

University of Mumbai
Examination May 2022

Examinations Commencing from 17th May 2022

Program: **Information Technology**

Curriculum Scheme: Rev 2019

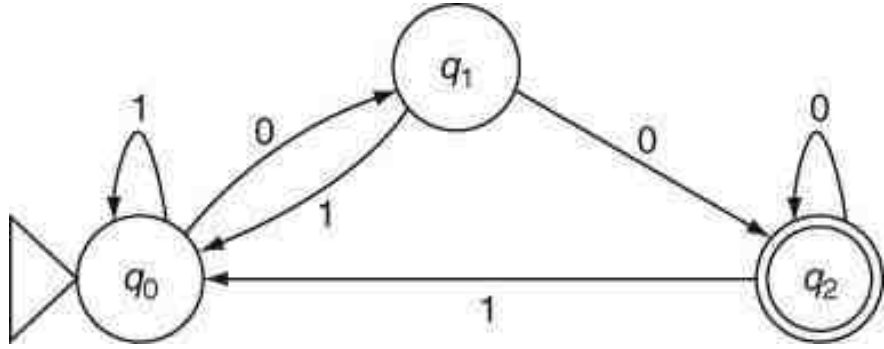
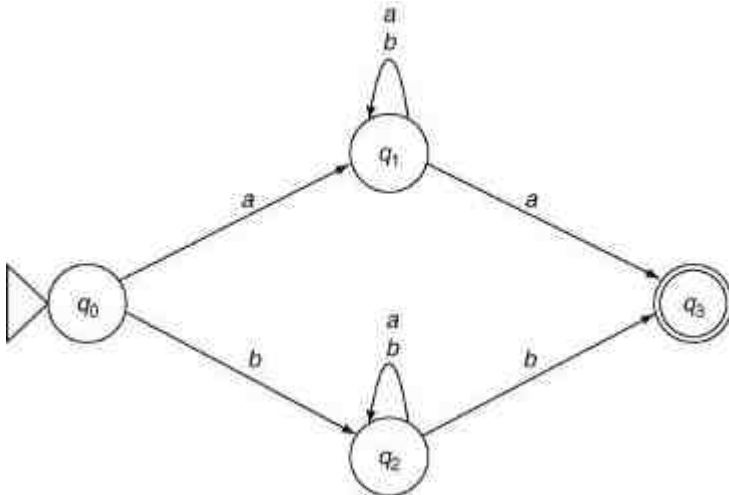
Examination: SE Semester IV

Course Code: ITC404 and Course Name: AUTOMATA THEORY

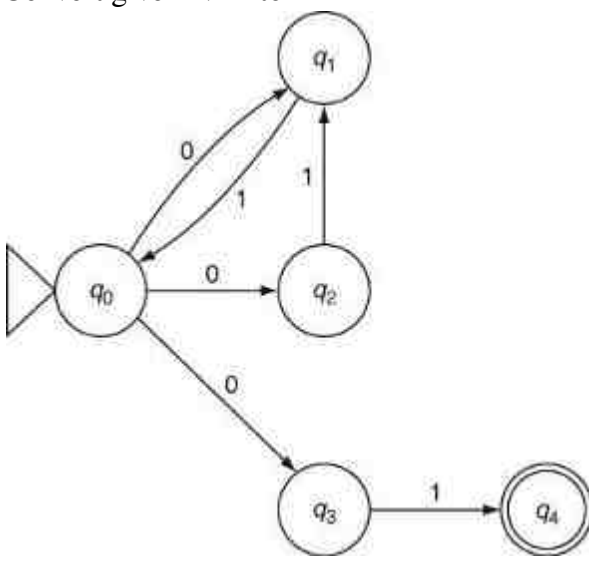
Time: 2 : 30 hours

Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Transition function of any automata defines
Option A:	$\Sigma^* Q \rightarrow \Sigma$
Option B:	$Q^* \Sigma \rightarrow \Sigma$
Option C:	$\Sigma^* \Sigma \rightarrow Q$
Option D:	$Q^* \Sigma \rightarrow Q$
2.	What is the correct form of production in Chomsky's Normal Form?
Option A:	$S \rightarrow aS$
Option B:	$S \rightarrow AB$
Option C:	$S \rightarrow Sa$
Option D:	$S \rightarrow A$
3.	Which of the following is a regular expression for binary strings with no consecutive 1's?
Option A:	$(01+10)^*$
Option B:	$(1+\lambda)(01+0)^*$
Option C:	$(0+1)^*(0+\lambda)$
Option D:	$(10+0)^*(1+\lambda)^*$

