

## Statistics for Machine Learning

Time: 3 hours

Assume any missing data suitably  
Answer All Questions

Max. Marks: 70

### PART-A

10X2M=20M

- |   | CO | BTL |
|---|----|-----|
| 1. a. State Bayes theorem.  | 1  | 1   |
| b. Write the assumptions of Binomial distribution.  | 1  | 1   |
| c. Define Central Limit theorem.  | 2  | 1   |
| d. Given below are uniform random numbers in between the interval [0,1]:<br>0.629,0.855,0.287,0.346,0.884,0.058,0.552,0.512. Generate two binomial<br>random numbers for B(4, 0.3). | 2  | 2   |
| e. Define likelihood function.  | 3  | 1   |
| f. Explain the use of F-test and define its test statistic.   | 3  | 2   |
| g. Write the multiple linear regression model for two independent variables<br>and one dependent variable and its normal equations.   | 4  | 2   |
| h. What is odds ratio in logistic regression?   | 4  | 2   |
| i. Write the working principle of k-means clustering.   | 5  | 2   |
| j. Define Mercers kernel.   | 5  | 1   |

### PART-B

5 X 10M = 50M

2. Suppose the weights of 800 male students are normally distributed with mean 140 pounds and standard deviation 10 pounds. Find the number of students whose weights are (i) between 138 and 148 pounds (ii) more than 152 pounds (iii) less than 150 pounds.

OR

3. A random variable X has the following Probability function:

Values of X	0	1	2	3	4	5	6	7
p(x)	0	K	2K	2K	3K	K <sup>2</sup>	2K <sup>2</sup>	7K <sup>2</sup> +K

Determine (i) K (ii) Evaluate  $P(X < 6)$  and  $P(X \geq 5)$  (iii) Mean (iv) Variance.

4. Given are the initial values  $x_0 = 29$ ,  $a=19$ ,  $m=128$ ,  $c=18$  for generating 15 random numbers from Uniform distribution  $U[0,1]$  using Linear Congruential Generation Method. Generate 3 Poisson Random Numbers and 3 Exponential Random Numbers with parameter 2.

OR

- |  |    |   |
|--|----|---|
| 5. a. Differentiate between Lottery method and Middle Square method. | 4M | 2 |
| b. State and prove Chebyshev's inequality.                           | 6M | 2 |

6. In a sample of 1000 persons from town A, 400 are found to be consumers of wheat. In a sample of 800 from town B, 400 are found to be consumers of wheat. Do these data reveal a significant difference between town A and town B, so far as the proportion of wheat consumers is concerned? 10M 3 3

OR

7. Given the following contingency table for hair colour and eye colour. Find the value of Chi-square. Is there any good association between the two? 10M 3 4

he two?

		Hair colour		
Eye colour		Fair	Brown	Black
	Blue	15	5	20
	Grey	20	10	20
	Brown	25	15	20

8. Fit a Multiple Linear Regression of  $X_1$  on  $X_2$  and  $X_3$  to the given data 10M 4 3

$X_1$	11	17	26	28	31	35	41	49	63	69
$X_2$	2	4	6	5	8	7	10	11	13	14
$X_3$	2	3	4	5	6	7	9	10	11	13

OR

9. a Explain the difference between Linear Regression and Logistic Regression Models. 5M 4 3

b Find the odds ratio and also estimate the parameters of logistic regression model at  $X=1$  and  $X=0$ . 5M 4 4

Groups	Deaths	Survivors
Treatment	20	80
Control	40	60

10. Divide the following data into two clusters by Using k means clustering. 10M 5 4

Objects	$X_1$	$X_2$
A	2	3
B	6	1
C	1	2
D	3	0

OR

11. Explain the computational procedure for principal component analysis and also obtain the principal components of the following variance covariance matrix  $\begin{bmatrix} 1 & 2 \\ 2 & 4 \end{bmatrix}$ . 10M 5 4



**Web Services**

Time: 3 hours

Assume any missing data suitably

Answer All Questions

PART-A

Max. Marks: 70

10X2M=20M

		CO	BTL
1	a. What are some of the examples of Web Services?	1	1
	b. What is document envelope?	1	1
	c. List different HTTP response codes.	2	2
	d. What is URI?	2	1
	e. Define read-only resources.	3	1
	f. What are the advantages of RESTfull services?	3	2
	g. What is uniform interface?	4	1
	h. Define service versioning.	4	1
	i. List the uses of UDDI registry.	5	2
	j. What is reliable messaging?	5	1

