Time: 2 hour 30 minutes　　　　Subject: TCS　　　　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.	**If L1 and L2 are context free language and R is a regular set, then which one of the languages below is not necessarily a context free language?**
Option A:	$L_1 L_2$
Option B:	$L_1 \cup L_2$
Option C:	$L_1 \cap L_2$
Option D:	$L_1 \cap R$
2.	**A Context Free Grammer G = (V , T , P , S) is said to be in _____, if every productions is of the form :** **A → aα where a € T is a Terminal and α is a string of zero or more variables.**
Option A:	Unit production.
Option B:	Chomsky Normal form.
Option C:	Null production.
Option D:	Greibach Normal form.
3.	**Consider the following statements :** **I : Each Turing Acceptable language is need not to be Turing Decidable.** **II : Every Turing Decidable is Turing acceptable.**
Option A:	Only I is true.
Option B:	Only II is true.
Option C:	Both are false.
Option D:	Both are true.
4.	**FSM can recognize :**
Option A:	Only Context free grammer
Option B:	Only Context sensitive grammer
Option C:	Only regular grammar
Option D:	Any grammar
5.	**Recursively enumerable languages are not closed under :**

Option A:	Concatenation
Option B:	Complementation
Option C:	Homomorphism
Option D:	Union

6.	**If P , Q , R be the three regular expressions then the equation R = Q + RP has a unique solution given by :**
Option A:	R = RP
Option B:	R = QP*
Option C:	R = Q*P
Option D:	R= P*R

7.	**Every Context free language can not be recognized by a _____ , but it can be recognized by _____.**
Option A:	NPDA , DPDA .
Option B:	DPDA , NPDA .
Option C:	NPDA , NPDA .
Option D:	DPDA , DPDA .

8.	**If a language is denoted by a regular expression** L = (x)* (x | y x) , **then which of the following is not a legal string within L ?**
Option A:	yx
Option B:	xyx
Option C:	x
Option D:	x y x y x

9.	**Algorithmically , Which of the following conversion is not possible ?**
Option A:	Regular grammar to context-free grammar
Option B:	Non-deterministic PDA to deterministic PDA
Option C:	Non-deterministic TM to deterministic TM
Option D:	Non-deterministic FSA to deterministic FSA

10.	**_____ is the Type 1 grammer according to Chomsky Hierarchy.**

Option A:	Unrestricted Grammer.
Option B:	Regular Grammer.
Option C:	Context free Grammer.
Option D:	Context sensitive Grammer.

Q2	
A	**Solve any TWO** **5 marks each**
i	*Compare and Contrast Moore and Mealy Machine.*
ii	*Find the GNF equivalent to CFG :* $S \rightarrow AB$ $A \rightarrow aA \mid bB \mid b$ $B \rightarrow b$
iii	*State and explain pumping lemma theorem for regular languages.*
B	**Solve any One** **10 marks each**
i	Give the Moore and Mealy machine for the following processes : "For input from (0 + 1)* , if inputs ends in 101 , output x ; if input ends in 110 , output y ; otherwise output z " .

ii	Let G be the grammer :
	$S \rightarrow aB \mid bA$
	$A \rightarrow a \mid aS \mid bAA$
	$B \rightarrow b \mid bS \mid aBB$
	Find : i) Left most derivation
	          ii) Right most derivation
	          iii) Parse tree
	          iv) Is the grammer unambiguoous ? , for the given string 00110101 .

Q3	
A	**Solve any TWO** **5 marks each**
i	*Explain Non-deterministic PDA.*
ii	*Obtain DFA to accept strings of 0's and 1's with even no. of 0's and even no. of 1's.*

iii	Explain halting problem of Turing Machine.	
B	**Solve any One**	**10 marks each**
i	Design a Turing Machine to accept the language given by a regular expression $0(0+1)*11$.	
ii	Construct the PDA accepting following language : $L = a^n b^m c^n \mid m, n >= 1$.	