4.	
Option A:	Given DFA is for binary numbers divisible 2
Option B:	Given DFA is for binary numbers divisible 3
Option C:	Given DFA is for binary numbers divisible 4
Option D:	Given DFA is for every 0 followed by 1
5.	
Option A:	Given DFA is for strings with the same first and last symbol
Option B:	Given NFA is for strings with the same first and last symbol
Option C:	Given NFA is for strings for searching the keyword “aba” or “bab”
Option D:	Given NFA is for strings with any combination of a’s and b’s
6.	$S \rightarrow 1S / 01S$ $S \rightarrow 0A$ $A \rightarrow 0B$ $B \rightarrow 1B / 10B / \lambda$
Option A:	The regular expression for above grammar is $(1 + 01)^*00(\lambda + 0)^*$
Option B:	The regular expression for above grammar is $(1 + 01)^*00(1 + 10)^*$
Option C:	The regular expression for above grammar is $(1 + 01)^*000(1 + 10)^*$
Option D:	The regular expression for above grammar is $(0 + 01)^*0(1 + 01)^*$

7.	The grammar for the language where a's followed by twice as many b's, i.e, $a^n b^{2n}$ Where $n \geq 1$.
Option A:	$S \rightarrow aSbb \mid b$
Option B:	$S \rightarrow aSbb$
Option C:	$S \rightarrow aSbb \mid \lambda$
Option D:	$S \rightarrow aSbb \mid ab$
8.	What is the language of Finite Automata ?
Option A:	Recursive sensitive Language
Option B:	Regular Language
Option C:	Context Sensitive Languages
Option D:	Context free Language
9.	Theis a programmable machine that can compute anything that is computable
Option A:	Deterministic Finite Automata
Option B:	Non Deterministic Finite Automata
Option C:	Universal Turing Machine
Option D:	Push down Automata
10.	Which of the following relates to the Chomsky hierarchy?
Option A:	Regular < CFL < CSL < Unrestricted
Option B:	CFL < CSL < Unrestricted < Regular
Option C:	CSL < Unrestricted < CF < Regular
Option D:	CSL < Unrestricted < Regular < CF

Q2.	Solve any Four questions out of Six. 5 marks each
A	<p>Convert given NFA to DFA</p>  <pre> graph LR start(()) --> q0((q0)) q0 -- 0 --> q1((q1)) q0 -- 1 --> q2((q2)) q1 -- 0 --> q0 q1 -- 1 --> q2 q2 -- 0 --> q0 q2 -- 1 --> q1 q0 -- 0 --> q3((q3)) q3 -- 1 --> q4(((q4))) </pre>
B	<p>Construct only a Mealy machine for the following: For input from, Σ^*, where $\Sigma = \{0,1\}$, if the input ends in '101', the output should be 'x'; if the input ends in '110', output should be 'y' otherwise output should be 'z'. (transition table and diagram both are expected)</p>
C	<p>Give Regular Expressions for</p> <ol style="list-style-type: none"> For all strings over 0,1 that starts with 10 and ends with 01 For all strings over a,b which contains exactly 3 occurrence of 'b' over $\Sigma = \{a,b\}$
D	<p>Consider the following CFG: $G = \{ (S, A), (a, b), P, S \}$, where P consists of :</p> <p>$S \rightarrow aAS \mid a$ $A \rightarrow SbA \mid SS \mid ba$</p> <p>Derive the string 'aabbaa' using leftmost derivation and rightmost derivation.</p>
E	<p>Compare and Contrast between FA, PDA and TM</p>
F	<p>what is Ambiguous Grammar, find if the following grammar is ambiguous or not by generating $(x + 2.0) * y / (z - 6.0)$</p> <p style="text-align: center;"> $S \rightarrow S + S$ $S \rightarrow S * S$ $S \rightarrow S - S$ $S \rightarrow S / S$ $S \rightarrow (S)$ $S \rightarrow \text{variable} \mid \text{constant}$ </p>

