University of Mumbai

Examination 2020 under cluster 4 (Lead College: PCE, New Panvel)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: **Rev2016**

Examination: **TE Semester V**

Course Code: **CSC501** and Course Name: **Microprocessor**

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	For single step execution ….. flag is used.
Option A:	IF
Option B:	TF
Option C:	DF
Option D:	OF
2.	Size of every location in instruction queue of 8086 microprocessor is ……. bits
Option A:	8
Option B:	16
Option C:	20
Option D:	32
3.	ALE signal from microprocessor 8086 in minimum mode is connected to …..
Option A:	Address Latches
Option B:	Transceivers
Option C:	Clock generator
Option D:	Bus controller
4.	Duty cycle of the clock required for microprocessor 8086 is …
Option A:	20 percent
Option B:	33 percent
Option C:	50 percent
Option D:	66 percent
5.	In maximum mode of 8086 DT/ $\overline{R}$ signal is generated by ……
Option A:	Microprocessor
Option B:	Address latches
Option C:	Transceivers
Option D:	Bus controller
6.	In 8086 instruction DIV CL stores quotient at …..
Option A:	AL
Option B:	AH

Option C:	CL
Option D:	CH
7.	Addressing mode of SUB AL, BL is …..
Option A:	Register
Option B:	Immediate
Option C:	Direct
Option D:	Register Indirect
8.	Which of the following is assembler directive?
Option A:	ADD
Option B:	MUL
Option C:	DIV
Option D:	SEGMENT
9.	8086 Instruction CMP AL, BL uses …….. operation.
Option A:	Addition
Option B:	Subtraction
Option C:	Complement
Option D:	Division
10.	How many hardware interrupt inputs are available on 8086 microprocessor?
Option A:	1
Option B:	2
Option C:	8
Option D:	16
11.	Which of the following ICWs are compulsory in any situation while programming 8259?
Option A:	ICW1 and ICW2
Option B:	ICW1 and ICW3
Option C:	ICW2 and ICW3
Option D:	ICW2 and ICW4
12.	Address of last location of EPROM in 8086 based memory system is …….
Option A:	00000H
Option B:	FFFFFH
Option C:	0000H
Option D:	FFFFEH
13.	Size of counters in 8253/8254 is ….
Option A:	8 bits
Option B:	16 bits
Option C:	20 bits
Option D:	32 bits
14.	How many I/O modes can be programmed using 8255?
Option A:	1

Option B:	2
Option C:	3
Option D:	4
15.	IC 8257 is ……
Option A:	Programmable Peripheral Interface
Option B:	DMA Controller
Option C:	Bus Controller
Option D:	Clock generator
16.	BSR mode of 8255 is applicable to
Option A:	Port A
Option B:	Port B
Option C:	Port C
Option D:	Not applicable to ports
17.	PE bit in Control Register of 80836 DX is used to enable ……
Option A:	Paging
Option B:	Real address mode
Option C:	Protected address mode
Option D:	Not applicable to 80386 DX
18.	How many segment registers are present in 80386 DX
Option A:	4
Option B:	5
Option C:	6
Option D:	8
19.	Branch prediction is done in …. Stage of Integer pipeline of Pentium processor.
Option A:	PF
Option B:	D1
Option C:	D2
Option D:	EX
20.	In MESI protocol “M” stands for
Option A:	Main
Option B:	Modern
Option C:	Modified
Option D:	Master
Q2	**Solve any Four out of Six 5 marks each**
A	Explain the use of $\overline{BHE}$ and A0 in 8086 based system.
B	List and explain any 5 assembler directives.
C	Explain with diagram how hardware interrupt capabilities of 8086 system can be increased beyond 2 hardware interrupts.
D	Explain Mode 2 of 8255 with diagram.
E	Distinguish Real address mode and Protected address mode.
F	Discuss Floating pipeline stages used in Pentium processor.

Q3.	**Solve any Two Questions out of Three** **10 marks each**
A	Draw and explain timing diagram for write operation in minimum mode of 8086.
B	Write assembly language program for 8086 to check the given string of 10 characters represent Palindrome.
C	Design 8086 based system with following specifications a) 8086 working at 5 MHz in minimum mode. b) 64 KB SRAM using 16 KB chips c) 32 KB EPROM using 16 KB chips

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Examination 2020 under cluster 4 (Lead College: PCE,New Panvel)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: Computer Engineering

Curriculum Scheme: Rev2016

Examination: TE Semester V

Course Code: CSC502 and Course Name: Database Management System

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	The physical storage structure or device could be changed without affecting the conceptual schema, this is known as _____
Option A:	Physical data Independence
Option B:	Logical data Independence
Option C:	External data independance
Option D:	View data independance
2.	A data dictionary is a repository that manages _____
Option A:	Memory
Option B:	Metadata
Option C:	Log
Option D:	Schema
3.	If you want to maintain and store information about your car inurance company, a car would be considered a(n) _____
Option A:	Relation
Option B:	Entity
Option C:	Instance
Option D:	Attribute
4.	The number of entities to which another entity can be associated via a relationship set is expressed as:
Option A:	Entity
Option B:	Attribute
Option C:	Schema
Option D:	Cardinality
5.	The attribute Retiremnet_date is calculated from DATE_OF_JOINING. The attribute Retirement_date is
Option A:	Single Valued
Option B:	Multivalued
Option C:	Derived
Option D:	Composite
6.	The _____ operation, allows us to find set of all common tuples that are belonging to both Relation R and Relation S.