Q4		
A	*Solve any TWO*	*5 marks each*
i	*Explain Chomsky Hierarchy.*	
ii	*Describe Finite State Machine.*	
iii	Construct left linear and right linear grammer for the regular expression : $(((01 + 10)*11)*00)*$	
B	**Solve any One**	**10 marks each**
i	Design a TM which recognizes words of the form $a^n b^n c^n \mid n >= 1$.	
ii	Convert the following RE to €- NFA and then convert it to DFA : $R = ((0 + 1)*10 + (00)*(11)*)*$.	

Time: 2hour 30 minutes   Max. Marks: 80

Subject (Paper Code) :   / Database Management System
Program No. & Name of the Examination:
1T00725 / T.E.(Computer Engineering)(SEM-V)(Choice Base Credit Grading System)(R2016)
===

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Schema Definition is written by _____.
Option A:	Database Manager
Option B:	Database Administrator
Option C:	Application Developer
Option D:	Storage Manager
2.	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:	Non conflict equivalent
Option B:	Conflict equivalent
Option C:	Equal
Option D:	Isolation equivalent
3.	An application where only one user accesses the database at a given time is an example of a _____.
Option A:	single-user database application
Option B:	multiuser database application
Option C:	e-commerce database application
Option D:	data mining database application
4.	The Purpose of foreign key is _____
Option A:	Sharing of the data among the relations
Option B:	Distribution of data
Option C:	Joining data
Option D:	Display data easily
5.	Which of the following is not a method in deadlock handling
Option A:	Deadlock prevention
Option B:	Deadlock detection
Option C:	Deadlock distribution
Option D:	Deadlock recovery
6.	An _____ is a set of entities of the same type that share the same properties, or attributes.
Option A:	Entity set
Option B:	Attribute set
Option C:	Relation set
Option D:	Entity model
7.	W-timestamp(Q) denotes?

Option A:	The largest timestamp of any transaction that can execute write(Q) successfully
Option B:	The smallest timestamp of any transaction that can execute write(Q) successfully
Option C:	The largest timestamp of any transaction that can execute read(Q) successfully
Option D:	The smallest timestamp of any transaction that can execute read(Q) successfully

8.	A functional dependency is a relationship between or among _____
Option A:	Entities
Option B:	Rows
Option C:	Attributes
Option D:	Tables

9.	Check the following query: Select doc_name from doctor Where salary <= 100000 and salary >= 90000; This query can be replaced by which of the following?
Option A:	select doc_name from doctor where salary between 90000 and 100000;
Option B:	select doc_name from doctor where salary <= 90000 and salary>=100000;
Option C:	select doc_name from doctor where salary between 100000 and 90000;
Option D:	select doc_name from doctor where salary >= 90000 and salary<=100000;

10.	Aggregate function is the function that _____
Option A:	takes a list of values and return a single value as result
Option B:	takes a list of values and return a list of values as result
Option C:	takes a single value and returns a list of values as result
Option D:	takes a single value and returns a single value as result

Q2	Solve any Two out of Three (10 marks each)
A	Explain types of users of database system with suitable example and responsibilities of DBA.
B	Explain types of join with suitable example.
C	Define deadlock. Explain deadlock handling.

Q3	Solve any Two out of Three (10 marks each)
A	Explain DDL and DML commands with suitable example.
B	Explain concept of serializability with its types.
C	Explain specialization and generalization with example.

