

NMAM INSTITUTE OF TECHNOLOGY, NITTE

(An Autonomous Institution affiliated to VTU, Belagavi)

Third Semester M.C.A. (Credit System) Degree Examinations

Volume 10 Number 11 November - December 2015

14MCA302 – OPERATING SYSTEMS

Duration: 3 Hours

Max. Marks: 100

Note: Answer **Five full questions**, choosing **One full question from each Unit**.

Unit 1

- | UNIT - I | Marks | B/T |
|--|-------|-----|
| a) Give the User perspective and system perspective of an operating system. | 6 | L2 |
| b) What are clustered systems? Explain. | 6 | L2 |
| c) Explain the different operating system services. | 8 | L2 |
|
 | | |
| a) What is Process Control Block? Explain. Describe the various states / a process undergoes with a neat sketch. | 6 | L2 |
| b) Describe any two types of special purpose operating systems. | 6 | L2 |
| c) Explain the different types of system calls. | 8 | L2 |

Unit 11

- b) A round robin scheduling algorithm with a time quantum of 4 milliseconds is used. Following is the set of 3 processes with its own burst time.

<u>Process</u>	<u>Burst Time</u>
P_1	24
P_2	3
P_3	3

Draw a Gantt Chart and Calculate the Average waiting time. Also find the average turnaround time.

- b) Explain Banker's algorithm with an example. 10 L3

a) Consider the following set of processes and its burst time in milliseconds. 10 L2

<u>Process</u>	<u>Burst Time</u>
P_1	6
P_2	8
P_3	7
P_4	3

By using the Shortest Job First Scheduling (SJF) algorithm, draw a Gantt Chart and Calculate Average waiting time. Also find the average waiting time for preemptive SJF.

- b) How can deadlock be prevented? Discuss the methods of deadlock prevention. 10 L2

Unit - III

- | | |
|--|-------|
| <p>a) Describe the basic concepts of Demand Paging. Also discuss the performance of demand paging.</p> <p>b) Explain Contiguous memory allocation and Segmentation with respect to memory management.</p> <p>c) How paging and swapping are handled in memory management? Explain.</p> | 10 L2 |
| | 10 L2 |
| | 10 L2 |

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- b) Let the page reference string be: 7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1. Three frames are allocated for the program in main memory. Determine the number of page faults using
- i) LRU page replacement policy.
 - ii) Optimal Page replacement policy

10 L3

Unit – IV

- a) Explain the differences between Linked Allocation and Indexed Allocation in file system implementation. 10 L2
- b) Describe system mounting and file sharing. 10 L2

- a) Explain the various file attributes and its purpose. 10 L2
- b) Explain the single level, two level and three level directory structure with diagram. 10 L2

Unit – V

- a) What are the different program threats in OS? Explain. 6 L2
- b) Compare Symmetric and Asymmetric Encryptions. 6 L2
- c) Explain Linux File Systems. 8 L2

- a) Describe the different system and network threats in OS. 8 L2
- b) Explain the design principles of Linux system with neat diagram 12 L2

Bloom's Taxonomy, L* Level

NMAM INSTITUTE OF TECHNOLOGY, NITTE

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Third Semester M.C.A. (Credit System) Degree Examinations

November - December 2015

13MCA511 – DATA WAREHOUSING AND DATA MINING

Duration: 3 Hours

Max. Marks: 100

Note: Answer Five full questions choosing One full question from each Unit.

Unit – I

- | | Marks | BT* |
|--|-------|-----|
| a) Define and describe an operational data store. | 05 | L*2 |
| b) Write the issues to be addressed while building an integrated database. | 05 | L3 |
| c) Provide an example to show how data cubes are used. | 10 | L4 |
| a) Develop a data model for Datawarehouse using Star schema for a University where we assume that the number of students is given by four dimensions; degree, year, country and scholarship. | 10 | L5 |
| b) Discuss the concept of Data marting with a relevant example. | 05 | L2 |
| c) With a neat example, explain various operations one can perform on a data cube. | 05 | L3 |