Option A:	Union
Option B:	Set Intersection
Option C:	Set difference
Option D:	Join
7.	The type of operation which extends the Projection operation by allowing functions of attributes to be included in the projection list.
Option A:	Join
Option B:	Union
Option C:	Projection
Option D:	Generalized Projection
8.	The operation which produces a relation R(X) that includes all tuples t[x] in R1(Z) that appears in R1 in combination with every tuple from R2(Y.)
Option A:	Cartesian Product
Option B:	Set difference
Option C:	Set division
Option D:	Join
9.	The Join operation in which it keeps every tuple in first or left relation R if no matching tuple is found in S, then the attributes of S in join result filled with NULL values
Option A:	Outer Join
Option B:	Left Outer join
Option C:	Right Outer Join
Option D:	Full Join
10.	In SQL which command is used to add new column in existing table ?
Option A:	Create
Option B:	Insert
Option C:	Alter
Option D:	Record
11.	Consider the following relation Movies (theater,address,capacity) Which of the options will be needed at the end of the SQL query : SELECT P1.address FROM movies P1 such that it always finds the addresses of theaters with maximum capacity?
Option A:	WHERE P1.capacity > = All (select P2. capacity from Movies P2)
Option B:	WHERE P1.capacity > = Any (select P2. capacity from Movies P2)
Option C:	WHERE P1.capacity > All (select max (P2. capacity) from Movies P2)
Option D:	WHERE P1.capacity >Any (select max (P2. capacity) from Movies P2)
12.	The output of SQL statement SELECT SUBSTR('ABFJRTSKIL',6) FROM Schema;
Option A:	TSKIL
Option B:	RTSKIL
Option C:	SKIL
Option D:	KIL
13.	In SQL , the View command is declared as:

Option A:	define view V as <query expression>;
Option B:	Create V as <query expression>
Option C:	Create or replace view V as <query expression>;
Option D:	define view V like <query expression>;
14.	When a non key attribute depends on another non key attribute, it is called
Option A:	Functional Dependency
Option B:	Transitive dependency
Option C:	Partial dependency
Option D:	Automicity
15.	2NF is
Option A:	every non-key attribute is fully functionally dependent on the entire primary key
Option B:	1NF and every non-key attribute is fully functionally dependent on the entire primary key
Option C:	No transitive dependencies
Option D:	only atomic attributes and primary key is defined
16.	If a transaction has obtained a _____ lock, it can read but cannot write on the item
Option A:	Shared Mode
Option B:	Exclusive Mode
Option C:	Read only mode
Option D:	Write only mode
17.	Deadlocks are possible only when one of the transactions wants to obtain a(n) ____ lock on a data item
Option A:	Binary
Option B:	Exclusive
Option C:	Shared
Option D:	Complete
18.	Which of the following concurrency control protocols ensure both conflict serialzability and freedom from deadlock? I. 2-phase locking II. Time-stamp ordering
Option A:	I only
Option B:	II only
Option C:	Both I and II
Option D:	Neither I and II
19.	If a schedule S can be transformed into a schedule S' by a series of swaps of non-conflicting instructions, then S and S' are
Option A:	Strict
Option B:	Equivalent
Option C:	Conflict Equivalent
Option D:	Non-Conflict Equivalent

20.	If several concurrent transactions are executed over the same data set and the second transaction updates the database before the first transaction is finished, the ____ property is violated and the database is no longer consistent.
Option A:	Automicity
Option B:	Consistency
Option C:	Durability
Option D:	Isolation

Q2	**Solve any Four out of Six** **5 marks each**
A	Discuss the roles of DBA
B	Explain data independence and discuss types of data independence
C	Explain Specialization and Generalization in EER with example
D	Explain different integrity constraints
E	Discuss the need of Normalization in Database design.Explain 3NF.
F	Explain deadlock with wait-for graph

Q3.	**Solve any Two Questions out of Three** **10 marks each**
A	Draw an E-R diagram for University database consisting of entities Student,Faculty,Department,Class. A student has a Unique id,the student can enroll for multiple classes and has at most one major. Faculty must belong to department and faculty can take multiple classes Every student will get a grade for the class he/she was enrolled. Convert E-R diagram into relational schema
B	Consider the employee database *employee (employeename, street, city,date of join)* *works (employeename, company name, salary)* *company (company name, city)* *manages (employee name, manager name)* Write SQL queries for the following statements 1) Find all the employees who joined in the month of october 2) Modify the database so that 'Anjali' now lives in 'Mumbai' 3) List all the employees who live in the same cities as their managers. 4) Find all employees who earn more than the average salary of all the employees of their company 5) Give all the employees of ABC corporation a 15 percent raise.
C	Explain any two concurrency control protocol in database system

