

Roll No.

TCS-601

B. TECH. (CSE) (SIXTH SEMESTER) END SEMESTER EXAMINATION, 2019

COMPILER DESIGN

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub questions in each main question.

(iii) Total marks for each main question are twenty.

1. Attempt any *two* questions of choice from (a), (b) and (c). $(2 \times 10 = 20 \text{ Marks})$

(a) Draw a block diagram of phases of a compiler and show the output of each phase, using the example of the following statement :

position := initial + rate * 60. (CO1)

(b) Explain the input buffer scheme for scanning the source program. How the use of sentinels can improve its performance ? Identify the lexemes, that make up the

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tokens in the following program segment.
Indicate corresponding token and pattern.

```
void sumnum(int i, int j)
{int k=6;
return i+j;
}
```

(CO4)

- (c) What are the cousins of compiler ? Give general format for LEX program and write a LEX program that recognizes the identifiers and float constants. (CO5)
2. Attempt any two questions of choice from (a), (b) and (c). (2×10=20 Marks)

- (a) Construct the LALR parsing table for the following grammar.

$$S \rightarrow TL$$

$$T \rightarrow p$$

$$L \leftarrow L, id \mid id$$

(CO2)

- (b) LR(1) grammars encompass all LL(1) grammars, plus many others. However, LL(1) and LR(0) grammars are incomparable—neither is a subset of the other.

- (i) Give an example of a grammar that is LL(1) but not LR(0), and explain why ?

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- (ii) Give an example of a grammar that is LR(0) but not LL(1), and explain why ? (CO2)

- (c) Consider the following grammar,

$$S \rightarrow n \mid b \mid Mn$$

$$M \rightarrow Mn \mid b$$

- (i) This grammar is not LL(1). Identify the conflicts in the grammar that make it not LL(1) and explain each.
- (ii) Rewrite the grammar so that it is LL(1). To prove that your grammar is LL(1), construct an LL(1) parsing table for it. You do not need to explicitly show the FIRST or FOLLOW sets, thought it might be useful to compute them. (CO2)

3. Attempt any two questions of choice from (a), (b) and (c). (2×10=20 Marks)

- (a) Write a syntax directed translation scheme for producing postfix expression for the expressions generated by the following grammar :

$$E \rightarrow E + T$$

$$E \rightarrow T$$

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 $T \rightarrow T^*F$ $T \rightarrow F$ $F \rightarrow 9$ $F \rightarrow 3$ $F \rightarrow 2$

Draw the annotated parse tree and show dependency graph for $9*3+2$. (CO3)

- (b) Write syntax directed definition for constructing syntax tree of an expression derived from the grammar :

 $E \rightarrow E + T \mid E - T \mid T$ $T \rightarrow (E) \mid id \mid num$ (CO3)

- (c) Give a SDT for desktop calculator and show its parser stack (postfix) implementation. (CO3)

4. Attempt any two questions of choice from (a), (b) and (c). ($2 \times 10 = 20$ Marks)

- (a) What is symbol table ? How symbol table can be managed ? Explain. (CO1)

- (b) Generate code for the following C statements :

(i) $x = f(a) + f(a) + f(a) + 10$ (ii) $x = f(a)/g(b, c) - d + 3$ (CO6)

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- (c) What is DAG ? For the following basic block construct DAG : (CO1 & CO6)

 $d = b * c;$ $e = a * b;$ $b = b + c;$ $c = b * c;$

5. Attempt any two questions of choice from (a), (b) and (c). ($2 \times 10 = 20$ Marks)

- (a) Construct basic blocks, data flow graph and identify loop invariant statements for the following :

(i) $f=1$ (ii) $i=2$ (iii) if $i \leq x$ goto (8)(iv) $f=f*i$ (v) $t1=i+1$ (vi) $i=t1$

(vii) goto (3)

(viii) goto calling program (CO6)

- (b) Discuss in detail the role of dead code elimination and strength reduction during code optimization of a compiler. (CO1)

- (c) Write a LEX/YACC code for evaluating any arithmetic expression. Write all the commands to generate the executable.

(CO5)

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B. TECH. (CSE) (SIXTH SEMESTER) END SEMESTER EXAMINATION, 2019

SOFTWARE ENGINEERING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any two sub questions in each main question.