Q3.	Solve any Two Questions out of Three 10 marks each
A	<p>What are steps for converting CFG to CNF ? Convert the given grammar G to CNF. G:</p> <p>$S \rightarrow a \mid aA \mid B \mid C$</p> <p>$A \rightarrow aB \mid \epsilon$</p> <p>$B \rightarrow Aa$</p> <p>$C \rightarrow aCD \mid a$</p> <p>$D \rightarrow ddd$</p>
B	Give a formal definition of Turing Machine (TM). Design a TM that performs the addition of two unary numbers. (transition table and diagram both are expected)
C	Design PDA for odd length palindrome, let $\Sigma = \{0,1\}$, $L = \{W X W^R\}$
Q.4	Solve any Two Questions out of Three 10 marks each
A	Explain Chomsky's Hierarchy with neat diagram
B	Construct DFA for given regular expression $(a+b)^* aba (a+b)^*$
C	Construct NFA with ϵ moves for "Zero or more number of 0's followed by zero or more number of 1's followed by zero or more number of 2's . convert this to DFA.

University of Mumbai

Examinations Summer 2022

Program: Information Technology

Curriculum Scheme: Rev2019

Examination: SE Semester IV

Course Code: ITC402

Course Name: Computer Network and Network Design

Time: 3 hrs

Max. Marks: 80

Q1.	Choose the correct option for the following questions. All the questions are compulsory and carry equal marks
1.	Which layer is responsible for the process to process delivery in the OSI Model?
Option A:	network layer.
Option B:	transport layer.
Option C:	session layer.
Option D:	data link layer.
2.	In TCP, if the ACK value is 400, then byte _____ has been received successfully.
Option A:	399
Option B:	400
Option C:	401
Option D:	402
3.	A three-layer switch is a _____.
Option A:	repeater
Option B:	link-layer switch
Option C:	router
Option D:	LAN switch
4.	The checksum field in the TCP segment is _____.
Option A:	optional
Option B:	user dependent
Option C:	depends on the type of data
Option D:	mandatory
5.	What is the maximum size of data that the application layer can pass on to
Option A:	Any size
Option B:	2^{16} bytes-size of TCP header
Option C:	2^{16} bytes
Option D:	1500 bytes
6.	Which transmission media provides the highest transmission speed in a network?
Option A:	Co-axial cable
Option B:	Twisted pair cable
Option C:	Optical fibre
Option D:	Electrical cable
7.	When does the station B send a positive acknowledgement (ACK) to station A in Stop and Wait protocol?
Option A:	only when station B receives frame with errors
Option B:	when retransmission of old packet in a novel frame is necessary

Option C:	Never
Option D:	only when no error occurs at the transmission level
8.	The Internet Protocol (IP) is _____ protocol.
Option A:	a reliable
Option B:	a connection-oriented
Option C:	a reliable and connection-oriented
Option D:	an unreliable
9.	In _____ routing, the least cost route between any two nodes is the route with the minimum distance.
Option A:	Path vector
Option B:	Link state
Option C:	Distance vector
Option D:	Path vector and link state
10.	Which of the following compression method is not lossless?
Option A:	run-length coding
Option B:	dictionary coding
Option C:	arithmetic coding
Option D:	predictive coding

Q2	Solve any Two Questions out of Three	10 marks each
A	Write in brief about the different Guided Transmission Media	
B	Describe the OSI Reference Model in detail with appropriate figures	
C	What do you mean by Routing? Explain any routing protocol in detail	