Unit – II

- | | | |
|---|----|----|
| a) Present some of the most important ideas and approaches which are used for data preprocessing. | 10 | L3 |
| b) Analyse the different variations of record data type of data set. | 5 | L4 |
| c) "The properties(operations) of numbers are typically used to describe attributes", Illustrate. | 5 | L4 |
| a) "A graph can sometimes be a convenient and powerful representation for data" Justify. | 05 | L4 |
| b) Compute Hamming distance between two objects that have only binary attributes,
$X=(1,0,1,1)$
$Y=(1,0,0,0)$ | 05 | L3 |
| c) List and discuss the properties of,
i) Euclidean distance measures.
ii) Similarity measures. | 10 | L2 |

Unit – III

- | | | |
|--|----|----|
| a) "If an itemset is frequent then all of its subset must also be frequent", Illustrate. | 10 | L4 |
|--|----|----|

- b) Using following transactions database compute support and confidence for the rules,
 i) { Milk, Eggs } -> { Cola } ii) {Bread, Milk} ->{ Eggs }.

TID	Bread	Milk	Eggs	Cola
1	1	1	1	0
2	1	0	1	0
3	0	1	1	1
4	1	1	0	0
5	1	1	0	1

05 L5

- c) Why Brute-force approach is expensive for mining association rules ?

05 L4

6. a) Give short notes on
i) Association Rule. ii) Item set and Support count

10 L2

- b) Using following dataset that contains ten transactions and five items, construct FP-tree and have a detailed discussion on it:

TID	Items
1	{a,b}
2	{b,c,d}
3	{a,c,d,e}
4	{a,d,e}
5	{a,b,c}
6	{a,b,c,d}
7	{a}
8	{a,b,c}
9	{a,b,d}
10	{b,c,e}

10 L4

Unit – IV

- a) With an example of your choice explain Decision trees. 10 L3

b) Give the structure of confusion matrix for a 2-class problem. 05 L1

c) Write a note on
i) Holdout method. ii) Cross-validation. 05 L2

a) Apply rule based classifier for an example of a vertebrate classification problem to generate classifier model. 10 L5

b) Discuss nearest neighbors classification with an example. 10 L3

Unit - V

- | | | |
|---|----|----|
| a) Write algorithm for k-means clustering and illustrate with example. | 10 | L2 |
| b) Give graph-based definitions of cluster proximity. | 05 | L2 |
| c) Define and discuss Well-Separated and Shared-Property clusters with example. | 05 | L3 |
| a) How does DBSCAN algorithm compute clusters? Explain. | 10 | L3 |
| b) List and discuss different classification oriented measures of cluster validity. | 10 | L2 |

NMAM INSTITUTE OF TECHNOLOGY, NITTE

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Third Semester M.C.A. (Credit System) Degree Examinations
Make up Examinations – January 2016**14MCA302 – OPERATING SYSTEMS**

Duration: 3 Hours

Max. Marks: 100

*Note: Answer Five full questions choosing One full question from each Unit.***Unit – I**

- | | | |
|---|-------|-----|
| 1. a) Describe the abstract view of the components of the Computer System. | Marks | BT* |
| b) List the various Operating system services. | 6 | L2 |
| c) With a neat sketch describe the various states a process undergoes. | 9 | L1 |
| 2. a) What are system calls? Explain? | 5 | L2 |
| b) Explain different types of schedulers in the operating system. | 6 | L2 |
| c) Explain process creation. Write a 'c' code to illustrate process creation. | 8 | L3 |
| | 6 | L4 |

Unit – II

- | | | |
|---|----|----|
| 3. a) With neat sketches describe the various Multithreading models. List the benefits of threading. | 10 | L4 |
| b) Assume you have the following jobs to execute with one processor, Consider the set of Processes, Priorities, CPU burst time as given in the following table. | | |

Process	Burst time	Priority
p1	6	4
p2	5	2
p3	3	6
p4	5	3

Draw a Gantt chart and calculate average waiting time and turnaround time of each process, Using FCFS, SJF, Priority and RR scheduling algorithms.
Assume Time quantum= 1.