(iii) Total marks for each main question is twenty.

1. Attempt any two parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Explain, why changes are inevitable in complex systems. Name any two approaches used in real life projects to cope up with the change. Give an example. (CO1, CO2)

(b) (i) Describe all the steps involved from the time of project initiation to project completion. (CO1, CO2)

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(ii) Describe the characteristics of a quality software. (CO1, CO3)		between the Student and Gate Exam portal system. (CO3, CO4, CO5)	
(c) What is Software Project Management (SPM) ? Which method of Agile supports SPM ? Explain the process in detail. (CO1, CO3)		(b) Write short notes on any <i>two</i> of the following : (CO1, CO4, CO6)	
2. Attempt any <i>two</i> parts of choice from (a), (b) and (c). (10×2=20 Marks)		(i) Code review techniques	
(a) What is SRS document ? What are the contents we should contain in the SRS document ? Elaborate with an example. (CO2, CO4)		(ii) Layered architectural pattern for Library Management system	
(b) Differentiate between any <i>two</i> of the following : (CO5, CO3, CO4)		(iii) Function point metrics	
(i) Function oriented and Object oriented design		(c) What is the benefit of modular design ? What are the different types of Cohesion and Coupling ? (CO4, CO5)	
(ii) Decision Tree and Decision Table		4. Attempt any <i>two</i> parts of choice from (a), (b) and (c). (10×2=20 Marks)	
(iii) Software verification and Validation		(a) How is testing integrated with the life cycle of a software product ? Is it sufficient to test a software product only at the end of its life cycle ? (CO1, CO6)	
(c) Illustrate the methods used for discovering the requirements in a project. (CO2)		(b) (i) List and explain various Integration Testing approaches. (CO5, CO6)	
3. Attempt any <i>two</i> parts of choice from (a), (b) and (c). (10×2=20 Marks)		(ii) Design test case for a login page consisting two fields only i.e. user id and password.	
(a) What are different perspectives of a system ? Design a system sequence diagram representing the interaction		(c) Consider a program for determination of nature of roots of a quadratic equation. Its input is a triple of positive integers a, b, c and the values may be from	

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[0, 100]. The output may be of the following words : (CO6)

(not. a quadratic equation, real roots, imaginary roots, equal roots)

Design Equivalence Partitioning classes.

5. Attempt any two parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Suppose the project was estimated to be 400 KLOC. Calculate the effort and development time for each of the project category i.e., organic, semidetached, embedded using COCOMO. (CO6)

(b) (i) Explain the process of Software Configuration Management (SCM). (CO3)

(ii) What is the importance of Risk management and how is it carried out ?

(c) Compare and contrast ISO 9000 and SEI CMM. List the maturity levels and their corresponding key processing areas (KPAs). (CO4)

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B. TECH. (CS/IT)
(SECOND SEMESTER)

END SEMESTER EXAMINATION, 2019

COMPUTER NETWORKS—I

Time : Three Hours

Maximum Marks : 100

- Note :** (i) All questions are compulsory.
(ii) Answer any *two* sub questions in each main question.
(iii) Total marks for each main question are twenty.

1. Attempt any *two* questions of choice from (a), (b) and (c). ($2 \times 10 = 20$ Marks)
 - (a) Discuss the switching fabric inside of a router. (CO1)
 - (b) Explain the following headers of a TCP segment : Source Port, Destination Port, Sequence Number, Acknowledgement number. (CO2)

- (2) TCS-604
- (c) We would like to transfer 20 KB ($B=$ Bytes) file across a network from node A to node F. Packets have a length of 1 KB (neglecting header). The path from node A to node F passes through 5 links, and 4 intermediate nodes. Each of the links is a 10 km optical fiber with a rate of 10 Mbps ($b =$ bits). Assume speed of light in optical fiber is 2×10^8 m/s. The 4 intermediate nodes each have a processing delay of 50 μ s. How long does it take to send the entire file across the network ? (CO1 and CO2)
2. Attempt any two questions of choice from (a), (b) and (c). $(2 \times 10 = 20$ Marks)
- (a) What is the role of MIME in emails ? Describe A, CNAME, NS and MX type of DNS Resource Records. (CO2 and CO3)
- (b) Draw the FSM for the sender side for reliable stop-and-wait protocol considering all error conditions (like packet loss etc). No explanation required. (CO5)