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Examination 2020 under cluster 4 (Lead College: PCE, New Panvel)

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: **Rev2012**

Examination: **TE Semester V**

Course Code: **CPC503** and Course Name: **Structured and Object Oriented Analysis & Design**

Time: **2hour** Max. Marks: **80**

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Q1.	**Choose the correct option for following questions.** **All questions are compulsory and carry equal marks. (2 marks each)**
1.	Process identification, evaluation with specification & design is part of ----------.
Option A:	requirement engineering
Option B:	feasibility study
Option C:	Business Process Reengineering (BPR)
Option D:	drawing the data flow diagram
2.	---------- are used to capture the exact and detailed requirements of the system to be developed.
Option A:	Feasibility Analysis
Option B:	software testing
Option C:	System architecture
Option D:	Requirement gathering techniques
3.	---------- is a process model used to design, develop and test high quality software.
Option A:	Economic Feasibility
Option B:	Software Development Life Cycle (SDLC)
Option C:	User interface requirements
Option D:	Implementation
4.	The fundamental objective of system analysis is to ----------.
Option A:	study and understand the system
Option B:	understand infrastructure of organisation
Option C:	train the employees
Option D:	sell the product
5.	SRS is abbreviation of the term ----------.
Option A:	Solution for Refining Software
Option B:	Software Requirement Specification
Option C:	Software Resource System
Option D:	System for Reuse of Software
6.	"What, How, When, Who, Where, and Why" are the six viewpoint perspectives of the stakeholders specified in ----------.
Option A:	Zachman Framework
Option B:	Business Process Reengineering

Option C:	System proposal
Option D:	SRS document
7.	Data flow diagrams & E-R diagrams are used in ----------.
Option A:	object-oriented analysis and design
Option B:	Non-structured analysis and design
Option C:	Joint analysis and design
Option D:	structured analysis and design
8.	---------- can be applied to system by providing authorization and authentication to user access.
Option A:	Security controls
Option B:	Database design
Option C:	Use Case Realization
Option D:	Designing of system interfaces
9.	---------- refer to benefits which can't be measured in terms of money.
Option A:	Tangible benefits
Option B:	Direct benefits
Option C:	Indirect benefits
Option D:	Intangible benefits
10.	---------- is measured as cost of usage of printer toner and paper.
Option A:	Variable cost
Option B:	Known cost
Option C:	Fixed cost
Option D:	Direct cost
11.	---------- consists of features of the proposed system, costs, benefits and schedule.
Option A:	Requirement gathering
Option B:	System proposal
Option C:	Waterfall model
Option D:	Process
12.	The time is required before system benefits can overtake the costs of the system is determined in ----------.
Option A:	candidate system
Option B:	net present value
Option C:	return on investment
Option D:	payback analysis
13.	---------- is a graphical representation of the flow of data through an information system.
Option A:	ER diagram
Option B:	Data flow diagram
Option C:	Sequence diagram
Option D:	Activity diagram
14.	In object-oriented analysis and design, ---------- is the main building block.
Option A:	use case

Option B:	Data
Option C:	Object
Option D:	Actor
15.	Inter dependability among modules of a program is called as ----------.
Option A:	Model
Option B:	coupling
Option C:	message
Option D:	interface
16.	Aggregation, association and generalization are the types of relationships shown in ----------.
Option A:	activity diagram
Option B:	state diagram
Option C:	sequence diagram
Option D:	class diagram
17.	---------- are the implementation diagrams in UML.
Option A:	Class & object
Option B:	Component & deployment
Option C:	Sequence & collaboration
Option D:	State & activity
18.	----------is designed such a way that it is expected to provide the user insight of the software.
Option A:	Business process Reengineering
Option B:	Zachman Framework
Option C:	cohesion
Option D:	User interface
19.	---------- deal with all types of flow control in system by using different elements such as fork and join.
Option A:	Activity diagrams
Option B:	Class diagrams
Option C:	Sequence diagrams
Option D:	State diagrams
20.	---------- is anything that interacts with the system, be it a person or another (external) system.
Option A:	Class
Option B:	Method
Option C:	Use-case Actor
Option D:	Message

Q2. **(20 Marks)**	**Solve any Two Questions out of Three.** **(10 marks each)**
A	What is system? Which are the different types of system? Explain the role of system analyst in analyzing, designing and implementation of system.
B	Explain six different types of feasibility study in detail.
C	Explain the purposes of use case diagram. Draw use case diagram for bank ATM example.

Q3. **(20 Marks)**	**Solve any Two Questions out of Three.** **(10 marks each)**
A	Define cohesion and coupling. List and explain the different types of cohesion and coupling in short.
B	Explain the steps to draw Data flow diagram (DFD). Draw the DFD upto level 2 for a payroll system.
C	Explain user interface design in system development. Draw different layouts of graphical user interface (GUI) for online book ordering system.