Q4	Write short notes (Any two out of three) 10 marks each
A	Relational algebra operators
B	SQL constraints
C	Timestamp based protocol

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Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which of the following properties does not correspond to a good Software Requirements Specification (SRS)?
Option A:	Verifiable
Option B:	Ambiguous
Option C:	Complete
Option D:	Traceable
2.	The 3 P's in Project management are
Option A:	Process, Performance and Product
Option B:	Process, Product and People
Option C:	Product, Performance and People
Option D:	People, Process and Performance
3.	Which of following is useful measure for measuring quality of system
Option A:	integrity, sales, usability, maintainability
Option B:	stakeholders, integrity, usability, sales
Option C:	correctness, usability, maintainability, integrity
Option D:	correctness, size, usability, maintainability
4.	Which of the following is size oriented Metric?
Option A:	Function Point
Option B:	Line of Code
Option C:	COCOMO Model
Option D:	Cost Estimation
5.	Which of the following tasks is not part of Software Configuration Management (SCM)?
Option A:	Change control
Option B:	Version control
Option C:	Configuration status reporting
Option D:	Planning
6.	According to Pareto's principle, x% of defects can be traced to y% of all causes. What are the values of x and y?
Option A:	60, 40
Option B:	70, 30
Option C:	80, 20
Option D:	No such principle exists
7.	Which of the following does not fall under project scheduling
Option A:	Effort validation
Option B:	Market assessment
Option C:	Compartmentalization

Option D:	Time allocation
8.	Which of the following are objectives of FTR?
Option A:	Determining who introduced the error in the program.
Option B:	Assess programmer productivity.
Option C:	Determining who introduced an error into the program
Option D:	Uncover errors in software work products
9.	Match the Following : A Performance risk B Cost risk C Support risk D Schedule risk 1. The degree of uncertainty that the product will meet its requirements and be fit for its intended use. 1. The degree of uncertainty that the project budget will be maintained. 1. The degree of uncertainty that the resultant software will be easy to correct, adapt, and enhance. 1. The degree of uncertainty that the project schedule will be maintained and that the product will be delivered on time.
Option A:	A-1 , B-2 , C-3 and D-4
Option B:	A-2 , B-1 , C-4 and D-3
Option C:	A-3 , B-4 , C-1 and D-2
Option D:	A-4 , B-3 , C-2 and D-1
10.	Which of the following is an incorrect design heuristic?
Option A:	Attempt to minimize structures with high fan-out; strive for fan-in as depth increases.
Option B:	Keep the scope of effect of a module within the scope of control of that module.
Option C:	Define modules whose function is predictable, but avoid modules that are overly restrictive.
Option D:	Evaluate the first iteration of the program structure to reduce cohesion and increase coupling.

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 Agile Process Model.	
B	Differentiate between White Box Testing and Black Box Testing	
C	What is Cost Estimation? Explain LOC Method	
D	List the principals of Software Design.	
E	What is Change Control. How it is different than version control	
F	Describe boundary value analysis with suitable example.	

Option 2

Q3 (20 Marks Each)	Solve any Two Questions out of Three	10 marks each
A	Develop a SRS for Hospital Management System	
B	Explain Coupling and Cohesion	
C	Explain Different Types of Testing	

Option 3

Q4. (20 Marks Each)	*Please delete the instruction shown in front of every sub question*	
A	**Solve any Two**	**5 marks each**
i.	Explain Software Configuration Process	
ii.	What are the different types of Risk?	
iii.	Explain Reverse Engineering.	
B	**Solve any One**	**10 marks each**
i.	Draw the Data Flow Diagram (upto 2 Level) for the Safe home Software	
ii.	Explain Software Quality Assurance. What is FTR?	

University of Mumbai
Examinations Summer 2022
Examinations Commencing from 17th May 2021 to _____
Program: _Computer Engineering_____
Curriculum Scheme: Rev2019
Examination: TE Semester: V
Course Code: **CSC504** and Course Name: **Data Warehousing and Mining**
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.	For the given attribute marks values: 35,45,50,55,60,65,75. Identify the first quartile and third quartile of data.
Option A:	35, 50
Option B:	35,75
Option C:	45,65
Option D:	45,60
2.	OLTP is not
Option A:	Operational database
Option B:	Subject oriented
Option C:	For continuous updates from many sources
Option D:	For high read, write update delete activity
3.	Correcting the customer flat number is
Option A:	Type1 change
Option B:	Type 2 change
Option C:	Type 3 change
Option D:	Type 4 change
4.	In Banking scenario following dimension tables are identified. Point out the inappropriate one.
Option A:	Account
Option B:	Branch
Option C:	Time
Option D:	Transaction
5.	A company would like to improve its sales by analyzing its past data. Which of the following tasks will occupy maximum time required for the return on investment?
Option A:	identifying sources of data
Option B:	ETL process
Option C:	data analysis
Option D:	preparing reports
6.	Suppose we have the following values for salary (in thousands of dollars),