## PART-B

5 X 10M = 50M

		M	CO	BTL
2	a. Differentiate SOAP and REST Web Services.	5	1	3
	b. Explain Programmable web and it's in habitants.	5	1	3
OR				
3	a. Illustrate the role of Json parsers in handling the data generated by WADL.	5	1	4
	b. Write about the following HTTP libraries. i) Needle. ii) Apache HTTPClient.	5	1	3
4	a. Discuss about amazon S3 web service.	5	2	3
	b. Illustrate the usage of active resource.	5	2	4
OR				
5	a. Elaborate the significance of s3 client and how it helps in access control?	5	2	5
	b. Write short notes on addressability and statelessness.	5	2	3
6	a. Judge how the requirements are converted into read-only resources.	5	3	5
	b. Reframe how the resources can be linked to each other.	5	3	5
OR				
7	a. Compare read-only resource, read-write resource with example.	5	3	4
	b. Write short note on the RESTfull map web service.	5	3	3
8	a. Write the steps to implement social bookmarking web services.	5	4	4
	b. Discuss about designing the different representations in web services.	5	4	3
OR				
9	a. Explain resource oriented architecture with neat diagram.	5	4	3
	b. Describe standard features of HTTP.	5	4	3
10	a. Discuss building blocks of web services.	5	5	4
	b. Appraise hypermedia technologies with examples.	5	5	5
OR				
11	a. Write short notes on WSDL and SOA.	5	5	3
	b. Illustrate the different problems with examples which web services are trying to solve.	5	5	5

**Cloud Computing**

Time: 3 hours

Assume any missing data suitably

Answer All Questions

PART-A

Max. Marks: 70

10 X 2M = 20M

		CO	BTL
1	a. Describe computational grids.	1	2
	b. Explain any three services offered by cloud.	1	1
	c. What are the security challenges in cloud computing?	2	2
	d. What are the different types of virtualizations used in cloud computing?	2	2
	e. Write a short note on SLA Management.	3	2
	f. Describe application controller.	3	2
	g. What is cell storage.	4	1
	h. Explain Amazon EC2 Instance?	4	2
	i. Explain software Vulnerability and Breaches in cloud.	5	2
	j. Write a short note on the current state of the Data Security in the Cloud.	5	3

**PART-B**

5 X 10M = 50M

		M	CO	BTL
2	Explain the Distributed System Models.	10	1	1
	OR			
3	a. What are the design objectives of computer clusters?	5	1	2
	b. Explain system models for distributed and cloud computing.	5	1	2
4	a. Describe three existing cloud applications and their benefits.	5	2	2
	b. Explain the role of workflow management systems in cloud computing.	5	2	2
	OR			
5	Compare and contrast full virtualization and para virtualization.	10	2	3
6	Discuss the stability of a two-level resource allocation architecture in cloud resource management.	10	3	3
	OR			
7	Explain the concept of feedback control based on dynamic thresholds in cloud resource management.	10	3	3
8	Explain the role of firewalls in cloud computing. How do firewalls protect cloud instances and applications from external threats?	10	4	3
	OR			
9	Explain the architecture and key components of the Google File System (GFS). How does GFS differ from traditional file systems?	10	4	3
10	Explain the concept of privacy impact assessment (PIA) and how it can be used to evaluate privacy risks in cloud computing.	10	5	2
	OR			
11	Describe the security risks posed by a management OS	10	5	2

**Internet of Things**

Assume any missing data suitably

Time: 3 hours

Answer All Questions

Max. Marks: 70

**PART-A**

10 X 2M = 20M

		CO	BTL
1	a. Differentiate between sensors and actuators.	1	2
	b. Describe the role of Cloud in IoT.	1	2
	c. What is MQTT?	2	1
	d. Describe features of Bluetooth.	2	1
	e. What do you mean by data acquisition?	3	1
	f. List out Cloud Storage models.	3	2
	g. Describe Data Analytics for IoT.	4	2
	h. Write Common challenges in OT (Operational Technology) Security.	4	2
	i. Define Edge Computing.	5	1
	j. Define Fog Computing.	5	1