University of Mumbai

Examination 2020 under cluster 4(Lead College: PCE)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program : **Computer Engineering**

Curriculum Scheme: Rev2016

Examination : TE Semester : V

Course Code : CSC504 and Course Name: Theory of Computer Science

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	How many final states will be there while designing FSM to accept strings starts with "111" or "011" over ∑ = {0, 1}?
Option A:	2
Option B:	1
Option C:	3
Option D:	1 or 2
2.	Which of the following statements are true in case of NFA? **Statement 1:** Missing Transitions **Statement 2:** Multiple transitions **Statement 3:** Transitions without reading input **Statement 4:** Deterministic transitions
Option A:	1 and 4
Option B:	1, 2 and 4
Option C:	2 and 3
Option D:	1, 2 and 3
3.	Which of the following statements are true? **Statement 1:** Mealy and Moore machine are equivalent in terms of capacity **Statement 2:** While converting from Mealy to Moore machine, If initial state is splitted then one of the splitted states will become new initial state. **Statement 3:** For Mealy machine, the output depends on the current input. **Statement 4:** There exists more number of states in Moore machine as compared to Mealy machine.
Option A:	1 and 2
Option B:	1, 2 and 3
Option C:	1 only
Option D:	1, 2 and 4
4.	The alphabet of ternary number includes _____ symbols?
Option A:	0, 1
Option B:	0, 1, 2
Option C:	0, 1, 2, 3
Option D:	1, 2, 3
5.	If regular expression (101)* is converted to ε-NFA then how many states will be there in converted ε-NFA?
Option A:	5
Option B:	7

Option C:	8
Option D:	6
6.	Let P, Q and R be the regular expression over given input symbol set and P is not ε(epsilon), then R = Q + RP has a unique solution:
Option A:	Q*P
Option B:	QP*
Option C:	Q*P*
Option D:	(P*Q*) *
7.	Arden's theorem is applicable to finite automata if it contains _____.
Option A:	More than one initial states
Option B:	Null transitions
Option C:	Non-null transitions
Option D:	More than one final states
8.	The regular expression that represents zero or more instances of an x or y is _____.
Option A:	(x+y)
Option B:	(x+y)*
Option C:	(x*+y)
Option D:	(xy)*
9.	While converting CFG into GNF it must be in _____.
Option A:	Simplified
Option B:	CFG
Option C:	Regular Grammar
Option D:	Any form
10.	Given grammar G: 1) S □ AS 2) S □ aBC | b 3) A □ SAA 4) A □ aa Which of the following productions denies the format of Greibach Normal Form?
Option A:	1 and 2
Option B:	2 and 3
Option C:	1, 2, 3 and 4
Option D:	1, 3 and 4
11.	The productions of the form non-terminal → one non-terminal, is called _____.
Option A:	Null production
Option B:	Unit production
Option C:	Nullable production
Option D:	Useless production
12.	_____ is Type 2 grammar according to Chomsky Hierarchy.
Option A:	Regular Grammar
Option B:	Context Sensitive Grammar
Option C:	Context Free Grammar
Option D:	Unrestricted Grammar
13.	What do you mean by the transition (q_1, ε, z_0) = { (q_2, z_0) }?
Option A:	Stack is empty and input is over

Option B:	Stack is full
Option C:	Pop operation is performed
Option D:	No operation
14.	The PDA is more powerful than Finite Automata because of _____.
Option A:	Implementation of Regular Languages
Option B:	Stack of infinite size
Option C:	Operation performed in PDA
Option D:	Implementation of Context Free Grammar
15.	The information stored on the tapes in Universal Turing Machine includes_____.
Option A:	Description of any other TM
Option B:	Description of any other TM, Input String, States
Option C:	Description of any other TM, Input String
Option D:	Description of any other TM, States
16.	How many components are present in the formal definition of Turing Machine and which are they?
Option A:	5, { Q, Σ, d, q_0, F }
Option B:	6 , { Q, Σ, Γ, d, q_0, F }
Option C:	4 , { Q, Σ, d, q_0 }
Option D:	7 , { Q, Σ, Γ, d, q_0, B, F }
17.	In which direction the head of Turing Machine can move?
Option A:	Right
Option B:	Left
Option C:	Cannot move
Option D:	Left and Right both
18.	What do the symbols {Γ, B} indicate in formal definition of Turing Machine?
Option A:	{ input alphabet, Blank symbol }
Option B:	{ tape alphabet, Blank symbol }
Option C:	{ input alphabet, Stack symbol }
Option D:	{ Stack alphabet, Blank symbol }
19.	Which of the following statement is True in case of Multi-tape Turing Machine?
Option A:	Multiple tapes have multiple heads
Option B:	Only one head used for multiple tapes
Option C:	Each tape have two or more heads
Option D:	Multiple tapes each having an independent head
20.	Which of the following are undecidable problem?
Option A:	Decide Language is regular or not
Option B:	Check Ambiguity
Option C:	Derive Parse Tree
Option D:	Halting Problem

Q2. **(20 Marks)**	**Solve any Two Questions out of Three 10 marks each.**

A	Let G be the grammar S → aB | bA A → a | aS | bAA B → b | bS | aBB Find leftmost derivation, rightmost derivation and parse tree for the string "**bbaaabbaba**" .
B	Design Turing Machine to recognize language, L= { $a^n b^{n+1}$ | n≥ 1 }.
C	Design Finite State Machine to check whether any ternary number is divisible by 3 or not.