Q3	Solve any Two Questions out of Three	10 marks each										
A	What is congestion and what are the causes of congestion?											
B	Compare TCP and UDP.											
C	Consider five source symbols of a discrete memoryless source. Their probabilities are given below. Find the Huffman code for each symbol.											
	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Symbol</td> <td>M1</td> <td>M2</td> <td>M3</td> <td>M4</td> </tr> <tr> <td>probability</td> <td>0.4</td> <td>0.3</td> <td>0.2</td> <td>0.1</td> </tr> </table>		Symbol	M1	M2	M3	M4	probability	0.4	0.3	0.2	0.1
Symbol	M1	M2	M3	M4								
probability	0.4	0.3	0.2	0.1								

Q4	Solve any Two Questions out of Three	10 marks each
A	Write a note on TCP timers.	
B	Compare lossless and lossy compression.	
C	Explain SNMP protocol.	

University of Mumbai
Examinations Summer 2022

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The magnitude of 8 bit signed binary number is
Option A:	7bit
Option B:	8 bit
Option C:	9 bit
Option D:	6 bit
2.	FFH is which type of number
Option A:	Hexadecimal
Option B:	Octal
Option C:	Decimal
Option D:	Binary
3.	If the program has a total 1000 instructions and CPU has 10 average CPI with speed of 2GHz. Find the execution time of a program
Option A:	01 micro seconds
Option B:	50 micro seconds
Option C:	05 micro seconds
Option D:	10 micro seconds
4.	Assuming AL=00H, which flag will be set when ALU performs SUB AL, 22H?
Option A:	Sign
Option B:	Carry
Option C:	Parity
Option D:	Zero
5.	The first machine cycle of an instruction is always a _____
Option A:	Memory read
Option B:	Fetch cycle
Option C:	I/O read
Option D:	Memory write
6.	In Instruction Pipelining Structural Hazard means _____
Option A:	Any condition in which either the source or the destination operands of an instruction are not available at the time expected in the pipeline
Option B:	A delay in the availability of an instruction causes the pipeline to stall
Option C:	The situation when two instructions require the use of a given hardware resource at the same time.
Option D:	When a data gets overwritten by branching
7.	In the case of Non Restoring Division Algorithm, when $(18)_{10}$ is divided by $(10)_{10}$, then what is stored in the registers Q & A respectively ?
Option A:	0001 , 1000
Option B:	0110 , 0001
Option C:	1000 , 0001

Option D:	0001, 1010
8.	Program counter holds _____
Option A:	Address of the instruction
Option B:	The data of instruction
Option C:	Instruction opcode
Option D:	Flag information
9.	In memory Hierarchy which is the fastest memory
Option A:	Main memory
Option B:	Secondary memory
Option C:	Register
Option D:	Cache
10.	DMA is used when _____
Option A:	I/O device is faster than the microprocessor
Option B:	I/O device is slower than the microprocessor
Option C:	I/O device and microprocessor are of same speed
Option D:	when speed is not the criteria for selection

Please use either of the 3 option given below while setting up the subjective/descriptive questions

Option 1

Q2 (20 Marks Each)	Solve any Four out of Six	5 marks each
A	Explain multiplexer and demultiplexer	
B	Explain following instructions of 8086 Microprocessor with one example each. 1) SBB 2) JMP 3) MOV 4) STD 5) NOT	
C	Describe Flynn's classification of parallel computing in detail.	
D	Perform $7 \div 2$ using the Restoring Division Algorithm.	
E	List and explain in detail the characteristics /parameters of memory	
F	Why I/O modules are required in microprocessor systems	

Option 1

Q3 (20 Marks Each)	Solve any Four out of Six	5 marks each
A	Explain SR and JK flip flop	
B	Write an assembly language program to add two 16 bit BCD numbers and store the result.	
C	Give the organization of the Hardwired control Unit and explain the function performed by various blocks.	
D	Explain following assembler directives of 8086 Microprocessor. 1) ASSUME 2) DUP 3) SEGMENT 4) ENDP 5) DB	
E	Explain associative cache mapping technique	
F	What is meant by programmed controlled I/O	

