

Roll No.

TCS-601**B. TECH. (CSE) (SIXTH SEMESTER)
MID SEMESTER EXAMINATION, 2019**

COMPILER DESIGN

Time : 1 : 30 Hours

Maximum Marks : 50

Note : (i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False : ($1 \times 5 = 5$ Marks)

(a) In a compiler, keywords of a language are recognized during phase.

(b) The lexical analysis for a modern computer language such as Java needs the power of in a necessary and sufficient sense.

(Finite state automata/

Deterministic pushdown automata/

Non-Deterministic pushdown automata/

Turing Machine)

(c) A top down parser generates Left most derivation. (True/False)

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- (d) Recursive descent parsing is an example of bottom up parsing. (True/False)
- (e) Regular expressions can be implemented using finite automata. (True/False)
2. Attempt any five parts : (3×5=15 Marks)
- Describe the need of separating the analysis phase into lexical phase and parsing.
 - What is the main idea of Left factoring ? Give an example.
 - Point out why buffering used in lexical analysis. What are the commonly used buffering methods ?
 - What is bootstrapping ?
 - Consider the following grammar :

$$A \rightarrow CB$$

$$C \rightarrow aB|B$$

$$B \rightarrow bc$$

Find the FIRST and FOLLOW of all non-terminal in grammar.

- (f) Draw transition diagram for an identifier.

Section—B

3. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Describe the following expressions after each phases : $a := b*c - d$. How various phases could be combined as pass in a compiler ?

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- (b) Consider the following grammar :

$$S \rightarrow (A)|a$$

$$S \rightarrow A, S|S$$

Construct leftmost derivations and parse trees for the following sentences :

- $(a, (a, a))$
- $(a, ((a, a), (a, a)))$

- (c) Define tokens, patterns and lexemes. List of tokens in the following C statement :

```
printf("i = %d, &i = %x", i, & i);
```

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

- What is Shift-Reduce and Reduce-Reduce conflict ? How can these be resolved ? Explain error recovery in LR parsing.

- Construct LR(0) parse table for the following grammar :

$$E \rightarrow E + F|F$$

$$F \rightarrow F|a|b$$

- Write the rule to eliminate left recursion in a grammar. Prepare and eliminate the left recursion for the grammar :

$$S \rightarrow Aa|b$$

$$A \rightarrow Ac|Sd|\epsilon$$

5. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$

(a) Show the following grammar is not LL(1) :

$$S \rightarrow aAb|Aba$$

$$A \rightarrow a$$

(b) Check whether the following grammar is LALR(1) :

$$S \rightarrow Aa|bAc|Bc|bda$$

$$A \rightarrow d$$

$$B \rightarrow d$$

(c) Write a LEX program for identifying the keywords and identifiers from the file.

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

SOFTWARE ENGINEERING

Time : 1 : 30 Hours

Maximum Marks : 50

- Note : (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)

- (a) The process of developing a software product using software engineering principles and methods is referred to as,

_____ .
(Software evolution/Software myths)

- (b) Which model is also called as the classic life cycle or the Waterfall model ?

(Iterative Development/Linear
Sequential Development)

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- (c) In the V-V model of software development, testing starts in parallel with the development. (True/False)
- (d) Initially a context diagram is drawn, which is a simple representation of the entire system under investigation. This is followed by which level of diagram ?
(Level1/Level2)
- (e) What is the final outcome of the requirements analysis and specifications phase ? (Drawing the data flow diagram/
The SRS Document)
2. Attempt any five parts : (3×5=15 Marks)
(Define/Short Numerical/Short Programming/
Draw)

- (a) What are functional and non-functional requirements ?
- (b) Differentiate between Software and Program.
- (c) Why is Spiral Model also called Meta Model ?

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- (d) What are the different types of design ? List their activities.
- (e) What is maintenance ? Describe its types.
- (f) Discuss levels of testing.

Section—B

3. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) Describe the software development life cycle for software development.
- (b) List and describe the characteristics of software.
- (c) Explain Incremental Model with the help of suitable example.
4. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) Give the techniques used for Requirement Elicitation and discuss pros and cons of each.
- (b) Explain the process of project management using Scrum in Agile software development.