10 L6

- | | | |
|--|---|----|
| a) Describe the dining philosophers problem. | 6 | L1 |
| b) Explain the Necessary Conditions for Deadlock to occur. | 4 | L4 |
| c) Consider the following Snapshot of the system | | |

	Allocation	Max	Available
	ABCD	ABCD	ABCD
P0	0012	0012	1520
P1	1000	1750	
P2	1354	2356	
P3	0632	0652	
P4	0014	0656	

Answer the following questions using Bankers Algorithm

- | | | |
|---|----|----|
| i) What is the content of Need Matrix? | 10 | L6 |
| ii) Is the system in Safe state? | | |
| iii) If request from P1 arrives for (0 4 2 0) can request be granted immediately? | | |

Unit – III

- | | | |
|---|----|----|
| a) Distinguish between Internal and external fragmentation. How compaction can solve the problem associated with external fragmentation. | 10 | L2 |
| b) Consider the following page reference page string
2,3,2,1,5,2,4,5,3,2,5,2
How many page faults would occur for the following replacement algorithms assuming 3 and 4 frames? Remember that all frames are initially empty, so your first unique pages will cost one page fault each. | | |
| i) LRU Replacement ii) FIFO replacement iii) Optimal Replacement | 10 | L6 |

P.T.O.

14MCA302

Make up – January 2016

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|----|--|----|----|
| 6. | a) Describe Thrashing . | 5 | L2 |
| | b) Discuss the solution to Dynamic Storage allocation Problem. | 5 | L2 |
| | c) Explain segmentation scheme in memory management. | 10 | L1 |

Unit – IV

- | | | | |
|----|---|----|----|
| 7. | a) Describe Tree structure directories and Two level directory structures. | 10 | L2 |
| | b) List the different File Access methods | 5 | L1 |
| | c) Explain the Linked method of Allocation of disk space. | 5 | L1 |
| 8. | a) Suppose a disk drive has 200 cylinders numbered 0 to 199 .the queue of pending request in FIFO order is 88, 183, 137, 122, 147, 124, 65, 167. Starting from 25 head position, what is the total distance the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms?
i)FCFS ii)SSTF iii)SCAN iv)C-SCAN | 12 | L6 |
| | b) Define the Protection principle incorporated in File System | 4 | L1 |
| | c) Explain Access matrix with domain as objects. | 4 | L5 |

Unit – V

- | | | | |
|-----|---|----|----|
| 9. | a) Give the definition of intrusion detection and Explain the audit-trail processing method of intrusion detection. | 6 | L1 |
| | b) Describe the following program threats.
i)Trojan horse ii)Trap Door iii)Stack and Buffer Overflow. | 6 | L2 |
| | c) Describe the following threats.
i)worms ii)viruses | 8 | L2 |
| 10. | a) Discuss the Virtual File system and Linuxext2fs file systems. | 10 | L4 |
| | b) Describe the components of a Linux system. | 5 | L2 |
| | c) Describe the Interprocess communication in Linux system. | 5 | L2 |

T* Bloom's Taxonomy, L* Level

NMAM INSTITUTE OF TECHNOLOGY, NITTE

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Fifth Semester M.C.A. (Credit System) Degree Examinations**Make up Examinations – January 2016****13MCA511 – DATA WAREHOUSING AND DATA MINING**

Duration: 3 Hours

Max. Marks: 100

Note: Answer Five full questions choosing One full question from each Unit.**Unit – I**

- | | Marks | BT* |
|--|-------|-----|
| a) Define data warehouse. | 4 | L*2 |
| b) Differentiate between an operational data base and a data warehouse | 6 | L4 |
| c) Explain with a neat diagram, the various OLAP operations that can be performed on the Data cube. | 10 | L2 |
| a) The data warehouse for a UNIVERSITY consists of the following 5 dimensions- STUDENT, COURSE, SUBJECT, SEMESTER, INSTRUCTOR and 2 measures –COUNT and AVG_GRADE (average grade). Draw a STAR schema diagram for the UNIVERSITY warehouse. Assume at least 4 attributes for each dimension. | 10 | L6 |
| b) What OLAP operations are required to extract the average grade of all students studying MCA course in 5th semester | 5 | L5 |
| c) Discuss the concept of Data martting with a relevant example | 5 | L2 |

Unit – II

- | | | |
|--|----|----|
| a) What is the need for data cleaning? Explain the strategies that can be adopted to clean missing and noisy data. | 8 | L3 |
| b) What is Data Mining? Explain with a neat diagram the architecture of the typical Data Mining System. | 12 | L2 |
| a) What are the different types of data sets on which data mining can be performed? | 10 | L2 |
| b) Discuss Euclidean distance measure. | 4 | L2 |
| c) Differentiate between Descriptive and Predictive Data Mining. | 6 | L3 |
| a) Consider the following transaction data set. | | |

TID	1	2	3	4	5
Item	{a, b}	{b,c,d}	{a,c,d,e}	{a,d,e}	{a,b,c}
TID	6	7	8	9	10
Item	{a,b,c,d}	{a}	{a,b,c}	{a,b,d}	{b,c,e}

Construct – FP tree. Show the trees separately after reading each transaction.