	in increasing order: 30, 36, 47, 50, 52, 52, 56, 60, 63, 70, 70, 110. The mid range of data would be:
Option A:	50,000
Option B:	70,000
Option C:	77,000
Option D:	52,000
7.	Consider the data transaction given below:T1:{F,A,D,B} T2:{D,A,C,E,B} T3:{C,A,B,E} T4:{B,A,D} With minimum support = 60% and the minimum confidence = 80% , which of the following is not valid association rule?
Option A:	A -----> B
Option B:	B ----->A
Option C:	D -----> A
Option D:	A -----> D
8.	Given the Confusion matrix , the accuracy is

Classes	YES	NO
YES	90	210
NO	140	9560

Option A:	60%
Option B:	100%
Option C:	96.5%
Option D:	35%
9.	Data collection is done by crawling through number of web pages in
Option A:	Data Mining
Option B:	Web mining
Option C:	Text Mining
Option D:	Spatial data mining
10.	What is a Dendrogram?
Option A:	A tree diagram used to illustrate the arrangement of clusters in hierarchical clustering
Option B:	A tree diagram used to illustrate the arrangement of clusters in partitional clustering
Option C:	A type of hierarchical clustering
Option D:	A type of bar chart diagram to visualize K-means clusters.

Question 2	Solve any Two out of Three 10 marks each
A	The college wants to record the marks for the courses completed by students using the dimensions: a) Course b) Student c) Time and a measure of Aggregate marks. Create a cube and describe following operations: i) roll up ii) Drill down iii) Slice iv) Dice
B	Discuss the different steps involved in data preprocessing.
C	Consider the following dataset S, which contains observations of several cases of sunburn:

Name	Hair	Height	Weight	Dublin	Result
Sarah	Blonde	Average	Light	No	Sunburned
Dana	Blonde	Tall	Average	Yes	None
Alex	Brown	Short	Average	Yes	None
Annie	Blonde	Short	Average	No	Sunburned
Emily	Red	Average	Heavy	No	Sunburned
Pete	Brown	Tall	Heavy	No	None
John	Brown	Average	Heavy	No	None
Katie	Brown	Short	Light	Yes	None

Unseen sample X= <brown,tall,average,No> Predict the result value as sunburned or None.

Question 3	Solve any Two out of Three	10 marks each

A

The table below shows the six data points. Apply Agglomerative clustering to find clusters. Use Euclidian distance measure. consider single linkage.

	X	y
D_1	0.4	0.53
D_2	0.22	0.38
D_3	0.35	0.32
D_4	0.26	0.19
D_5	0.08	0.41
D_6	0.45	0.30

.

B

A database has four transactions .Let min sup =60% and min conf=80%.

TID	Date	Items purchased
T100	21/04/2022	{K,A,D,B}
T200	21/04/2022	{D,A,C,E,B}
T300	22/04/2022	{C,A,B,E}
T400	23/04/2022	{B,A,D}

	Find all the frequent item sets using apriori algorithm and also list all the strong association rules.
C	What is web structure mining? List the approaches used to structure the web pages to improve on the effectiveness of search engines and crawlers. Explain page rank technique in detail

Question 4	Solve any Four Questions out of Six 5 marks each
A	Explain major issues in data mining.
B	Differentiate between OLTP and OLAP.
C	Explain web usage mining in detail.
D	What are the various methods for estimating classifiers accuracy.
E	Use k means algorithm to create 3-clusters for given set of values:{2,3,6,8,9,12,15,18,22}
F	What are the various Issues regarding Classification and Prediction?