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- (c) Write short notes on Data Dictionary and Decision Table.
5. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$
- (a) Explain the process of Requirement Engineering in detail.
 - (b) Explain the different phases in RUP Model and list the work flows associated.
 - (c) What is DFD ? Design the various levels of DFD for Hostel Management System.

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B. TECH. (CSE/CSE-CC/CSE-BDA/IT)
(SIXTH SEMESTER)

MID SEMESTER EXAMINATION, 2019

COMPUTER NETWORKS—I

Time : 1 : 30 Hours

Maximum Marks : 50

- Note :** (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False : ($1 \times 5 = 5$ Marks)
 - (a) "A user requests a Web page that consists of some text and three images. For this page, the client will send one request message and receive four response messages." (True/False)
 - (b) _____ (Process ID / Socket number / Port Number) is used by a process running on one host to identify a process running on another host.

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- (c) "The Date : header in the HTTP response message indicates when the object in the response was last modified." (True/False)
- (d) FTP uses port number ____ (20/21/23) for control and uses port number ____ (20/21/23) for data.
- (e) Full form of CDN is ____ and full form of RFC is ____.
2. Attempt any five parts : (3×5=15 Marks)

(Define/Short Numerical/Short Programming/Draw)

(a) Is it possible that an organization's Web server and mail server have exactly the same alias for a hostname (for example foo.com) ? If yes, what would be the type for the resource record (RR) that contains the hostname of the mail server ? If not, why ?

(b) Suppose N packets arrive simultaneously to a link at which no packets are currently being transmitted or queued. Each packet is of length L and the link has transmission rate R. What is the average queuing delay for the N packets ?

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- (c) Write the SMTP commands sequentially for sending an email from a@abc.com to x@xyz.com.
- (d) What is an Access Network ? Name three types of Access Networks (only name, do not explain).
- (e) Explain the DNS record : (disney.com, afs.disney.com, NS).
- (f) How will you download a file of 12345 bytes in three equal parts in parallel using the Range header of http.

Section—B

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

- (a) Differentiate between Propagation Delay and Transmission Delay.
- (b) Consider sending voice from Host A to Host B over a packet switched network. Host A converts on-the-fly analog voice to a digital 64-Kbps bit stream. Host A then groups the bits into 48-byte packets. There is one link between host A and B; its transmission rate is 1 Mbps and its propagation delay is 2 ms. As soon as Host A gathers a packet, it sends it to Host B.

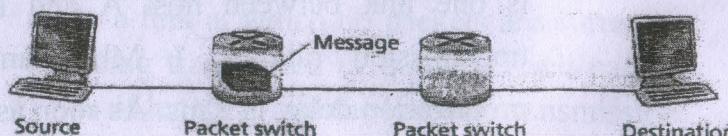
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As soon as Host B receives an entire packet, it converts the packet's bits to an analog signal. How much time elapses from the time a bit is created (from the original analog signal at A) until a bit is decoded.

- (c) Refer the figure given below. Consider a file of 8 Mb size is sent from source to destination. Suppose each link in the figure is 2 Mbps. Ignore propagation, queuing and processing delays. How long does it take to move the file from source to destination if it is sent as a single packet. Now suppose the file is segmented into 800 packets with each packet being 10,000 bits long. Now how long does it take to move the file from host to destination ?



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4. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$

(a) Explain the following cache control mechanisms : must-revalidate, no-cache, max-age.