- | | | |
|--|----|----|
| b) Explain how associations rules are generated from frequent item sets. | 10 | L5 |
| c) Write a note on Item set & Support count. | 5 | L3 |
| | 5 | L2 |

P.T.O.

6. a) For the following transaction data set, find all frequent item sets for minimum support of 25%.

Transaction Id	I1	I2	I3	I4	I5	I6	I7	I8	I9
T1	1	0	0	0	1	1	0	1	0
T2	0	1	0	1	0	0	0	1	0
T3	0	0	0	1	1	0	1	0	0
T4	0	0	1	0	0	0	0	0	0
T5	0	0	0	0	1	1	1	0	0
T6	0	1	1	1	0	0	0	0	0
T7	0	1	0	0	0	1	1	0	1
T8	0	0	0	0	1	0	0	0	0

10 L5

- b) Explain the frequent pattern growth (FP-growth) algorithm with a suitable example.

10 L3

Unit – IV

7. a) Explain the Hunt's algorithm for classification with an example. 10 L3
 b) Write a short note on decision tree induction. 5 L2
 c) Write the algorithm for k-nearest neighbor classifier. 5 L2
8. a) How Bayesian theorem is used for classification? Explain 10 L3
 b) Explain the techniques used for evaluating performance of classifier. 10 L2

Unit – V

9. a) Consider the following 8 data points with (x,y) representing location.
 A1 (2,10), A2 (2,5) , A3 (8,4), B1 (5,8), B2 (7,5), B3 (6,4), C1 (1,2) & C2 (4,9)
 Cluster the data using the k-means algorithm, into 3 clusters assuming A1, B1 and C1 to be initial cluster centers. 12 L5
- b) Explain the basic Agglomerative hierarchical clustering algorithm with suitable diagrams. 8 L2
10. a) What is a proximity matrix? Given two objects represented by tuples (8,6 2,5,3) and (3,5, 2, 7,9)
 (i) Compute the Euclidean distance between the two objects.
 (ii) Compute the Manhattan distance between the two objects.
 (iii) Compute the Minkowski distance between the two objects using q= 3. 6 L3
- b) Explain the Density based clustering algorithm (DBSCAN). 7 L2
 c) Explain how the quality of clusters can be measured. 7 L4

* Bloom's Taxonomy, L* Level

NMAM INSTITUTE OF TECHNOLOGY, NITTE
(An Autonomous Institution affiliated to VTU, Belagavi)Fourth Semester M.C.A. (Credit System) Degree Examinations
April – May 2016**14MCA401 – ENTERPRISE JAVA**

Duration: 3 Hours

Max. Marks: 100

Note: Answer Five full questions choosing One full question from each Unit.

Unit – I

- | 1. | a) Briefly discuss the API available in Java for TCP/IP network programming with a suitable example. | Marks | BT* |
|----|--|-------------|----------------|
| | b) Describe the role of the stub, skeleton and naming class in RMI. Explain the difference between bind() and rebind(). | 10 | L2 |
| | c) How the datagrams are created and explain the arguments that can be passed to datagram constructor. How is the sender's address, sender's port number and the data extracted from a datagram? | 5 | L2 |
| 2. | a) Write a program to display the contents of a HTML file hosted in a web server.
b) Explain the terms remote interface, remote object, rmic and rmiregistry.
c) Design a distributed computing application with the necessary classes and interfaces to accept student details, calculate the total and percentage and display the details. | 5
6
4 | L2
L4
L2 |
| | | 10 | L4 |

Unit – II

- | | | | |
|----|--|----------|----------|
| 3. | a) Differentiate between heavy weight and light weight components. Are Java swing components heavy weight? Justify. | 4 | L4 |
| | b) Write a code fragment in Java to call a stored procedure. | 6 | L3 |
| | c) An application is required to accept a number and display its factorial. Show with aid of suitable code fragments how you would achieve this in Java Swing | 10 | L3 |
| 4. | a) Describe how you may write a swing code to create a Combo box that gives a selection of food items. On selecting a food item, the item should be displayed in a textbox.
b) Write a Java program that implements a batch process using JDBC. | 10
10 | L3
L3 |