Option 1

Q4. (20 Marks Each)	Solve any Four out of Six	5 marks each
A	Convert 25 decimal to binary	
B	Identify the addressing modes of the following instructions 1. MOV CX, 2200H	

	<p>2.MOV AX,[1000H]</p> <p>3.MOV CL, AL</p> <p>4.MOV [SI], AX</p> <p>5.MOV AX, [SI+200]</p>
C	Explain the concept of nano programming
D	Explain Amdahl's Law.
E	<p>Consider a direct mapped cache with block size 4 KB. The size of the main memory is 16 GB and there are 10 bits in the tag. Find-</p> <ol style="list-style-type: none"> 1. Number of bits in physical address 2. Number of bits in block offset 3. Number of bits in line number
F	Write short notes on DMA

University of Mumbai

Examination First Half 2022 under cluster __ (Lead College: _____)

Examinations Commencing from 16 MAY 2022 to 30 MAY 2022

Program: **BE COMPUTER ENGINEERING**

Curriculum Scheme: Rev2019 (C scheme)

Examination: SE Semester : IV

Course Code: **CSC 401** and Course Name: **Engineering Mathematics IV**

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	If X is a Poisson variate and $P(X=1)=P(X=2)$, then $E(X^2)$ is
Option A:	1
Option B:	5
Option C:	8
Option D:	6
2.	If $A = \begin{bmatrix} 2 & 0 & -1 \\ 0 & 2 & 0 \\ -1 & 0 & 2 \end{bmatrix}$ Eigen value of Adj. A are
Option A:	5,6,2
Option B:	2,3,6
Option C:	5,3,6
Option D:	1,3,6
3.	If $f(z) = \frac{3z^2+z}{z^2-1}$, then residue of f(z) at $z = -1$ is
Option A:	1
Option B:	-1
Option C:	2
Option D:	-2
4.	The value of $\int_C \frac{\cos \pi z}{z^2-1} dz$ where C is the circle $ z = 1/2$
Option A:	πi
Option B:	$2 \pi i$
Option C:	0
Option D:	$-\pi i$
5.	According to Time shifting property of z-transform, if X(z) is the z-transform of x(n) then what is the z-transform of x(n-k)?
Option A:	$z^k X(z)$
Option B:	$z^k X(z)$
Option C:	$X(z+k)$
Option D:	$X(z-k)$
6.	The value of $Z^{-1} \left[\frac{z^2}{(z-a)(z-b)} \right]$ is
Option A:	$\frac{a^{n+1} - b^{n+1}}{a + b}$

Option B:	$\frac{a^{n+1} + b^{n+1}}{a - b}$
Option C:	$\frac{a^{n+1} - b^{n+1}}{a - b}$
Option D:	$\frac{a^{n+1} + b^{n+1}}{a + b}$
7.	If a random variable X follows Poisson distribution such that $P(X=0)=6P(X=3)$, find the mean and variance of the distribution.
Option A:	mean = 1, variance = 1
Option B:	mean = 1, variance = -1
Option C:	mean = 1, variance = 2
Option D:	mean = 1, variance = -2
8.	In normal distribution
Option A:	Mean = Median = Mode
Option B:	Mean < Median < Mode
Option C:	Mean > Median > Mode
Option D:	Mean \neq Median \neq Mode
9.	If the primal LPP has an unbounded solution then the dual has
Option A:	Unbounded solution
Option B:	Bounded solution
Option C:	Feasible solution
Option D:	Infeasible solution
10.	The value of Lagrange's multiplier λ for the following NLPP is Optimize $z = 6x_1^2 + 5x_2^2$ Subject to $x_1 + 5x_2 = 7$ $x_1, x_2 \geq 0$
Option A:	$\lambda = 31/84$
Option B:	$\lambda = 84/31$
Option C:	$\lambda = 13/74$
Option D:	$\lambda = 31/64$