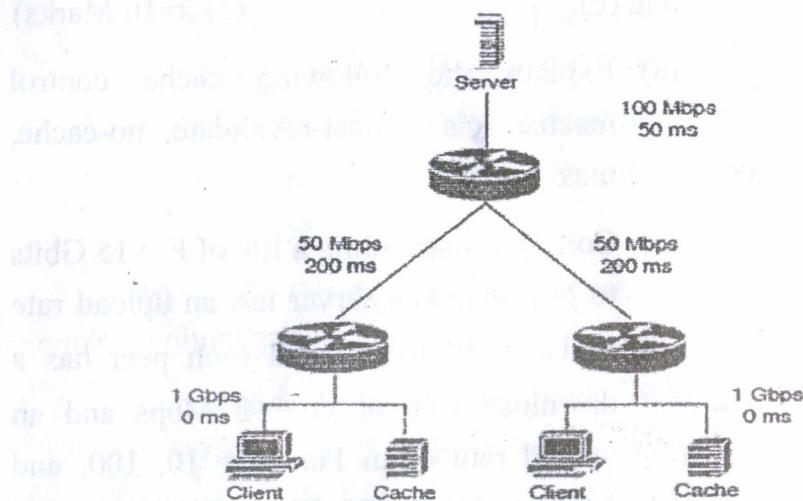
(b) Consider distributing a file of $F = 15 \text{ Gbits}$ to N peers. The server has an upload rate of $U_s = 30 \text{ Mbps}$, and each peer has a download rate of $d_i = 2 \text{ Mbps}$ and an upload rate of u . For $N = 10, 100,$ and $1,000$ and $u = 300 \text{ Kbps}, 700 \text{ Kbps},$ and 2 Mbps , prepare a chart giving the minimum distribution time for each of the combinations of N and u for both client-server distribution and P2P distribution.

(c) Refer to the following figure where a server is connected to a router by a 100 Mbps link with 50 ms propagation delay. This router is connected to two other routers each over a 50 Mbps link with 200 ms propagation delay. A 1 Gbps link connects a host and a cache to each of these routers, these links have

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0 propagation delay. All packets are 20,000 bits long.



- (i) What is the end-to-end delay from when a packet is transmitted by the server to when it is received by the client ? Assume there are no caches, ignore processing and queuing delays.
- (ii) Assume one single active client but caches are on and behave like HTTP caches. A client's HTTP GET is first directed to its local cache. 65% of the request can be satisfied by the local cache. What is the average rate at which each client can receive data ?

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

- (a) What are the main tasks of DNS ?
- (b) Consider a new peer Oggy that joins Bit Torrent without possessing any chunks. Without any chunks, he cannot become a top-four uploader for any of the other peers, since he has nothing to upload. How then will Oggy get his first chunk ?
- (c) Assume that a client wants to retrieve www.yahoo.com but has no information about the web server's IP address. Describe the process of the client obtaining the IP address under the assumption that it is not cached at the local DNS server and the local DNS server has not cached an entry for the .com DNS server (Describe for the recursive case).

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

OBJECT ORIENTED ANALYSIS AND DESIGN

Time : 1 : 30 Hours

Maximum Marks : 50

- Note : (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False : ($1 \times 5 = 5$ Marks)
 - (a) An represents a relationship between two classes.
 - (b) The fact that the same operation may apply to two or more classes is called
 - (c) When the whole is deleted, parts in aggregation are also removed. (True/False)
 - (d) Knowing UML means one can handle object-oriented analysis and design. (True/False)

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- (e) Structure diagrams do not emphasize the things that must be present in the system being modeled. (True/False)
2. Attempt any five parts : (3×5=15 Marks)
(Define/Short Numerical/Short Programming/ Draw)
- (a) Write a short note on "Object-Oriented Modeling Techniques".
 - (b) Draw Use case diagram for Online Shopping.
 - (c) Draw Sequence diagram for Railway Reservation System.
 - (d) Compare Object Oriented Analysis and Design (OOAD) and Structured Systems Analysis and Design (SSAD) with example.
 - (e) Define the terms encapsulation, inheritance and polymorphism.
 - (f) Draw the activity diagram for ATM machine for withdrawing cash.

Section—B

3. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) Write a short note on Booch Methodology and Jacobson Methodology.

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- (b) Draw a sequence diagram for telephone call.
 - (c) What is UML ? What are the building blocks of UML ?
4. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) Write the difference between sequence diagram and collaboration diagram with suitable example.
 - (b) Draw a UML Class Diagram representing the following elements from the problem domain for a hockey league. A hockey league is made up of at least four hockey teams. Each hockey team is composed of six to twelve players, and one player captains the team. A team has a name and a record. Players have a number and a position. Hockey teams play games against each other. Each game has a score and a location. Teams are sometimes lead by a coach. A coach has a level of accreditation and a number of years of experience, and can coach multiple teams. Coaches and players are people, and people have names and addresses. Draw a class diagram for this information, and be

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sure to label all associations with appropriate multiplicities.