**PART-B**

5 X 10M = 50M

		M	CO	BTL
2	a. Explain the generic M2M System Solution with a neat diagram	5	1	2
	b. Summarize the Megatrends, Capabilities and implications of IoT	5	1	3
<b>OR</b>				
3	a. Explain the various emerging IoT applications.	5	1	2
	b. Explain various trend in Information and communication technologies and its impact on IoT.	5	1	3
4	a. Describe Arduino, Raspberry Pi for IoT	5	2	2
	b. Explain the need of communication devices in IoT	5	2	3
<b>OR</b>				
5	a. What is ZigBee protocol? Why it is used in IoT applications	5	2	2
	b. Explain CoAP protocol in IoT	5	2	2
6	a. Discuss Cloud Storage models in IoT	5	3	3
	b. Explain Unstructured data storage on cloud/local server	5	3	3
<b>OR</b>				
7	a. Explain the data acquiring and storage mechanism for IoT	5	3	2
	b. Explain Implementation of Device integration in IoT	5	3	3
8	a. Discuss Big Data Analytical Tools for IoT	5	4	2
	b. Describe Edge Streaming Analytics	5	4	2
<b>OR</b>				
9	a. Explain OT (Operational Technology) security in IoT	5	4	3
	b. Discuss in detail about Streaming Analytics Spatial Analytics	5	4	2
10	a. Need and Reasons for Fog Computing in IoT	5	5	2
	b. Differentiate Fog Computing and Edge Computing	5	5	3
<b>OR</b>				
11	a. Explain Edge Cloud Computing Services for IoT	5	5	2
	b. Explain Characteristics and Applications of Fog Computing	5	5	2



**Information Security**

Assume any missing data suitably

Time: 3 hours

Answer All Questions

PART A

Max. Marks: 70

10 X 2M = 20M

		CO	BTL
1	a. What are the OSI security architecture focuses on security services mechanism and attacks.	1	1
	b. Discuss the responsible of Internet society.	1	2
	c. What is Malware Analysis?	2	1
	d. Compare Viruses and Worm.	2	4
	e. How APK Tool helps for Android Malware analysis.	3	1
	f. What are Birthday Attacks? List two Attacks against one-way Hash function.	3	3
	g. Justify and list the reasons that make the PGP(Pretty Good Privacy) to use widely.	4	3
	h. What are the services of IP security?	4	1
	i. What is Secure Electronic Transaction?	5	1
	j. The protocol used for the management of TCP/IP networks is the Simple Network Management Protocol (SNMP). List the key capabilities of SNMP.	5	3

**PART-B**

5 X 10M = 50M

		M	CO	BTL
2	a. Compare the differences between specific security mechanisms and pervasive security mechanisms.	4	1	4
	b. Illustrate and Explain the Internetwork Security Model	6	1	2
	OR			
3	a. Buffer overflow is a situation that occurs when the amount of data that is placed in the memory is greater than the amount of storage space actually allocated. Demonstrate how buffer overflow will handle for the following situation, Consider a stack that can store 16-byte of buffer variables, if 17th byte is inserted into it then it results in buffer overflow.	5	1	2
	b. Depict the normal flow of security attacks and summarize the four general categories of attack.	5	1	2
4	a. Discuss the goals of Malware Analysis	5	2	3
	b. Explain the Virtual Machines and their usage in malware analysis	5	2	2
	OR			
5	a. Discuss about Hashing and Finding strings in malware analysis.	5	2	3
	b. What happens when you run the malware executable?	5	2	1
6	a. Explain Android architecture and App development cycle with neat sketch.	6	3	2
	b. Explain Message Authentication based on DES.	4	3	2
	OR			

7	a	Discuss Dex2Jar and JD-GUI in Android Malware Analysis.	4	3	3
	b	Explain two types of attacks on hash and MAC.	6	3	2
8	a	Explain SSL architecture and its protocol.	5	4	2
	b	Explain IP security with suitable diagram	5	4	2
		OR			
9	a	Discuss the format of the TLS record with example.	4	4	3
	b	Authentication Header provides authentication and integrity, Identify the fields of authentication header in detail.	6	4	3
10	a	Explain the different types of Intrusion Detection System (IDS) with their advantages and disadvantages.	5	5	2
	b	Illustrate firewall configuration with diagram	5	5	2
		OR			
11	a	Summarize the key features of SET.	5	5	2
	b	Discuss the three types of firewalls	5	5	3