Q2	Solve any Four out of Six	5 marks each									
A	Given $A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$, find the eigenvalues of A. Also find eigenvalues of $4A^{-1}$ and eigenvector of $A^2 - 4I$.										
B	Evaluate $\int_0^{1+i} (x^2 - iy) dz$ along the path (i) $x^2 = y$ (ii) $y = x$										
C	Find $Z\{2^k \cos(3k + 2)\}, k \geq 0$.										
D	The following table gives the number of accidents in a city during a week. Find whether the accidents are uniformly distributed over a week										
	<table border="1"> <tr> <td>Day</td> <td>Sun</td> <td>Mon</td> <td>Tue</td> <td>Wed</td> <td>Thu</td> <td>Fri</td> <td>Sat</td> <td>Total</td> </tr> </table>	Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total	
Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total			

	No. of accidents	13	15	9	11	12	10	14	84
E	Solve by Simplex Method Maximise $z = 7x_1 + 5x_2$ Subject to $-x_1 - 2x_2 \geq -6$ $4x_1 + 3x_2 \leq 12$ $x_1, x_2 \geq 0$								
F	Solve the following NLPP Maximise $z = -2x_1^2 - x_2^2 + 10x_1 + 4x_2$ Subject to $2x_1 + x_2 \leq 5$ $x_1, x_2 \geq 0$								

Q3	Solve any Four out of Six	5 marks each
A	Find the Eigen values and Eigen Vectors of the following matrix. $A = \begin{bmatrix} 3 & -1 & 1 \\ -1 & 3 & -1 \\ 1 & -1 & 3 \end{bmatrix}$	
B	Evaluate $\int_C \frac{\sin \pi z^2 + \cos \pi z^2}{(z-1)(z-2)} dz$ where C is the circle $ z = 3$	
C	Obtain inverse z-transform $\frac{z+2}{z^2-2z-3}$, $1 < z < 3$	
D	The height of six randomly chosen sailors are in inches: 63,65,68,69,71,72. The height of 10 randomly chosen soldiers are: 61,62,65,66,69,69,70,71,72 and 73.	
E	Solve by the dual Simplex Method Minimise $z = 6x_1 + 3x_2 + 4x_3$ Subject to $x_1 + 6x_2 + x_3 = 10$ $2x_1 + 3x_2 + x_3 = 15$ $x_1, x_2 \geq 0$	
F	Find the relative maximum or minimum of the function $z = x_1^2 + x_2^2 + x_3^2 - 8x_1 - 10x_2 - 12x_3 + 100$	

Q4	Solve any Four out of Six	5 marks each
A	Show that the following matrix is diagonalizable. Also find the diagonal form and a diagonalizing matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$	
B	Evaluate $\int_C \frac{4z^2+1}{(2z-3)(z+1)^2} dz$, $C: z = 4$ using Cauchy's residue theorem.	
C	Find the inverse z-transforms of $F(z) = \frac{z}{(z-1)(z-2)}$; $ z > 2$	

D	<p>If the heights of 500 students is normally distributed with mean 68 inches and standard deviation 4 inches, estimate the number of students having heights (i) greater than 72 inches</p> <p>(ii) less than 62 inches (iii) between 65 and 71 inches.</p>
E	<p>Using Simplex method</p> <p>Maximize $z = 10x_1 + 6x_2 + 5x_3$</p> <p>Subject to $2x_1 + 2x_2 + 6x_3 \leq 300$</p> <p>$10x_1 + 4x_2 + 5x_3 \leq 600$</p> <p>$x_1 + x_2 + x_3 \leq 100$</p> <p>$x_1, x_2, x_3 \geq 0$</p>
F	<p>Using Lagrange's multiplier</p> <p>optimize $z = 4x_1 + 6x_2 - 2x_1^2 - 2x_1x_2 - 2x_2^2$</p> <p>subject to $x_1 + 2x_2 = 2$</p> <p>$x_1, x_2 \geq 0$</p>

University of Mumbai
Examination May 2022

Program: **Information Technology**
Curriculum Scheme: Rev 2019
Examination: SE Semester IV