Unit – III

- | | | | |
|----|--|----------|----------|
| 5. | a) Discuss the purpose of Bean Introspection. Write Java code to illustrate Bean introspection. | 10 | L4 |
| | b) Briefly discuss the different types of JavaBean properties. Discuss with suitable examples. | 10 | L2 |
| 6. | a) Design a component with properties and methods to implement employee information.
b) Write a Java program to illustrate the use of bound properties. | 10
10 | L6
L3 |

Unit – IV

- | | | | |
|----|---|-------------|----------------|
| 7. | a) Briefly discuss the advantages of servlets over CGI.
b) When are init(), service(), doGet() and doPost() methods called in a servlet?
c) Explain their syntax.
Explain scriptlets, declarations, directives, expressions in the context of JSP. | 4
8
8 | L2
L2
L2 |
|----|---|-------------|----------------|

P.T.O.

14MCA401

SEE – May – June 2016

8. a) How to create and read a cookie in a servlet? 10 L3
b) Design a web application where employee data is accepted in an HTML form and the payroll is calculated in a JSP page and displayed to the end user. 10 L3

Unit – V

9. a) Differentiate between the different types of Session Beans. Illustrate any one with the help of an example. 10 L4
b) What is the necessity of creating an entity bean? Explain the important components used. 4 L2
c) Briefly discuss profiles and configuration in the context of J2ME. 6 L2
10. a) J2ME defines two configurations - CLDC and CDC. Explain them. 5 L2
b) Briefly discuss MIDlet and its lifecycle. 5 L2
c) Design the necessary classes and interfaces to demonstrate object persistence in EJB. 10 L6

BT* Bloom's Taxonomy, L* Level

NMAM INSTITUTE OF TECHNOLOGY, NITTE
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Fourth Semester M.C.A. (Credit System) Degree Examinations
April – May 2016

14MCA402 – DATA COMMUNICATION AND COMPUTER NETWORKS

Duration: 3 Hours

Max. Marks: 100

Note: Answer Five full questions choosing One full question from each Unit.

	Unit – I	Marks	BT*
1.	a) Describe the design issues present in the layers. b) What are the applications of satellite microwave? c) Explain the characteristics and the different transmission modes of Optical fibers.	6 4 10	L*2 L1 L2
2.	a) Discuss the functions of OSI layers b) What is Noise? Explain the types of noise. c) Given a channel with intended capacity of 20 Mbps, bandwidth of the channel is 3 MHz .Calculate signal to noise ratio in dB.	7 7 6	L2 L2 L4
3.	Unit – II <i>PAM, Delta</i>		
	a) Show that delta modulation is better than PCM. b) Given message 1101011011 and pattern 10011 calculate FCS and check for errors during data transmission using CRC modulo 2 arithmetic. c) Create a Biphase encoding for bit stream 0111001101.	8 8 4	L3 L4 L4
4.	a) Explain Error correction process with block code principle. b) Describe the HDLC frame structure and operations.	10 10	L2 L2
5.	Unit – III		
	a) Discuss what is Fiber Distributed Data Interface and its frame structure. b) Describe the methods used in Broadcast routing with a neat diagram.	10 10	L2 L4
6.	a) Describe the method of Hierarchical routing with an example. b) Explain the Token ring IEEE802.5.	10 10	L4 L4
7.	Unit – IV		
	a) What are the techniques of achieving good quality of service? Explain. b) What is RSVP? c) Explain the IPV6 header structure.	10 4 6	L2 L1 L2
8.	a) What are the policies used at different layers to prevent congestion? Explain. b) Write a note on load shedding in networks. c) Illustrate the tunneling procedure.	10 4 6	L4 L5 L2
9.	Unit – V		
	a) Design the structure of TCP header. b) Explain how remote procedure calls are done using UDP.	10 10	L2 L2
10.	a) Explain Domain Name space and Name Servers. b) Write a note on multiplexing and crash recovery.	10 10	L3 L3

NMAM INSTITUTE OF TECHNOLOGY, NITTE

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Second Semester M.C.A. (Credit System) Degree Examinations

May - June 2016

15MCA205 – PROBABILITY, STATISTICS AND QUEUING

Duration: 3 Hours

Max. Marks: 100

- Note: 1) Answer Five Full questions choosing One full question from each Unit.
 2) Statistical Tables are permitted.