Q3. **(20 Marks)**	
A	**Solve any Two 5 marks each.**
i.	Explain Post Correspondence Problem in detail.
ii.	Prove that L = { W c W^R | W Є (a + b)* } is not regular.
iii.	Explain Universal Turing Machine in detail.
B	**Solve any One 10 marks each**
i.	Convert given Regular Expression, RE= a(a + b)*b to Minimized DFA.
ii.	Design PDA for L= {a^{2n} b^n, n ≥ 1}.

University of Mumbai

Examination 2020 under cluster 4 (Lead College: PCE)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: Rev2016

Examination: TE Semester :V

Course Code: CSDLO5011 and Course Name: Multimedia Systems

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	CCITT Group 3 compression utilizes Huffman coding to generate a set of _____ code and set of _____ codes for given bit stream.
Option A:	makeup code, terminating code
Option B:	Vertical Code, Pass Code
Option C:	Pas code, Terminating code
Option D:	Vertical Code, Terminating code
2.	While enlarging the image,_____image will blur while _____image will not blur.
Option A:	vector,bitmap
Option B:	bitmap,gif
Option C:	bitmap,vector
Option D:	bitmap, jpeg
3.	What is the extension at the image file used by digital cameras and supports upto 24-bit colors?
Option A:	.bmp
Option B:	.jpeg
Option C:	.gif
Option D:	.tif
4.	If I want to use Google meet as a tool for my online class. Which of the following will be best supported Multimedia System Architecture for the same?
Option A:	Workstation Architecture
Option B:	IMA Architecture
Option C:	Network Architecture
Option D:	Internet Architecture
5.	_____ correlation between adjacent frames in a sequence of images in video applications.
Option A:	Spatial redundancy
Option B:	Spectral redundancy
Option C:	Temporal redundancy
Option D:	Coding redundancy
6.	_____ in JPEG aims at reducing the total number of bits in the

	compressed image.
Option A:	Zig-zag ordering
Option B:	run-length encoding
Option C:	Quantization
Option D:	Entropy coding
7.	WAVE sound file format bit stream encoding is the _____
Option A:	PCM
Option B:	DM
Option C:	PWM
Option D:	DPCM
8.	Component video is an analog format that carries _____ only
Option A:	Audio data
Option B:	visual data
Option C:	Text Data
Option D:	Image Data
9.	The higher the bit rate, the less compression, which results in overall _____ of audio file.
Option A:	less quality
Option B:	zero quality
Option C:	Poor quality
Option D:	higher quality
10.	_____ a digital compression of video data that compresses the size of the video file by compressing the image data of each frame
Option A:	Temporal compression
Option B:	Spatial compression
Option C:	redundant compression
Option D:	visual compression
11.	In video compression, _____saves even more space by using differences between the current frame and both the preceding and following frames to specify its content.
Option A:	B - frames
Option B:	Multi-frame
Option C:	I - frame
Option D:	P - frames
12.	In H.261, each CIF frame is composed of _____ Groups of Blocks (GOBs)
Option A:	8
Option B:	10
Option C:	12
Option D:	16
13.	Multicast packets are encapsulated inside regular IP packets for "tunneling", so that they can be sent to the destination through the islands. Is the a feature of_____ packets.
Option A:	RTP

Option B:	RTCP
Option C:	IGMP
Option D:	MBONE
14.	_____ is a measure of smoothness of the audio/video playback, related to the variance of frame/packet delays.
Option A:	Packet loss
Option B:	Latency
Option C:	Jitter
Option D:	Data rate
15.	In IP-Multicast, message is sent to _____
Option A:	only receiver
Option B:	only one node
Option C:	all nodes in the domain
Option D:	a set of specified nodes
16.	_____ monitors QoS in providing feedback to the server (sender) on quality of data transmission and conveys information about the participants of a multiparty conference.
Option A:	RTCP
Option B:	RTP
Option C:	IGMP
Option D:	RTSP
17.	Digital signatures offer a way of verifying both the authenticity and _____ of a message.
Option A:	integrity
Option B:	Confidentiality
Option C:	Copyrights
Option D:	Privacy and Anonymity
18.	Which of the following is not type of Steganography?
Option A:	Image
Option B:	Audio
Option C:	Video
Option D:	Text
19.	if I want to edit my childhood photograph, first I have to convert it into the digital format. What would be the best suitable device for the same?
Option A:	Camera
Option B:	scanner
Option C:	printer
Option D:	Electric pen
20.	What will be more suitable from below to describe a digital signature?
Option A:	Signature which is used to authenticate the person on digital documents
Option B:	Signature image which is used in online platform to fill the form whenever its needed.
Option C:	Signature which provides the authentication of the user through self produced methods

Option D:	Signature which provides the authentication of the user through security mechanisms

Q2	**Solve any Four out of Six** **5 marks each**
A	Describe different mediums in multimedia.
B	Compare CCITT group 3 one D and CCITT group 3 two D.
C	What are the different types of redundancies in image?
D	Compare WAV and MPEG Audio.
E	Explain different types of video signals.
F	What are design issues face to design the authoring system.

