.

c) What is Relational Calculus? What is the difference between tuple relational calculus anddomain relational calculus? Explain with the help of suitable examples
d) Explain structure of XML document with suitable example.

e) Why concurrency control is needed in database system? Explain, any One concurrencycontrol technique?
f) Discuss briefly about mobile database and multimedia database

g) What three data anomalies are likely to be the result of data redundancy? How can suchanomalies be eliminated?
h) What are the construct used in the relational calculus. Explain each of them with example.
i) How OLAP is used to extract and view data in warehousing?

j) What is relational model? How the data and relationships are represented in tables inrelational models?
k) What do you mean by Normalization? Explain the first three normal forms along withBCNF and the anomalies that exist in these normal forms with the help of suitableexamples.
l) Discuss nested relations in object relational databases. Why they are called complex datatypes?

Part-III

Long Answer Type Questions (Answer Any Two out of Four)

Q3   What is Data Mining? Explain Data Mining Techniques. Compare between Data Miningand Data Warehousing.   **(16)**

Q4   What is the difference between relational algebra and relational calculus?   **(16)**

Q5   What do you mean by ODBC and JDBC? Explain with the help of an example how toaccess data in the database from a Java application.   **(16)**

Q6   What is an XML Schema? What are the basic rules while writing XML? Explain.   **(16)**

5th SEMESTER Regular / Back 2022-23
SUBJECT : Database Management Systems
BRANCH(S): CSE,CSEAIME,CSIT,CST,IT,
Time : 3 Hour
Max Marks : 100
Q.Code : L242

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 Answer the following questions :   (2 x 10)

a) In Relational model what do you mean by cardinality?
b) How can you map a conceptual model to a relational model?
c) What is the use of DML in DBMS?
d) List two reasons why we may choose to define a view?
e) A primary key if combined with a foreign key creates what?
f) Explain the following terms associated with relational database design : Primary Key, Secondary key, Foreign Key?
g) What is ACID property?
h) What is Phantom Phenomenon?
i) What is the possible violation if an application program use isolation level "Repeatable Read"
j) Which protocol always ensures recoverable schedule?

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of   (6 × 8)
Twelve)

a) What do you understand by a data model? Explain the difference between conceptual data model and the internal model.
b) What are the main steps of database design? Explain them in brief.
c) Explain the entity integrity and referential integrity constraints. How they are use full in database Design?
d) Explain with the help of examples, the concept of insertion anomalies and deletion anomalies
e) Given R with FD set F ={A→B, BC→D, D→BC, DE→Ø }Find the number of redundant FDs in F.
f) Given R(ABCDEFGH) with FDs F={A→C,B→D,E→F,G→H,C→G}.How many number of candidate keys are there? Which normal form R is in ?
g) What is the goal of query optimization? Why is optimization important?
h) Why do query optimizers consider only left-deep join trees? Give an example of

a query and a plan that would not be considered because of this restriction.

i) What is normalization? Explain the first and second normal forms using appropriate example.

j) During its execution, a transaction passes through several states, until it finally commits or aborts. List all possible sequences of states through which a transaction may pass. Explain why each state transition may occur.

k) Explain the difference between relational algebra and relational calculus.

l) Discuss 4 basic features of ODBMS. What are the advantages?

Part-III
Only Long Answer Type Questions (Answer Any Two out of Four)

Q3   a. What is lossy decomposition? Check whether the following decompositions are lossy or lossless.   (8x2)

(i) Let R=ABCD,R1 = AD, R2 = AB, R3 = BE, R4 = CDE, R5 = AE, F={ A->C, B->C, C->D, DE->C, CE->A}
(ii) R (XYZWQ), FD= {X->Z, Y->Z, Z->W, WQ->Z, ZQ-> X, R1 (XW), R2 (XY), R3 (YQ), R4 (ZWQ), R5 (XQ)
b. Eliminate redundant FDs from
(i) F={X->Y, Y->X, Y->Z, Z->Y, X->Z, Z->X}
(ii) F = {X->YZ, ZW->P, P->Z, W->XPQ, XYQ, YW, WQ ->YZ}

Q4   a. A database is being constructed to keep track of the teams and games of a   (8x2)
sports league. A term has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the positions they played in that game, and the result of the game. Try to design an ER schema diagram for this application, stating any assumptions you make, Choose your favourite sport (soccer, football, baseball.....)
b. What are the basic operations for a relational language? How are basic operations represented in relational algebra, TRC, DRC, and SQL?

Q5   a. what is serializability ? Explain conflict serializabilityand view serializability.   (8x2)
b. Test if the following schedule is conflict serializable or not.
R1(A), R2 (D), W1 (B), R2(B), W3 (B), R4 (B), W2 (C), R5 (C), W4 (E), R5 (E), W5 (B). https://www.bputonline.com

Q6   a. Explain various locking technique for concurrency control.   (8x2)
b. Describe optimistic concurrency control techniques?