Unit – I**Marks BT***

1. a) A & B are two events with $P(A) = 0.6$, $P(B)=0.3$ and $P(A \cap B) = 0.2$. Find the probability that
 i) A does not occur
 ii) A or B occurs
 iii) neither A nor B occurs 06 L*2
- b) The probability that A hits a target is $\frac{1}{4}$ & probability that B hits the target is $\frac{2}{3}$. Both shoot at the target. Find the probability that at least one of them hit the target. 06 L2
- c) A box contains 10 coins of which 5 are two headed, 3 coins are two tailed, and 2 are normal. A coin is chosen at random and tossed.
 i) Find the probability that head turns up
 ii) If head turns up find the probability that it is normal coin 06 LS
2. a) Of 10 girls in a class, 3 have blue eyes. Two of the girls are chosen at random. Find the probability that
 i. Both have blue eyes
 ii. Neither has blue eyes.
 iii. At least one has blue eye
 iv. Exactly one has blue eye 06 L2
- b) A pair of dice is rolled. If the two numbers appearing are different, find the probability that
 i. sum is 6
 ii. the sum is 4 or less 06 L2
3. a) A city is partitioned into districts A,B,C having 20%, 40% and 40% of the registered voters respectively. The registered voters listed as Democrats are 50% in A, 25% in B and 75% in C. A registered voter is chosen at random. Find the probability that
 i) The voter is a listed Democrat
 ii) If the voter is listed Democrat find the probability that voter is from district B. 08 LS

Unit – II**04 L1**

3. a) What are the merits and demerits of mean?
 b) Prepare a frequency table for the following data with width of each interval as 10. Use exclusive method of classification.
- | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 57, | 44, | 80, | 75, | 00, | 18, | 45, | 14, | 04, | 64, | 72, |
| 51, | 69, | 34, | 22, | 83, | 70, | 20, | 57, | 28, | 96, | 56, |
| 60, | 47, | 10, | 34, | 61, | 66, | 80, | 46, | 22, | 10, | 84, |
| 50, | 47, | 73, | 42, | 33, | 48, | 65, | 10, | 34, | 66, | 53, |
| 75, | 90, | 58, | 46, | 38, | 69 | | | | | |
- 08 L2

c)	Calculate the median for the following frequency distribution.	08	L3
	Marks 45-50 40-45 35-40 30-35 25-30 20-25 15-20 10-15 5-10 No. of students 10 15 26 30 42 31 24 15 7		

- a) Classify the following data by taking class interval such that their mid values are 17, 22, 27, 32 and so on.

30	42	30	54	40	48	15	17	51	42	25	41
30	27	42	36	28	26	37	54	44	31	36	40
16	22	30	31	19	48	16	42	32	21	22	46
33	41	21									

- b) Find the mode of the distribution

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
No. of students	3	5	7	10	12	15	12	6	2	8

- c) What are the merits and demerits of median?

Unit - III

5. a) A coin is such that head appears twice as likely as tail. This coin is tossed 3 times. Find the probability distribution of heads.
b) A fair coin is tossed twice.

Define $X = \begin{cases} 1 & \text{if first toss is H} \\ 0 & \text{otherwise} \end{cases}$

$$Y = \begin{cases} 1 & \text{if both tosses are H} \\ 0 & \text{otherwise} \end{cases}$$

Find joint probability distribution.

- c) Find correlation coefficient between X and Y

$\backslash Y$	-4	2	7
X			
1	1/8	1/4	1/8
5	1/4	1/8	1/8

6. a) A player tossed two coins. He gets \$2 if 2 heads occur & \$1 if 1 head occurs. He loses \$3 if no head occurs. Find the expected value of the game.
b) A pair of dice is rolled. X denoted the minimum of two numbers. Find the distribution of X and expectation of X.
c) Two dimensional random variable (X, Y) has joint pdf $f(X, Y) = X+Y$, $0 \leq X \leq 1$, $0 \leq Y \leq 1$ find the correlation coefficient between X and Y.