<table>
<tr><td>Q3</td><td>Solve any Two Questions out of Three 10 marks each</td></tr>
<tr><td>A</td><td>A networking company uses a compression technique to encode the message before transmitting over the network. Suppose the message contains the following characters with their frequency:
a:7 b:16 c:19 d:45 e:13 f:6 Note that each character in input message takes 1 byte. If the compression technique used is Huffman Coding, how many bits will be saved in the message?</td></tr>
<tr><td>B</td><td>Explain the step by step Shannon-Fano compression algorithm and Solve by the Shannon-Fano frequency code for following frequencies of symbols.
<table>
<tr><td>Symbol</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr>
<tr><td>Frequency</td><td>12</td><td>8</td><td>7</td><td>6</td><td>5</td></tr>
</table></td></tr>
<tr><td>C</td><td>Write a short note on Steganographic methods.</td></tr>
</table>

University of Mumbai

Examination 2020 under cluster 4 (Lead College: PCE, New Panvel)

Examinations Commencing from 7th January 2021 to 20th January 2021

Program: **Computer Engineering**

Curriculum Scheme: Rev 2016

Examination: TE Semester V

Course Code: CSDLO5012 and Course Name: Advanced Operating Systems

Time: 2 hour Max. Marks: 80

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Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Various Models are used for building distributed computing system.From the following statement which is true i)MiniComputer Model ii)Workstation Model iii)Process Pool Model iv)Hybrid Model
Option A:	i,ii,iii,iv
Option B:	i and ii
Option C:	iii and iv
Option D:	i and iv
2.	What are the advantages of Batch Operating Systems? Choose the correct option i)It is very difficult to guess or know the time required by any job to complete. Processors of the batch systems know how long the job would be when it is in queue ii)Multiple users can share the batch systems iii)The idle time for batch system is very less iv)It is easy to manage large work repeatedly in batch systems
Option A:	i and ii
Option B:	ii and iii
Option C:	i,iii,iv
Option D:	i, ii,iii,iv
3.	Various autonomous interconnected computers communicate with each other using a shared communication network. Independent systems possess their own memory unit and CPU. These are referred as
Option A:	loosely coupled systems

Option B:	Tightly coupled system
Option C:	Network Operating system
Option D:	Batch Operating System
4.	---------- types of systems, each processor contains a similar copy of the operating system and they all communicate with each other.
Option A:	Multiprocessors operating System
Option B:	Symmetric Multiprocessors
Option C:	Asymmetric Multiprocessors
Option D:	Symmetric Multiprocessors and Asymmetric Multiprocessors
5.	How many fields are there in Process Table
Option A:	1
Option B:	4
Option C:	5
Option D:	7
6.	Which field in U-area restrict the size of the process and size of the file
Option A:	Error Field
Option B:	UID
Option C:	Limit
Option D:	An array
7.	The UNIX system divides its virtual address space in logically separated -------
Option A:	Page
Option B:	Process
Option C:	Segment
Option D:	Region
8.	If the kernel executes in the context of a process, its virtual address space is
Option A:	dependent of Process
Option B:	Independent of Processes.
Option C:	Dependent of operating system
Option D:	Independent of operating system
9.	The register context consists components: i)Program counter ii)The processor status register (PS) iii)The stack pointer iv)The general purpose registers Choose the correct options
Option A:	i,iv
Option B:	i,ii,iii,iv
Option C:	i,ii,iii
Option D:	iii iv
10.	The algorithm “allocreg” used for

Option A:	Allocation of Process
Option B:	Allocating a Region
Option C:	Allocation of Memory
Option D:	Allocation of pages
11.	What happens, if the sleep priority is above a threshold value,
Option A:	A process will not wake up on receiving a signal,
Option B:	A process will wake up on receiving a signal,
Option C:	A process become zombie
Option D:	A process will be terminated
12.	The open and create system calls return an integer called a ----------
Option A:	file Table
Option B:	file descriptor
Option C:	file id
Option D:	file UID
13.	Data structure used in kernel of unix operating system
Option A:	File table and the user file descriptor table
Option B:	Inode Table and file table
Option C:	Process Control Block and File descriptor Table
Option D:	Super Block and Boot Block
14.	The kernel caches data in the buffer pool according to a
Option A:	First in First out algorithm
Option B:	Least recently used algorithm
Option C:	Round Robin algorithm
Option D:	Priority Algorithm
15.	Which statement is not correct about “init” process in Unix?
Option A:	It is generally the parent of the login shell
Option B:	It has PID 1.
Option C:	It is the first process in the system
Option D:	Init forks and execs a ‘getty’ process at every port connected to a terminal.
16.	What is a shell script?
Option A:	group of commands
Option B:	a file containing special symbols
Option C:	a file containing a series of commands
Option D:	group of functions
17.	A process is an instance of _____ program.
Option A:	Waiting
Option B:	Executing
Option C:	Terminated
Option D:	Halted
18.	What is cron?
Option A:	a simple process
Option B:	an orphan process