- (3) TCS-604
- (c) Find out all the subnets and show the range of valid hosts of each subnet for 131.107.32.1 and subnet mask 255.255.224.0 (CO6)
3. Attempt any two questions of choice from (a), (b) and (c). $(2 \times 10 = 20$ Marks)
- (a) Explain how DHCP works. (CO3 and CO6)
- (b) Consider a network using 8-bit host addresses. Suppose a router uses longest pre-fix matching and has the forwarding table shown below. For each of the four interfaces, give the associated range of destination host addresses and the number of addresses in that range. (CO2 and CO6)
- | Prefix Match | Interface |
|--------------|-----------|
| 1 | 0 |
| 11 | 1 |
| 111 | 2 |
| Otherwise | 3 |
- (c) Following diagram depicts a UDP packet. First three rows indicate the Pseudoheader.

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Calculate the checksum. (ASCII value of A is 65, B is 66 and so on)(CO3 and CO4)

153.18.8.105			
171.2.14.10			
All 0s	17	15	
1087		13	
15	All 0s		
T	E	S	T
M	N	P	All 0s

4. Attempt any *two* questions of choice from (a), (b) and (c). $(2 \times 10 = 20 \text{ Marks})$

(a) Draw the IPv6 datagram format and explain all the header fields in it.

(CQ5 and CO6)

(b) Consider five measured Sample RTT values as 106 ms, 120 ms, 140 ms, 90 ms, and 115 ms. Compute the Estimated RTT after each of these Sample RTT values is obtained, using a value of $\alpha = 0.125$ and assuming that the value of Estimated RTT was 100 ms just before the first of these five samples were obtained. Compute also the Dev RTT after each sample is obtained,

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assuming a value of $\beta = 0.25$ and assuming the value of Dev RTT was 5 ms just before the first of these five samples was obtained. Finally compute the TCP Timeout interval after each of these samples is obtained. Write down any expression which you are using for calculation. (CO5)

- (c) Consider the cases of Go-Back-N, Selective Repeat, and TCP (no delayed ACK). Assume that the timeout values for all three protocols are sufficiently long such that 5 consecutive data segments and their corresponding ACKs can be received (if not lost in the channel) by the receiving host (Host B) and the sending host (Host A) respectively. Suppose Host A sends 5 data segments to Host B, and the 2nd segment (sent from A) is lost. In the end, all 5 data segments have been correctly received by Host B. (CO5)
- (i) How many segments has Host A sent in total and how many ACKs has Host

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B sent in total ? What are their sequence numbers ? Answer this question for all three protocols. 7

- (ii) If the timeout values for all three protocol are much longer than 5 RTT, then which protocol successfully delivers all five data segments in shortest time interval ? Explain why. 3

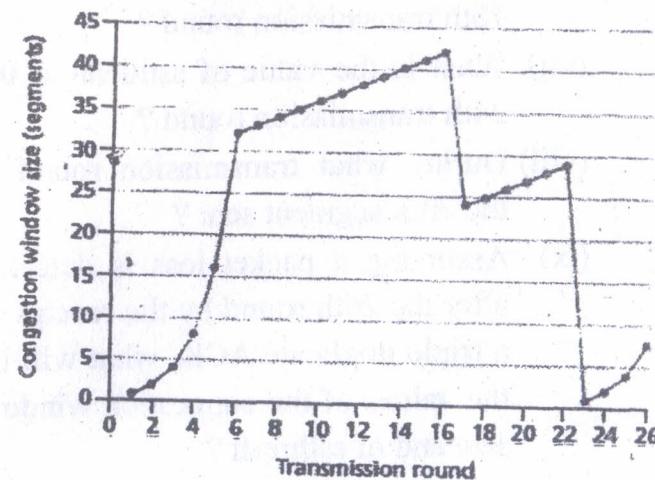
5. Attempt any two questions of choice from (a), (b) and (c). (2×10=20 Marks)

- (a) Explain the TCP three-way handshake for connection establishment, clearly showing the relevant flag values. (CO5)
- (b) Consider sending a 2400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 623. How many fragments are generated ? What are the values in the various fields in the IP datagram(s) generated related to fragmentation ? (CO6)

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- (c) Consider the figure given below. Assuming TCP Reno is the protocol experiencing the behavior as shown, answer the following questions (Each sub-question is of one mark). (CO5)



- (i) Identify the intervals of time when TCP slow start is operating.
- (ii) Identify the intervals of time when TCP congestion avoidance is operating.
- (iii) After the 16th transmission round, is segment loss detected by a triple duplicate ACK or by a timeout ?