- (c) Draw an appropriate Use case diagram for student registration system of your university. Identify objects with their attributes and functionalities before making the Use case diagram. Only teachers and administrator can access such system.
5. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$

(a) What are some of the form of associations ? Draw their UML representations.

(b) Draw the sequence diagram for all possible actions performed a user in online cloud storage system, explained below :

A user can perform the uploading and downloading file from the cloud server. Cloud server is located on Amazon cloud which is accessed via high speed internet. This is very useful application to store the data on cloud. In order to access the application, user has to register himself/herself with the cloud service provider. A

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cloud administrator has authority to register and authenticate users for accessing the application. Both user/admin. can login for uploading/downloading a file from cloud server. Both can also view and update his/her profile and can view their files. They can delete files for the cloud storage which are no longer in use. In addition, an administrator can view the user profile of all users and can also delete a user profile. After completing all operations, user/admin. has to logout from application.

(c) Draw the Use case diagram and Class diagram for the online cloud storage system explained above in Q 5(b).

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(a) (b) (c) (d) (e) (f) (g) (h) (i) (j)
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B. TECH. (CS-BDA)
(SIXTH SEMESTER)

MID SEMESTER EXAMINATION, 2019

BIG DATA STORAGE AND PROCESSING

Time : 1 : 30 Hours

Maximum Marks : 50

- Note :** (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. Write True/False : (1×5=5 Marks)
 - (a) Hadoop follows default replication factor “4”.
 - (b) Each file is stored in HDFS as block.
 - (c) The default block size is 128 MB in Hadoop 2.x.
 - (d) Data Node receives heartbeat and block reports from all the Name nodes.
 - (e) HDFS uses Master/Slave architecture.

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2. Attempt any *five* parts : $(3 \times 5 = 15 \text{ Marks})$
(Define/Short Numerical/Short Programming/
Draw)
- Draw the HDFS architecture.
 - Importance of box classes in Hadoop
Framework.
 - What is YARN ?
 - Main components of HDFS.
 - Write a short note on commodity
hardware.
 - Write a short note on Node Manager.

Section—B

3. Attempt any *two* parts of choice from (a), (b)
and (c). $(5 \times 2 = 10 \text{ Marks})$
- Tell us how big data and Hadoop are
related to each other.
 - Explain the different file input formats for
Hadoop.
 - What are the differences between Hadoop
2 and Hadoop 3 ?
4. Attempt any *two* parts of choice from (a), (b)
and (c). $(5 \times 2 = 10 \text{ Marks})$
- Explain the characteristics of Big Data in
terms of five “V”.

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- Do you prefer good data or good models ?
Why ?
 - How is combiner important in MapReduce
program ? Write a Java code to implement
a combiner.
5. Attempt any *two* parts of choice from (a), (b)
and (c). $(5 \times 2 = 10 \text{ Marks})$
- What is reducer ? Explain the difference
between combiner and reducer.
 - What are the three running modes of
Hadoop ?
 - Write a MapReduce code for
“WordCount”.

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TCS-693

**B. TECH. (CS/IT) (SIXTH SEMESTER)
MID SEMESTER EXAMINATION, 2019**

FULL STACK WEB DEVELOPMENT

Time : 1:30 Hours

Maximum Marks : 50

- Note :** (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False : ($1 \times 5 = 5$ Marks)
 - (a) The closing HTML tag is indicated by the character.
 - (b) The tag used for comments in HTML.
 - (c) CSS can be used inline and internal at same time. (True/False)
 - (d) HTML is case sensitive. (True/False)
 - (e) Java script is server side scripting language. (True/False)