University of Mumbai
Examinations Summer 2022
Program: Computer Engineering
Curriculum Scheme: Choice Base Credit Grading System Rev2016
Examination: TE Computer Engineering Semester V (Choice Based Credit Grading System)
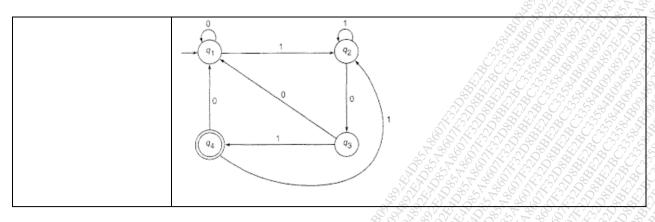Course Code: 31904 and Course Name: Theory of Computer Science

Time: 2 hour 30 minutes   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.	Write a Regular expression for string for ∑ = {0, 1} containing exactly two 0s.
Option A:	1*001*
Option B:	1*01*01*
Option C:	(1+0)*00
Option D:	01*0
2.	FSM is less powerful than TM because
Option A:	It does not have the capability to remember long input sequence
Option B:	It has no finite states
Option C:	It had no single final state
Option D:	It has multiple start state
3.	Context Sensitive grammars are---------grammers.
Option A:	Type 0
Option B:	Type 1
Option C:	Type 2
Option D:	Type 3
4.	A language L is recursively enumerable if and only if it can be enumerated by some
Option A:	Turing machine
Option B:	Finite State Machine
Option C:	Deterministic finite state machine
Option D:	Moore machine
5.	Halting problem is
Option A:	Unsolvable
Option B:	Solvable
Option C:	Depends on problem
Option D:	Depends on TM and UTM
6.	If S---> TaaaT , T---> aT , T---> bT, T---> ^ then the language generated can be given as
Option A:	(a+b)aaa(a+b)
Option B:	(a+b)*aaa(a+b)*
Option C:	aaa
Option D:	(ab)*aaa(ab)*
7.	Which of the following can accept even palindrome over {a,b}
Option A:	FSM
Option B:	DFA
Option C:	NFA
Option D:	Turing Machine

8.	If the grammer is such that every production is of the type A-->aB then the grammer is in -------------
Option A:	Chomsky's Normal form
Option B:	Greibach Normal form
Option C:	Not any normal form
Option D:	Context free form
9.	Identify the correct equation for Arden's Theorem.
Option A:	R = Q + RP has a unique solution: R=Q*P
Option B:	R =Q + RP has a unique solution: R=Q*P*
Option C:	R = Q + RP has a unique solution: R=QP*
Option D:	R = Q + RP has a unique solution: R= (P*Q*) *
10.	The productions of the form A $\rightarrow$ B, is called _____.
Option A:	Null production
Option B:	Unit production
Option C:	Unique production
Option D:	Useless production

Q2	
A	**Solve any Two** **5 marks each**
i.	Write Short note on Undecidability.
ii.	Define ambiguity in Grammar. Give an example of ambiguous grammar.
iii.	Design a automata accepting strings containing 1101 for $\sum = \{0, 1\}$
B	**Solve any One** **10 marks each**
i.	Convert the following regular expression to DFA $(0+1)*(00+11)001$
ii.	Design a Moore machines that output modulus 5 when an input is given in Decimal format. Also convert the same into mealy machine

Q3	**Solve any Two Questions out of Three** **10 marks each**
A	Explain Turing Machine. Design a TM for $0^n1^n2^n \mid n>1$.
B	Reduce the following grammar to Greibach Normal Form S->AB A->a B->C|b C->D D->E E->a
C	Explain and prove Arden's theorem. Find the regular expression for the following automata using Arden's theorem.