Option C:	a daemon
Option D:	a zombie process
19.	Which of the following is not an OS for mobile?
Option A:	Palm
Option B:	Windows
Option C:	Mango
Option D:	Android
20.	For real time operating systems, interrupt latency should be _____
Option A:	Minimal
Option B:	Maximum
Option C:	Zero
Option D:	Dependent on the scheduling

Q2 **(20 Marks)**	**Solve any Four out of Six** **5 marks each**
A	Explain the U-area
B	Explain the context of a process.
C	Explain different types of kernel.
D	Explain the region table.
E	When attaching a region to a process how can the kernel check the region does not overlap virtual address in regions already to the process?
F	Compare NOS with DOS

Q3. **(20 Marks)**	**Solve any Two Questions out of Three** **10 marks each**
A	Explain the architecture of Unix OS
B	Explain the structure of file directories.
C	Write and explain the ialloc algorithm

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Curriculum Scheme: Rev2016

Examination: TE Semester V

Course Code: CSDLO5013 and Course Name: Advanced Algorithm

Time: 2 hour Max. Marks: 80

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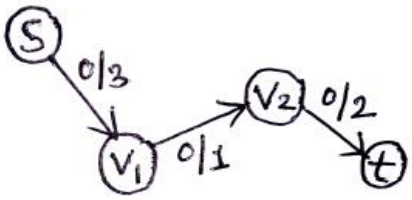
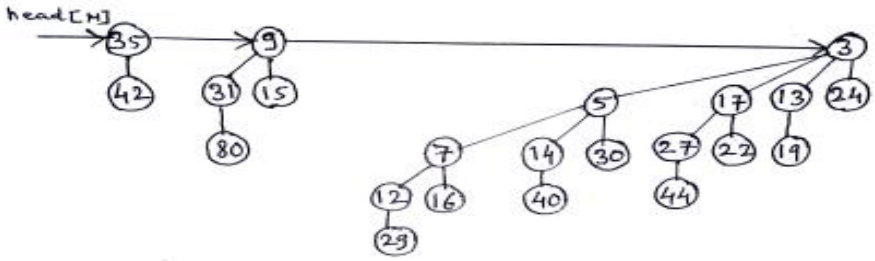
Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	In dynamic table, the amortized cost of the single operation is at the most -------
Option A:	2
Option B:	1
Option C:	3
Option D:	4
2.	In Hiring Problem, how many times a new office assistant will be hired if the input is considered in the order of rank of candidates where the order is <4, 5, 2, 6, 3, 7, 8, 9, 10, 1>
Option A:	5
Option B:	6
Option C:	8
Option D:	7
3.	A binomial tree B_k has ---
Option A:	K^2 nodes and the height of the tree is 2k
Option B:	(k+2) nodes and the height of the tree is (lg k)
Option C:	K nodes and the height of the tree is (k +2)
Option D:	2^k nodes and the height of the tree is k
4.	Let the capacity of the edge from vertex u to vertex v is 30 and flow from vertex u to vertex v is -10 (minus 10). The residual capacity C_f is ---------
Option A:	20
Option B:	30
Option C:	40
Option D:	50
5.	In bipartite graph G = (V E), vertex set can be partitioned into V = P U Q where ---------- and all edges in E go between P and Q.

Option A:	P is subset of Q
Option B:	Q is subset of P
Option C:	$P \cap Q = \Phi$
Option D:	$P \cap Q \neq \Phi$
6.	The sweeping algorithm which takes n line segments as input and considers endpoints in sorted order have runtime complexity of ---------- to determine any pair of line segments intersects.
Option A:	O(n)
Option B:	O(n lg n)
Option C:	$O(n^2)$
Option D:	O(lg n)
7.	Let $A \leq p$ B. Which of the following statement is true?
Option A:	problems A and B are polynomial time equivalent
Option B:	problem B is polynomial time reducible to problem A
Option C:	problem A is polynomial time reducible to problem B.
Option D:	problem A cannot be reducible to Bin polynomial-time.
8.	In Aggregate analysis for sequence of n operations worst case time is T(n). In the worst case the amortized cost per operation is given by ----------
Option A:	n /T(n)
Option B:	T(n)/n
Option C:	T(n) * T(n)
Option D:	n * n
9.	In Red-Black tree, RB-DELTE_FIXUP procedure takes time ------- and performs at the most ----------rotations.
Option A:	O(n) and 2 rotations
Option B:	O(n) and 4 rotations
Option C:	O(lg n) and 3 rotations
Option D:	O(n lg n) and 1 rotations
10.	In relabel-to-front algorithm let f is preflow. The edge from vertex u to vertex v is admissible if and only if ----------
Option A:	Residual capacity of edge u to v is greater than zero and height of vertex u is