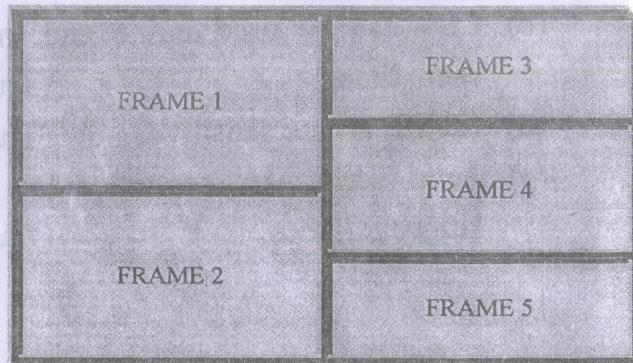
(2)

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2. Attempt any *five* parts : (3×5=15 Marks)
(Define/Short Numerical/Short Programming/
Draw)
- What is Favicon ? Write the code for adding Favicon.
 - Explain META tags in HTML with sample.
 - What is the difference between form get and form post ?
 - Name three ways to define a color in html ?
 - How we group radio in any form ?
 - What is the difference between submit and button ?

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Write Code for HTML Frameset :



(3)

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- What is selector in CSS ? Can I attach more than one declaration to a selector ? What is cascading order ?
 - Briefly discuss the event handling from form elements and button elements in JavaScript.
4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Write Code for HTML Table :

Time Table					
Hours	Mon	Tue	Wed	Thu	Fri
	Science	Maths	Science	Maths	Arts
	Social	History	English	Social	Sports
	Lunch				
	Science	Maths	Science	Maths	Project
	Social	History	English	Social	

- What does DOM stand for ? Explain the top most objects in the DOM ? Explain the Navigator Object in detail.
- Create a web page which uses prompt() dialog to ask a user for their name, age and mobile no. Display the information they enter on the page formatted as a small table.

5. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$

(a) Write Code for HTML Form :

First Name :

Last Name :

Full Name :

Date of Birth :

Education : Graduation PostGraduation

Gender : Male FeMale

Department :

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- (b) What is CSS ? What is external Style Sheet ? How to link ? And what is inline style ? How to link ?
- (c) How do I get the value of form elements using name and Id ? Explain with suitable example.

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

**IMAGE PROCESSING AND
COMPUTER VISION**

Time : 1 : 30 Hours

Maximum Marks : 50

- Note :** (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False : ($1 \times 5 = 5$ Marks)
 - (a) There are _____ pixels in an image whose size is $300 \times 400 \times 3$.
 - (b) The range of a grayscale image is 0 to 1.
(True/False)
 - (c) Mean filter is the better than Median filter to remove salt and pepper noise.
(True/False)
 - (d) Saliency means uniqueness. (True/False)
 - (e) _____ function in MATLAB provide filters for image enhancement.

(2)

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2. Attempt any five parts : (3×5=15 Marks)
(Define/Short Numerical/Short Programming/
Draw)
- Describe what is sampling and quantization in the digital image formation.
 - Write a MATLAB program to rotate an image 180 degrees clockwise.
 - Write a MATLAB program to create an image of the Japan flag and save it. It has a red coloured disc in the center of the white background.
 - Give the equation for Convolution.
 - Give the list of different filters that are used for edge detection.
 - What is an image complement ? How to compute it ?

Section—B

3. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Explain the different noise models with appropriate figures and equations.

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- Write a MATLAB program to compute the histogram of a grayscale image.
- Apply 3×3 median filter on the image data matrix below :

255	255	254	254
253	34	253	34
253	234	45	33
125	128	129	35

4. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Distinguish between a binary, grayscale and colour image.
 - Write a MATLAB program to convert an 8-bit grayscale image into an equivalent of the 3-bit grayscale image.
 - Describe RGB and HSI colour system.
Give the MATLAB functions for converting from one to another.

5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- Give the 3×3 matrices of Sobel, Prewitt and mean filters.
 - Write a MATLAB program to read a video, reverse it in the time dimension and save it.
 - Write a MATLAB program to sharpen an image through mean filtering.