- (iv) After the 22nd transmission round, is segment loss detected by a triple duplicate ACK or by a timeout ?
- (v) What is the initial value of ssthresh at the first transmission round ?
- (vi) What is the value of ssthresh at the 18th transmission round ?
- (vii) What is the value of ssthresh at the 24th transmission round ?
- (viii) During what transmission round is the 70th segment sent ?
- (ix) Assuming a packet loss is detected after the 26th round by the receipt of a triple duplicate ACK, what will be the values of the congestion window size and of ssthresh ?
- (x) Suppose TCP Tahoe is used (instead of TCP Reno), and assume that triple duplicate ACKs are received at the 16th round. What are the ssthresh and the congestion window size at the 19th round ?

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B. TECH. (CSE) (SIXTH SEMESTER) END SEMESTER EXAMINATION, 2019

OBJECT ORIENTED ANALYSIS AND DESIGN

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

- (ii) Answer any *two* sub questions in each main question.
 - (iii) Total marks for each main question is twenty.
1. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) Explain various concepts used in object oriented paradigm with suitable diagram wherever required in detail. (CO1)
 - (b) Draw a sequence diagram for withdrawing money from ATM. (CO2)
 - (c) A retail system will interact with customers who place and track orders. In turn, the system will validate the user for

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ship orders and bill the customer. If all orders are not ready, part of the order can be dispatched. Draw the Use case diagram and consider the following things : (CO2)

- Identify the actors that interact with the element. Candidate actors include groups that require certain behavior to perform their tasks or that are needed directly or indirectly to perform the element's functions.
- Organize actors by identifying general and more specialized roles.
- For each actor, consider the primary ways in which that actor interacts with the element.
- Consider also interactions that change the state of the element or its environment or that involve a response to some event.
- Consider also the exceptional ways in which each actor interacts with the element..
- Organize these behaviors as use cases, applying include and extend relationships to factor common behavior and distinguish exceptional behavior.

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2. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Explain Object Oriented Software Development : A Use Case Derive approach in detail with suitable diagram.

(CO2)

(b) What is OOAD ? What are the benefits of OOAD over traditional analysis and design process of software development ?

(CO1)

(c) Draw a use case diagram for booking an online movie ticket booking system having the following functionalities : (CO2)

- A distinction is made between users and registered users. Only registered users can buy tickets. A user becomes a registered user by logging in. Unregistered users can register with a username that has not been taken by another user, an e-mail address and a freely chosen password.
- Every user can search for movies, actors, directors and other persons and theatres.
- For every movie and person there is a page showing their details. The movie details consists of a title, the year it

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was released in, a description, the genre of this movie and a photo. Also there are lists for the persons who were involved in this film, a soundtrack and some other information. The details to a person are restricted to its name, birthday, place of birth and a photo and the details of a theatre are composed of an address, show rooms and performances. Registered users can comment and rate movies, store their favourite movies and theatres in a personal list and buy tickets.

3. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) Define an axiom. Mention the design axioms applied to object oriented design process with suitable example. (CO3)

(b) What is the difference between activity diagram and sequence diagram ? Explain with example. (CO2)

(c) A cellular network will interact with customers who place a call and receive a call. He/she can use scheduler to schedule the Phone Calls. There may be some exceptional behaviors of the users such as

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: a customer can also place conference call and can receive addition calls. Draw Use case diagram and consider the following things : (CO3)

- Identify the actors that interact with the element.
- For each actor, consider the primary ways in which that actor interacts with the element.
- Consider interactions that change the state of the element or its environment or that involve a response to some event.
- Consider the exceptional ways in which each actor interacts with the element.
- Organize these behaviors as use cases, applying include and extend relationships to factor common behavior and distinguish exceptional behavior.

4. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) Explain the Object Modeling Technique (OMT) presented by Jim Rumbaugh et al. (CO2)

(b) Model with a class diagram the following System : Vending Machine, A vending machine sells small, packaged, ready to eat items (chocolate bars, cookies, candies, etc.). Each item has a price and a name. A customer can buy an item, using a smart card (issued by the vending machine company) to pay for it. No other payment forms (i.e. cash, credit card) are allowed. The smart card records on it the amount of money available. The functions supported by the system are :

- Sell an item (choose from a list of items, pay item, distribute item)
- Recharge the machine
- Set up the machine (define items sold and price of items)
- Monitor the machine (number of items sold, number of items sold per type, total revenue)
- Check the availability of an item.

The system can be used by a customer, a maintenance employee (who check the items and recharges items in the machines), an administrator (who sets up the machine). However, we don't need to keep track of which user bought

something or to keep track of the id or other details of his smart card. For example : We're not interested in saying that the customer Arushi bought 10 candies with the smart card # 1. We are interested in Vending machine sold 10 candies, each with price ₹ 1. (CO3)

(c) What is Object Storage ? Which address space is used in it ? Explain the durability and scalability of object storage. (CO4)

5. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) What do you mean by a test plan and a test case ? Explain various types of testing strategies. (CO5)

(b) Which layer of three-tier architecture is called as access layer ? How are classes of access layer created ? Explain the redundancy issues. (CO4)

(c) What is software quality assurance ? Explain its activities. (CO5)

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**B. TECH. (CSE)
(SIXTH SEMESTER)**

END SEMESTER EXAMINATION, 2019

BIG DATA STORAGE AND PROCESSING

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

- (ii) Answer any two sub questions in each main question.
- (iii) Total marks for each main question is twenty.
1. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) Summarize the challenges of Big Data analysis. **(CO1)**

(b) Describe the five 'V's in Big Data. **(CO1 & CO2)**

(c) Discuss the different types of digital data with suitable example. **(CO2)**

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2. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Explain the YARN components in Hadoop. (CO2)
 - (b) Draw and explain the architecture of HDFS. (CO3)
 - (c) Demonstrate the dataflow in Hadoop. (CO2 & CO3)
3. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Classify the different file input types used in Hadoop. (CO3)
 - (b) Justify the conditions of combiner in Map-Reduce program. (CO5)
 - (c) Demonstrate the working of Map-Reduce using “word-count” program. (CO4)
4. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Discuss the different mode of Hadoop installation. (CO4)
 - (b) Give original examples of Big Data Applications and criticize your points. (CO1)
 - (c) Explain the system requirements of Hadoop installation and justify with reasons. (CO5)

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5. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) Classify the tables in Hive with suitable example. (CO4)
 - (b) Compare the CAP theorem with ACID properties. (CO4)
 - (c) Demonstrate the working of HBase with some suitable examples. (CO4 & CO5)

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TCS-693

**B. TECH. (CSE) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2019**

FULL STACK WEB DEVELOPMENT

Time : Three Hours

Maximum Marks : 100

- Note :** (i) All questions are compulsory.
(ii) Answer any *two* sub questions in each main question.
(iii) Total marks for each main question are twenty.

1. Attempt any *two* questions of choice from (a),
(b) and (c). $(2 \times 10 = 20 \text{ Marks})$

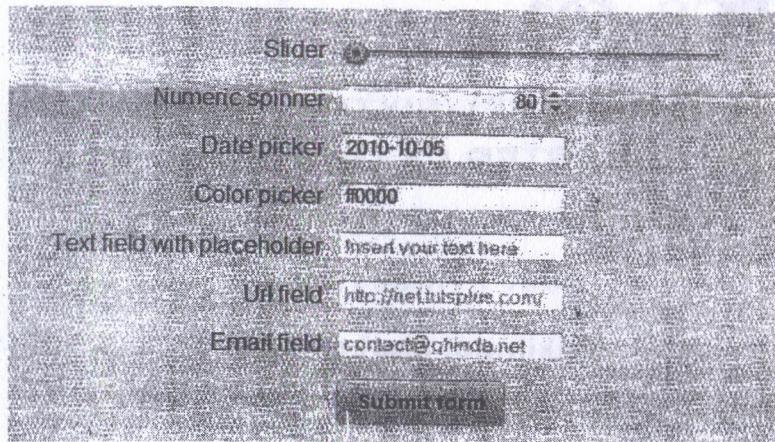
- (a) Describe the concepts of HTTP is stateless protocol, and how to use SESSION and COOKIES in PHP to make it Stateful.