Course Code: ITC403
Time: 2 hour 30 minutes

Course Name: Operating System
Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Symmetric multiprocessing architecture of computer system uses shared -----
Option A:	Processors, Memory
Option B:	Memory, Bus
Option C:	Bus
Option D:	Hard drives
2.	Aging is called as-----
Option A:	Increasing the time of execution
Option B:	Increasing the priority of a process
Option C:	Decreasing the priority of a process
Option D:	Drawback of FCFS
3.	Suppose that a process is in “Blocked” state waiting for some I/O service. When the service is completed, it goes to the-----
Option A:	Running state
Option B:	Ready State
Option C:	Terminated state
Option D:	Suspended state
4.	Which one of the following is not true?
Option A:	kernel is the program that constitutes the central core of the operating system
Option B:	kernel is the first part of operating system to load into memory during booting
Option C:	kernel is made of various modules which can not be loaded in running operating system
Option D:	kernel remains in the memory during the entire computer session
5.	Which of the statement is true in case of PCB
Option A:	PCB is used to identify process area
Option B:	PCB is created per process which is used to store relevant information about process.
Option C:	PCB is created to store process in user area.
Option D:	PCB is used by user to access process code and data.
6.	Resource request is done in particular order to avoid -----
Option A:	Deadlock
Option B:	Confusion
Option C:	Overhead on OS
Option D:	Resource conflict
7.	-----is generally faster than ----- and -----.
Option A:	First fit, best fit, worst fit

Option B:	Best fit, first fit, worst fit
Option C:	Worst fit, best fit, first fit
Option D:	Worst fit, first fit, best fit
8.	In the _____ algorithm, the disk arm starts at one end of the disk and moves toward the other end, servicing requests till the other end of the disk. At the other end, the direction is reversed and servicing continues.
Option A:	LOOK
Option B:	SCAN
Option C:	C-SCAN
Option D:	C-LOOK
9.	Run time mapping from virtual to physical address is done by _____
Option A:	Memory management unit
Option B:	CPU
Option C:	PCI
Option D:	API
10.	Consider the following set of processes, the length of the CPU burst time given in milliseconds. Process Burst time P1- 24, P2- 3, P3- 7, P4- 13, P5- 21. Assuming the above process being scheduled with the SJF scheduling algorithm, which of the following statement is true?
Option A:	The waiting time for the process P5 is 10 ms
Option B:	The waiting time for the process P5 is 0 ms
Option C:	The waiting time for the process P5 is 44 ms
Option D:	The waiting time for the process P5 is 23 ms

Q. 2	Solve any Two Questions out of Three, 10 marks each
A	What is Internal fragmentation? Explain static partitioned allocation with partition sizes 400,180, 100,300,45. Assuming First fit and Best fit method indicate the memory status after memory request for sizes 95, 180, 285, 380, 30.
B	Give the explanation of necessary conditions for deadlock. Explain how a resource allocation graph determines a deadlock.
C	Consider the page reference string 1,2,3,5,2,4,5,6,2,1,2,3,7,6,3,2,1,2,3,6. Calculate the Page fault using 1. Optimal 2. LRU 3. FIFO algorithms for a memory with three frames.

Q. 3	Solve any Four Questions out of Six, 5 marks each
A	What are the various objectives and functions of Operating Systems?
B	Differentiate between process and threads.
C	What is virtual memory? Mention its advantages.
D	Explain about file attributes, file operations, and file types.
E	Explain about Resource Allocation Graph (RAG).
F	What are various features of Mobile and Real Time Operating Systems?

Q. 4	Solve any Two Questions out of Three, 10 marks each
A	Suppose the head of a moving 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)SSTF (c) C- SCAN

B	<p>Consider the following five processes, with the length of the CPU burst time given in milliseconds. Process Burst time is P1-10, P2-29, P3-3, P4-7, P5-12. Consider the First come First serve (FCFS), Non Preemptive Shortest Job First(SJF), Round Robin(RR) (quantum=10ms) scheduling algorithms. Illustrate the scheduling using Gantt chart. Calculate the Average Waiting Time and Turn Around Time.</p>
C	<p>What is semaphore and its types? How the classic synchronization problem - Dining philosopher is solved using semaphores?</p>