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B. TECH. (CS-CC)

(SIXTH SEMESTER)

MID SEMESTER EXAMINATION, 2019

DEVOPS ON CLOUD

Time : 1 : 30 Hours

Maximum Marks : 50

- Note :** (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. State True/False : $(1 \times 5 = 5 \text{ Marks})$
 - (a) Agile, best suited when requirement change frequently. $(\text{True}/\text{False})$
 - (b) DevOps best suited when, development and operations need to be agile. $(\text{True}/\text{False})$
 - (c) Git is centralized version control tool. $(\text{True}/\text{False})$

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- (d) Jenkins is used for continuous integration.
(True/False)
- (e) Maven and Gradle is used for testing.
(True/False)
2. Attempt any five parts : $(3 \times 5 = 15 \text{ Marks})$
(Define/Short Numerical/Short Programming/
Draw)
- (a) Differentiate between Git and GitHub.
- (b) Write a short note on SDLC.
- (c) What is Dark Launching ?
- (d) Define scalability and elasticity.
- (e) Life Cycle of DevOps.
- (f) Major Open Source DevOps Tools.

Section—B

3. Attempt any two parts of choice from (a), (b)
and (c). $(5 \times 2 = 10 \text{ Marks})$
- (a) What is version control ? Explain any one
distributed version control tool.
- (b) Explain the evolution of software
development.
- (c) What are the differences between
Waterfall and Agile ?

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4. Attempt any two parts of choice from (a), (b)
and (c). $(5 \times 2 = 10 \text{ Marks})$
- (a) What are the fundamental difference
between DevOps and Agile ?
- (b) Explain the important stages of DevOps.
- (c) Explain some basic git commands.
5. Attempt any two parts of choice from (a), (b)
and (c). $(5 \times 2 = 10 \text{ Marks})$
- (a) What is meant by continuous integration ?
- (b) Explain how can you set up Jenkins job.
- (c) Mention some of the useful plugins in
Jenkins and their role.

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

MACHINE LEARNING—II

Time : 1 : 30 Hours

Maximum Marks : 50

- Note :** (i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. Write True/False : (1×5=5 Marks)
 - (a) Linear regression can be used for classification.
 - (b) There can be only one dependent variable in one regression equation.
 - (c) ANN is a machine learning technique.
 - (d) A neural network is a multilayered model.
 - (e) SVM is a statistical learning technique.

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2. Attempt any *five* parts : $(3 \times 5 = 15 \text{ Marks})$
(Define/Short Numerical/Short Programming/
Draw)
- (a) Distinguish between classification and regression.
 - (b) What are Lagrange Multipliers ?
 - (c) What are support vectors ?
 - (d) Explain the kernel method.
 - (e) Define Loss Function.
 - (f) What is principal component analysis ?

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$
- (a) Describe the perspectives and issues in machine learning.
 - (b) Obtain the equation of the lines of regression from the following data :

X	Y
1	9
2	8
3	10
4	12
5	11
6	13
7	14

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- (c) What is the difference between Linear regression and Logistic regression ?
4. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$
- (a) Differentiate between supervised, unsupervised and reinforcement learning.
 - (b) What are karush-Kuhn-Tucker conditions ?
 - (c) What equations are used for classification in a linear support vector machine ?
5. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$
- (a) Explain the steps required for selecting the right machine learning algorithm.
 - (b) Suppose you are running a factory, producing some sort of widget that requires steel as a raw material. Your costs are predominantly human labour, which is \$20 per hour for your workers and the steel itself, which runs for \$170 per ton.

Suppose your revenue R is loosely modeled by the following equation :

$$R(h, s) = 200 h^{2/3} s^{1/3}$$

h represents hours of labour

s represents tons of steel

If your budget is \$20,000, what is the maximum possible revenue ?

- (c) Explain the relationship between Artificial intelligence, Machine learning and Data mining.

Global minimum value is unique (d)

Local minimum value can be unique (e)

Global minimum value is unique (f)

Local minimum value can be unique (g)

Global minimum value is unique (h)

Local minimum value can be unique (i)

Global minimum value is unique (j)

Local minimum value can be unique (k)

Global minimum value is unique (l)

Local minimum value can be unique (m)

Global minimum value is unique (n)

Local minimum value can be unique (o)

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TIT-607

B. TECH. (IT) (SIXTH SEMESTER)
MID SEMESTER EXAMINATION, 2019

**SOFTWARE VERIFICATION, VALIDATION
AND TESTING**

Time : 1 : 30 Hours

Maximum Marks : 50

- Note :**(i) This question paper contains two Sections.
(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks : (1×5=5 Marks)
 - (a) is also known as functional testing. (White box/Black box)
 - (b) Bug prevention is a goal of software testing. (Short-term/Long-term)
 - (c) An Oracle is the means to judge the of a test.