(CO1)

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- (b) Design and write the code in HTML5 Form. (CO2)



- (c) Explain CSS Pseudo classes, Pseudo entity and type selector. (CO3)
2. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) What does DOM stand for ? Explain the top most objects of DOM in java script. (CO3)
- (b) Define the CSS Box Model and use selectors to provide the styles to the web pages at various levels. (CO3)
- (c) Write a function in java script to insert a string within a string at a particular position (default is 1). (CO3)

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Test Data :

```
console.log(insert('We are doing some exercises.'));
```

```
console.log(insert('We are doing some exercise.', 'Java Script'));
```

(CO3)

3. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) What is a difference between DIV and SPAN tag. List the various HTML tags and use them to develop the user-friendly webpages. (CO3)

(b) Write a program in java script to input a string from user through a text field convert a string to Uppercase on onfocus() event and Lowercase on onblur() event. (CO4)

(c) Explain, what is php ? Name and uses all Super Global Variable define in PHP with suitable examples. (CO6)

4. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)

(a) Write a program in php how to upload a file, check type of file is of image, length of a file < 50000 and image type equal jpeg only. (CO5)

- (b) Write a PHP program, how to connect through a database ? Write a PHP program to select data from the database. (CO6)
- (c) Explain include vs. require function in PHP also explain GET vs. POST method with suitable example. (CO5)
5. Attempt any *two* questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) Write a java script to display the timer clock on webpage using method setInterval(), and setTimeOut. (CO4)
- (b) What is XML and DTD ? Explain relationship between XML and DTD with some suitable example. (CO3)
- (c) Write a program in PHP to open file and read contents char by char till the end of the file, find all the consonant in separate file and vowel in separate file. And also explain fopen() all permission. (CO6)

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**B. TECH. (CSE) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2019**

**IMAGE PROCESSING AND COMPUTER
VISION**

Time : Three Hours

Maximum Marks : 100

- Note :**(i) All questions are compulsory.
- (ii) Answer any *two* sub questions in each main question.
- (iii)Total marks for each main question is twenty.
1. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) What is the ratio of sizes of a black and white, grayscale and a RGB images of same resolution ?

- (b) Apply Huffman encoding on the following table. Frequency is number of times that character occurred :

Character	Frequency
a	50
b	230
c	200
d	300
e	720

Also calculate how much space we have saved using Huffman encoding.

- (c) What is segmentation ? Give some algorithms' name which are used for segmentation.
2. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) Differentiate between Image Enhancement and Restoration.
 - (b) Write a Matlab/C/python code to detect edges in an image.
 - (c) What are the basic morphological operation ? Explain its working with example.

3. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) Write down the steps involved in watershed algorithm and explain them.
 - (b) Write down the code for background extraction from an image using median pixel values.
 - (c) Define Hough transform using appropriate formulas and graphs.
4. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) What is histogram specification ? Explain with example histogram normalisation.
 - (b) What is hit and miss transform ? What is the use of hit and miss transform ?
 - (c) Define Otsu algorithm. Write Matlab/c/python code of Otsu's algorithm.
5. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) What is image compression ? Explain with appropriate example why we need image compression.

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- (b) What is a connected component ? Write a Matlab/c/python code to find number of connected components in an image.
- (c) What is Spatial domain and Frequency domain ? How image is digitally formed in a camera ?

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**B. TECH. (CSE)
(SIXTH SEMESTER)**

END SEMESTER EXAMINATION, 2019

DEVOPS ON CLOUD

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any two sub questions in each main question.

(iii) Total marks for each main question is twenty.