5ᵗʰ Semester Regular / Back Examination: 2021-22
DATABASE MANAGEMENT SYSTEMS
Branch: CSE, CST, IT
Max Marks: 100
Time: 3 Hours
Q Code: OF258

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right-hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (02×10)
a) What is metadata? Give an example? (2)
b) Differentiate between schema and instance? (2)
c) Explain how update command works in SQL? (2)
d) Explain briefly about the object-oriented data model? (2)
e) Define Foreign Key? Write an example to explain it. (2)
f) Explain the role of DBA in DBMS? (2)
g) Define a Transaction in database? (2)
h) Explain the dirty read problem? (2)
i) What is trivial functional dependency? (2)
j) Explain the use of hashing in Index structures? (2)

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (06×08)
a) Explain the three-schema architecture of DBMS? (6)
b) Give an example of a weak entity set? Explain why it is weak with an ER diagram. (6)
c) What do you mean by the Integrity constraints? Explain each with the proper example? (6)
d) Explain the Armstrong's axioms for Functional dependencies? (6)
e) Given R(A, B, C, D, E, F) with FDs
$\{A \rightarrow C, B \rightarrow E, AB \rightarrow C, C \rightarrow D, E \rightarrow F\}$
Normalize R up to BCNF. (6)
f) What is multivalued functional dependency? Explain 4NF with example. (6)
g) In SQL which command is used for table creation? Also write the SQL command for creating a table with proper constraints. (6)
h) What are the deadlock and starvation problems in database in concurrent transactions? (6)
i) Define different states of a Transaction with proper diagram? (6)
j) Explain the ACID property of a Transaction in detail. (6)
k) Explain the multi-level indexing and B⁺ Tree? (6)
l) What is the use of Index in database management system? Explain the primary and secondary Indexing with proper diagram? (6)

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four) (02×16)

Q3 Consider the following relation R(A,B,C,D,E,F) with a set of functional dependencies: (16)
FD = { A → BC, B → CD, D → EF, BC → AG, ABG → DF }
a) Find the closure of each determinant.
b) Find the candidate key.
c) Find the canonical cover.

Q4 Consider the following relations: (16)
PERSON(P_id, F_name, L_name, Occupation, Salary, City)
ORDER(O_id, P_id, Item, Quantity, Price, Order_date)
The Primary Keys are P_id and O_id respectively.
Express the following queries in SQL and Relational Algebra.

1

a) Find the person's name and city whose name starts with S.
b) Find the person with the highest salary.
c) Find the average salary for each Occupation.
d) Find the detail of the person who has ordered any item.
e) Find the name of the person who has ordered in the same date.

289 f) Find the name of the person who hasn't ordered any item.
g) Find the highest ordered item.
h) Find the detail of Item with lowest Price.

Q5 What are the various types of database failure? Explain Log-Based recovery scheme by showing the (16) immediate and deferred database modification with proper example.

Q6 What is ER model? Draw the detailed ER diagram for BPUT university database systems. (16)

Registration No :

Total Number of Pages : 01 **B.Tech.**
PCCS4205

4ᵗʰ Semester Back Examination 2017-18
DATABASE ENGINEERING
BRANCH : CSE, IT, ITE
Time : 3 Hours
Max Marks : 70
Q.CODE : C1177
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Q1 **Answer the following questions :** **(2 x 10)**
   a) Write the characteristics that distinguish the database approach with the file based approach.
   b) Define functional dependencies.
   c) Explain "Query optimization".
   d) What are the properties of transaction?
   e) List the four conditions for deadlock.
   f) Differentiate static and dynamic hashing.
   g) What is two phase commit protocol?
   h) What are primary and secondary keys?
   i) Define replication transparency.
   j) Write the ACID properties of transaction.

Q2 **a)** What are the functions of DBMS? Explain three level architecture of database. **(5)**
   b) Briefly explain about views of data. **(5)**

Q3 **a)** Explain about SQL fundamentals. **(5)**
   b) Discuss about join order optimization and heuristic optimization algorithm. **(5)**

Q4 **a)** What are the different states and desirable properties of transaction? Explain briefly. **(5)**
   b) What is data model and explain different types of data models. **(5)**

Q5 **a)** Write short note on Deadlock. **(5)**
   b) Explain in detail RAID technology. **(5)**

Q6 **a)** Describe and differentiate spatial and mobile databases. **(5)**
   b) Describe database security and integrity. Explain its various methods. **(5)**

Q7 What is relational model? Compare and contrast it with network and hierarchical model. **(10)**

Q8 **Write short answer on any TWO :** **(5 x 2)**
   a) Classification and clustering.
   b) DML
   c) Database recovery technique
   d) Distributed System