(Success/Failure/Both)

(2)

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- (d) The domain of possible inputs to the software is too to test.
- (e) "Are we building the right product ?" is (Verification/Validation)
2. Attempt any *five* parts : (3×5=15 Marks)
(Define/Short Numerical/Short Programming/Draw)
- (a) What are the benefits of early testing ?
- (b) What is the Psychology behind testing by an independent team ?
- (c) What is the need for verification ?
- (d) Differentiate between error, bug, fault and failure.
- (e) Give the different types of bug based on criticality.
- (f) What are the types of errors detected by black box testing ?

Section—B

3. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) Explain the general principles of Software testing.

(3)

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- (b) Explain different stages of STLC.
- (c) Differentiate between (any *two*) :
- (i) Effective and Exhaustive testing
 - (ii) Verification and Validation
 - (iii) Structural and Functional testing
4. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) Explain decision table technique for designing test case with suitable example.
- (b) Explain the difference between verification and validation. Explain how these activities play role in V-process model.
- (c) A program reads an integer number with the range [1, 100] and determine whether it is a prime number or not. Design test cases for this program using BVC, robust testing and worst case testing methods of BVA.
5. Attempt any *two* parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) List and explain long-term goals of Software testing.

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- (b) What is Basic path testing ? Determine the cyclomatic complexity in a CFG for an example.
- (c) What is Mutation Testing ? What is the difference between primary and secondary mutant ?

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B. TECH. (IT) (SIXTH SEMESTER)
MID SEMESTER EXAMINATION, 2019

INFORMATION THEORY AND CODING

Time : 1 : 30 Hours

Maximum Marks : 50

Note :(i) This question paper contains two Sections.

(ii) Both Sections are compulsory.

Section—A

1. Fill in the blanks/True-False : (1×5=5 Marks)

- (a) According to Shannon-Hartley Theorem, channel capacity becomes infinite with infinite bandwidth. (True/False)
- (b) _____ technique can be used to increase average information per bit.

(2)

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- (c) New abbreviation of binary digit is represented by _____.
- (d) The relation between entropy and mutual information is _____.
- (e) If emitted message is independent of previous message, we refer such source as a memory less source. (True/False)
2. Attempt any five parts : (3×5=15 Marks)
(Define/Short Numerical/Short Programming/Draw)
- (a) Difference between analog and digital signal.
- (b) Explain mutual information.
- (c) Define modulation.
- (d) Write in brief about error control coding.
- (e) Suppose we have a horse race with eight horses taking part. Assume that the probabilities of winning for the eight horses are $1/2$, $1/4$, $1/8$, $1/16$, $1/64$, $1/64$, $1/64$, $1/64$. Calculate the entropy of horses.
- (f) What is the need of cyclic code ?

(3)

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Section—B

3. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) What is PCM ? Explain all the elements of PCM.
- (b) Describe delta modulation and its features.
- (c) In a binary PCM if '0' occurs with probability $1/4$ and '1' occurs with probability $3/4$.
4. Attempt any two parts of choice from (a), (b) and (c). (5×2=10 Marks)
- (a) What is the need of sub-band coding ?
- (b) Describe information rate. Find information rate of a source emitting 04 messages with probability $1/8$, $3/8$, $1/8$, $3/8$. The signal is sampled with Nyquist rate.
- (c) Explain noisy and noiseless channel with a suitable example.

(4)

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5. Attempt any *two* parts of choice from (a), (b) and (c). $(5 \times 2 = 10 \text{ Marks})$
- (a) Define uncertainty, information and entropy in communication theory. Discuss some properties of entropy.
- (b) Calculate entropy when $P_k = 0$ and when $P_k = 1$.
- (c) Discuss about Huffman Coding with suitable example.

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