1. Attempt any two parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
 - (a) Discuss the evaluation of software engineering. **(CO1)**
 - (b) What are the fundamental differences between DevOps & Agile ? **(CO1 & CO2)**
 - (c) Which are the top DevOps tools ? Which tools have you worked on ? **(CO3)**

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2. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) What are the benefits of using version control ? Describe branching strategies you have used. (CO2)

(b) Explain the scheduling mechanism in Jenkins. Write down the steps for scheduling a job by timer in Jenkins.(CO3)

(c) Mention some of the useful plugin in Jenkins and their use. (CO2 & CO3)

3. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) What is continuous testing ? How to Automate testing in DevOps life-cycle ? (CO3)

(b) What is Selenium IDE ? What are the Testing types supported by Selenium ? (CO3)

(c) What are the key elements of Continuous testing tools ? (CO6)

4. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) Explain the docker image with docker container and docker hub. (CO4)

(3)

- (b) What is Puppet ? Describe the most significant gain you made from automating a process through Puppet.

(CO5)

(c) How is exactly Docker different from hypervisor virtualization ? What are its benefits ? (CO5)

5. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)

(a) What is Nagios ? How does Nagios work ? (CO3)

(b) What are containers ? What are the advantages that Containerization provides over virtualization ? (CO6)

(c) What is the difference between Asset Management and Configuration Management ?

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Roll No.

TCS-672

B. TECH. (CSE) (SIXTH SEMESTER) END SEMESTER EXAMINATION, 2019

MACHINE LEARNING 2

Time : Three Hours

Maximum Marks : 100

- Note : (i) All questions are compulsory.
(ii) Answer any *two* sub questions in each main question.
(iii) Total marks for each main question are twenty.

1. Attempt any *two* questions of choice from (a),
(b) and (c). $(2 \times 10 = 20 \text{ Marks})$
(a) Develop the support vector machine for the following points $(1, 1)$, $(1, -1)$, $(2, 1)$, $(2, -1)$, $(4, 0)$, $(5, 1)$, $(5, -1)$ and $(6, 0)$ considering the support vectors as S1

(2)

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- (2, 1), S2 (2, -1) and S3 (4, 0). Where S1, S2 and S3 are support vectors. (CO1)
- (b) How liner separability can be achieved in Support Vector Machine Consider the example of XOR gate. (CO1)
- (c) What is a confusion matrix ? Explain recall, precision and F-measure.
(CO1 and CO3)
2. Attempt any two questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) Describe how principal component analysis is carried out to reduce dimensionality of data sets ? (CO2)
- (b) Cluster the following 8 points with (x, y) representing location into three clusters :
A1 (2, 10), A2 (2, 5), A3 (8, 4), A4 (5, 8),
A5 (7, 5), A6 (6, 4), A7 (1, 2) and
A8 (4, 9). Initial cluster centers are A1, A4 and A7. (CO2)
- (c) Implement XOR function using McCulloch-Pitts neuron (consider binary data). (CO3 and CO4)

(3)

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3. Attempt any two questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) What is hidden markov model ? Explain hidden markov model with suitable example. (CO4)
- (b) Compare and contract supervised learning, unsupervised learning and reinforcement learning. (CO1)
- (c) Explain reinforcement learning in detail along with the various elements involved in forming the concept. Also define what is meant by partially observable state ? (CO6)
4. Attempt any two questions of choice from (a), (b) and (c). (2×10=20 Marks)
- (a) Explain the steps required for selecting the right machine learning algorithm. (CO1)
- (b) Explain how back propagation algorithm helps in classification. (CO4)
- (c) Write a program to add two tensors ? List commonly used arithmetic operators in Tensor. (CO5)

(4)

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5. Attempt any *two* questions of choice from (a),
(b) and (c). $(2 \times 10 = 20$ Marks)

- (a) What is Tensor Flow ? Write different types of Tensors. (CO5)
- (b) Discuss in detail about the steps involved in knowledge discovery process. (CO1)
- (c) What is convolution neural network ? Explain the different layers of convolution neural network. (CO5)

Roll No.

TIT-607

**B. TECH. (IT) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2019**

**SOFTWARE VERIFICATION, VALIDATION
AND TESTING**

Time : Three Hours

Maximum Marks : 100

Note :(i) All questions are compulsory.

(ii) Answer any *two* sub questions in each main question.

(iii)Total marks for each main question is twenty.

1. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$

(a) Explain different phases and associated activities in STLC. (CO1)

(b) What are the goals and benefits of software testing ? (CO1)

(2)

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- (c) A program computes $a*b$, where a lies in the range [1, 10] and b within [1, 5]. Design the test cases for this program using BVC, robust testing and worst-case testing methods. (CO2)
2. Attempt any *two* parts of choice from (a), (b) and (c). (10 \times 2=20 Marks)
- (a) Write short notes on the following : (CO1, CO2, CO3)
- (i) Evolutionary phases of software testing
 - (ii) States and life cycle of a Bug
 - (iii) Test case and Test Suite
 - (iv) Mutation Testing
- (b) Explain State table technique for designing test case with suitable example. (CO2)
- (c) A program calculates the total salary of an employee with the conditions that if the working hours are less than or equal to 48, then give normal salary. The hours over 48

(3)

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- on normal working days are calculated at the rate of 1.25 of the salary. However on holidays or Sundays, the hours are calculated at the rate of 2.00 times of the salary. Design test cases using decision table testing. (CO2)
3. Attempt any *two* parts of choice from (a), (b) and (c). (10 \times 2=20 Marks)
- (a) What is a V-diagram ? How does it support early testing ? List and explain various verification and validation activities. (CO3/CO4)
- (b) Differentiate between the following : (CO3/CO4)
- (i) Structural and functional testing
 - (ii) Code walkthrough and code inspection
 - (iii) Breadth first and depth first integration testing
 - (iv) Alpha and beta testing
- (c) Explain Linear Independent Path and Control Flow Graph. Draw a control flow graph for the following sets of code and find McCabe's Cyclomatic complexity $V(G)$: (CO2)
- while($x \neq y$) {
 If($x > y$), then
 $x = x - y$;

```
else y=y-x;  
}  
return x;
```

4. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) What is the importance of debugging process ? Discuss the steps required for performing a debugging process. (CO4)
 - (b) Explain the process and elements of Security Testing. (CO2/CO6)
 - (c) Explain, why test cases are prioritized. Mention the criteria for prioritizing the test cases. (CO5)
5. Attempt any *two* parts of choice from (a), (b) and (c). (10×2=20 Marks)
- (a) List and explain static and dynamic testing tools for software testing (CO5)
 - (b) What is Automation testing ? Give its prerequisites and benefits. (CO6)
 - (c) List and explain UML diagrams that are helpful in testing an Object Oriented Software (OOS). (CO5)

Roll No.

TIT-608

**B. TECH. (IT) (SIXTH SEMESTER)
END SEMESTER EXAMINATION, 2019**

INFORMATION THEORY AND CODING

Time : Three Hours

Maximum Marks : 100

- Note :**(i) All questions are compulsory.
(ii) Answer any *two* sub questions in each main question.
(iii)Total marks for each main question is twenty.
1. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) Write a short note on Text Compression and Image Compression. (CO1)
 - (b) “Adaptive Huffmann Coding is a significant improvement in text compression.” Support this statement in your own words. (CO6)
 - (c) Difference between memory and memory-less channels. Explain types of each. (CO2 \& CO5)

2. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) Explain Information Theory methodology and properties of information. (CO1)
 - (b) Explain digitization. How can different information formats be digitized? (CO5)
 - (c) LPC stands for ? Explain working procedure and applications of LPC. (CO6)
3. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) Write a short note on Video Compression. Explain any format to support your answer. (CO3)
 - (b) Describe pixel, bitmap, vector and how they are different and similar to each other. (CO6)
 - (c) Describe audio and video coding formats. (CO6)
4. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) Create a Adaptive Huffman Coding Tree for — “aardvark”. (CO3 & CO5)
 - (b) Give a brief idea of Arithmetic Encoding. How is it better than Adaptive Huffman Encoding ? (CO3 & CO5)

- (c) What is the need of jpeg ? Describe its compression technique. (CO6)
5. Attempt any *two* parts of choice from (a), (b) and (c). $(10 \times 2 = 20 \text{ Marks})$
- (a) CELP is an abbreviation for ? Explain its encoding and decoding technique. (CO6)
 - (b) What is an event ? Write brief introduction of sources of information and techniques to measure this information. (CO1)
 - (c) Write shortcomings of Delta Modulation and how is it different from Adaptive Delta modulation technique. (CO1 & CO2)