	larger than vertex v.
Option B:	Residual capacity of edge v to vertex u is greater than zero and height of vertex u is less than vertex v.
Option C:	Residual capacity of edge u to v and height of vertex u and vertex v is equal.
Option D:	Residual capacity and height both conditions need not be fulfilled.
11.	Those problems that can be solved in polynomial time known as ---------- problems.
Option A:	Decision
Option B:	Intractable
Option C:	Tractable
Option D:	Complete
12.	The convex hull of a set Q of points, denoted by CH(Q). If $\|Q\| \geq 3$ then at termination of Graham scan algorithm bottom to top content of stack is ---------
Option A:	Exactly the vertices of CH(Q) in counterclockwise order
Option B:	Exactly the vertices of CH(Q) in clockwise order
Option C:	All the vertices in CH(Q)
Option D:	All the vertices having same polar angle.
13.	The time complexity of the recurrence T(n) = 3T (n/3)+ n/2 by using master theorem is -----
Option A:	ɵ (n^2)
Option B:	ɵ(n log n)
Option C:	ɵ(log n)
Option D:	ɵ(n)
14.	Let Red-Black has n number of internal nodes. Then this tree has height at most ----------
Option A:	lg(n +1)
Option B:	n
Option C:	2 lg(n^2)
Option D:	2 lg(n+1)
15.	Which of the following statement is correct in case of hiring problem?
Option A:	Interviewing has higher cost than hiring.
Option B:	Interviewing and hiring both have equal cost.

Option C:	Interviewing has lower cost whereas hiring is expensive
Option D:	hiring has lower cost than Interviewing
16.	In Push-relabel algorithm the basic operation PUSH(u, v) that pushes flow from vertex u to vertex v applies if ----------
Option A:	u is an overflowing vertex, $C_f(u, v)>0$ and vertex u height = vertex v height + 1.
Option B:	v is an overflowing vertex, $C_f(v, u)>0$ and vertex v height = vertex u height + 1.
Option C:	u is an underflowing vertex, $C_f(u, v)>0$ and vertex u height = vertex v height + 1.
Option D:	v is an underflowing vertex, $C_f(v, u)>0$ and vertex v height = vertex u height + 1.
17.	Let M and N are the two vectors. If the cross product M X N = 0 then --------
Option A:	M and N are said to be colinear
Option B:	M is clockwise from N with respect to the origin (0,0)
Option C:	M is counterclockwise from N with respect to the origin (0,0)
Option D:	M and N are not related to each other.
18.	Suppose two problems A and B not known to be in NP. Let problem C be an NP-Complete problem. Problem A is polynomial-time reducible to C and problem C is polynomial-time reducible to problem B. Which one of the following statements is true?
Option A:	Problem A is NP-hard
Option B:	Problem A is NP-Complete
Option C:	Problem B is NP-hard
Option D:	Problem B is NP-Complete
19.	In the union of two binomial heaps H1 and H2, the root list of H1 and H2 is merged into a single linked list which is sorted by ----------
Option A:	Increasing order of the key value of the root nodes.
Option B:	Decreasing order of the key value of the root nodes.
Option C:	Decreasing order of the degree of the root nodes.
Option D:	Increasing order of the degree of the root nodes
20.	Deletion of a node in Red-Black tree takes ---------- time
Option A:	O(lg n)
Option B:	O(n)
Option C:	O(lg n)
Option D:	O(lg (lg n))

Q2 **(20 Marks)**	**Solve any Four out of Six (5 marks each)**
A	Show the red-black tree that result after successively inserting the keys 11, 10, 9, 4, 6, 1 into an initially empty red-black tree.
B	Explain how accounting method of amortized analysis is used to analyze the increment operation on a binary counter that starts at zero.
C	Use master method to find run time complexity of the following recurrence. $T(n) = 6T(n/3) + n^2 \log n$
D	Prove that vertex-cover problem is NP-complete
E	Consider the initial flow network as shown below. Find maximum flow from source vertex s to sink t using Relabel-to-front Algorithm. Consider initial vertex V_1 for discharge operation. 
F	Explain analysis of hiring problem using indicator random variable.

Q3. **(20 Marks)**	**Solve any Two Questions out of Three (10 marks each)**
A	Write steps to extract the node with minimum key from binomial heap. Extract the node with minimum key from following binomial heap. Show each step clearly. 
B	Use recursion tree method to find time complexity of the following recurrence. $T(n) = T(n/4) + T(n/2) + cn^2$
C	What is maximum flow in the given network from source s to sink t by Ford Fulkerson algorithm? Show all the flow networks, residual networks and augmented paths.