Q4	
A	**Solve any Two** **5 marks each**
i.	Explain Chomsky's classification of Languages
ii.	Discuss post correspondence problem with suitable example.
iii.	Convert following grammar to CNF S->aSab|bSb|aa|bb|a|b
B	**Solve any One** **10 marks each**
i.	State pumping lemma for Regular languages. Prove $L = a^p \mid p$ is prime is not regular
ii.	Design a PDA that accepts following strings $L = (ab)^n c^n \mid n >= 1$

Time: 2 hour 30 minutes   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.	Which element is used to get highlighted text in HTML5?
Option A:	<u>
Option B:	<b>
Option C:	<mark>
Option D:	<highlight>
2.	<p style="background: red; border: black;"> is the example of--------------
Option A:	External style sheet
Option B:	Internal style
Option C:	Class style
Option D:	Inline style
3.	```<script language="javascript">
function x()
{
document.write(2+5+"8");
}
</script>```
Option A:	258
Option B:	Error
Option C:	7
Option D:	78
4.	Which one is not a data type in PHP?
Option A:	Resources
Option B:	Objects
Option C:	Null
Option D:	Void
5.	Which of the following is true about servlets?
Option A:	Servlets execute within the address space of web server
Option B:	Servlets are platform-independent because they are written in java
Option C:	Servlets can use the full functionality of the Java class libraries
Option D:	Servlets execute within the address space of web server, platform independent and uses the functionality of java class libraries
6.	Which object stores references to the request and response objects?
Option A:	SessionContext
Option B:	pageContext
Option C:	HttpSession
Option D:	sessionAttribute
7.	Ajax is about updating _____, without reloading the full-page.
Option A:	parts of a web page
Option B:	parts of a database records
Option C:	parts of a HTML tags dynamically
Option D:	parts of a CSS classes dynamically

8.	For What npm stands?
Option A:	Node Project Manager
Option B:	Node Package Manager
Option C:	New Project Manager
Option D:	New Package Manager
9.	ReactJS uses _____ to increase performance
Option A:	Virtual DOM
Option B:	Original DOM
Option C:	Both of above
Option D:	None of above
10.	Which CSS property can provide to add an effect when changing from one style to another, without using Flash animations or java script?
Option A:	Associations
Option B:	Transitions
Option C:	Transistor
Option D:	None of the above

Q2.	Solve any Four out of Six	5 marks each
A	What is the difference between class selector and ID selector?	
B	Explain built -in objects in JavaScript	
C	What is session in servlet and list different ways to handle it.	
D	Give characteristics of RIA.	
E	How to define variable in PHP and explain scope of variables.	
F	What is the use of XMLHttpRequest object? Explain methods that are used to send request to server using AJAX	

Q3.	Solve any Two Questions out of Three	10 marks each
A	Write an external style sheet and link it with HTML code. The stylesheet should include the following i. The web page will have the background image "img1.jpg". ii. The table headings will have red background color. iii. Background color of alternate paragraphs are different. iv. The hyperlinks on the web page will not have underline.	
B	Write code to process online Alumni information for your college. Create forms to get name, address, date of birth, and email id. Write JavaScript code to validate the following: i. User has filled all the fields prior to form submission ii. Valid email-id (with '@' and '.') iii. Age validation using DOB (>=22 years)	
C	What is Servlet and explain the life cycle in detail.	

Q4.		
A	Solve any Two	5 marks each
i.	What are benefits of using JSON over XML data?	
ii.	Write a program in JSP to display system date and time.	
iii.	List and explain different features of React.	
B	Solve any One	10 marks each
i.	Explain <audio> and <video> elements with example in HTML5.	
ii.	Create a well formed XML document to maintain Library catalogue. It should contain the name of the book, author, publisher and year of publishing, format it in tabular manner using XSLT.	