06 L3

08 L3

06 L3

08 L2

Unit - IV

7. a) A die is tossed 300 times. Find the expectation and variance of the number of 2's.
b) Suppose that the student IQ scores are normally distributed with mean $\mu = 100$ S.D. $\sigma = 20$. Find the % of students whose IQ is i) between 80 and 120 ii) Over 160
c) The average lifetime of a light bulb is 3000 hours with a standard deviation of 696 hours. A simple random sample of 36 bulbs is taken. i) What are the expected value and standard deviation? ii) What is the probability that the average life time in the sample will be between 2670.56 and 2809.76 hours? iii) What is the probability that the average life time in the sample will be equal to or greater than 3219.24 hours?

06 L2

06 L2

08 L2

15MCA205

SEE – May – June 2016

- a) Among 10,000 random digits find the probability that digit 3 appears.
- between 975 and 1024 times
 - at most 950 times
- b) X is a binomially distributed random variable. If $E(X) = 2$ & $V(X) = (4/3)$. Find n & p .
- c) MNM Corporation gives each of its employees an aptitude test. The scores on the test are normally distributed with a mean of 75 and a standard deviation of 15. A simple random sample of 25 is taken from a population of 500.
- What is the probability that the average aptitude test score in the sample will be between 70.14 and 82.14?
 - What is the probability that the average aptitude test score in the sample will be equal to or greater than 82.68?
 - Find a value, C , such that $P(\bar{X} \geq C) = .015$.
- 08 L2
06 L1
08 L3

Unit – V

- a) A man either takes a bus or drives his car to work each day. Suppose he never takes the bus 2 days. But if he drives to work then next day he is just likely to drive again as he is to take a bus. Find the stationary distribution of the Markov process.
- b) People arrive at cinema ticket booth according to Poisson distribution at a rate of 25 per hour. The service time is exponentially distributed with an average time of 2 per minute. Calculate the mean number in the queue, the mean waiting time, the mean number in the system and utilization factor.
- c) A psychologist makes the following assumptions on the behavior of mice. For any particular trial 80% of the mice that went right on a previous experiment will go right on this trial and 60% of those mice that went left on previous experiment will go right on this trial. If 50% of mice went right on this trial
- Find the prediction of the psychologist for the next two trials.
 - When will the process stabilize?
- b) In a municipality hospital patients arrival are considered to be Poisson with an arrival interval time of 10mins. The doctors (examination and dispensing) time may be assumed to be exponentially distributed with an average of 6mins find :
- What is the chance that a new patient directly sees the doctor?
 - For what proportion of the time the doctor is busy?
 - What is the average number of patients in the system?
 - What is the average waiting time of the system?
- 10 L4
10 L4
10 L4
10 L4

NMAM INSTITUTE OF TECHNOLOGY, NITTE
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Second Semester M.C.A. (Credit System) Degree Examinations
Make up / Supplementary Examinations - July 2016
15MCA205 – PROBABILITY, STATISTICS AND QUEUING

Time: 3 Hours

Note: 1) Answer Five full questions choosing One full question from each Unit.
 2) Use of Statistical Tables is permitted.

Max. Marks: 100

Unit – I

- | | Marks | BT* |
|---|-------|-----|
| a) With examples, explain Sample Space Event and probability of an Event. | 3 | L*1 |
| b) A fair die is thrown twice. Find the probability that (i) even numbers occur on both throws, (ii) an even number occurs in at least one throw. | 5 | L2 |
| c) Three balls are drawn successively from the box containing 6 red balls, 4 white balls, and 5 blue balls. Find the probability that they are drawn in the order red, white, and blue if each ball is (i) replaced, (ii) not replaced. | 6 | L3 |
| d) The probabilities that a husband and wife will be alive 20 years from now are given by 0.8 and 0.9, respectively. Find the probability that in 20 years (i) both, (ii) neither, (iii) at least one will be alive. | 6 | L3 |
| a) A message communicated through a channel consists of zeros and ones. Because of noise in the channel, a 1 that is transmitted could be received as a 0 and vice-versa. The probability that a transmitted 1 is received as a 0 is 0.05 and the probability that a transmitted 0 is received as a 1 is 0.1. Find the probability that (i) the message 101 is received as 110, (ii) the message 011 is received as 001, and (iii) the message 110 is received correctly. | 6 | L3 |
| b) In a survey of 120 passengers, an airline found that 48 preferred ice cream with their meals, 78 preferred fruits and 66 preferred coffee. In addition, 36 preferred any given pair of these and 24 passengers preferred them all. If two passengers are selected at random from survey sample of 120, what is the probability that (i) they both preferred only coffee with their meals, (ii) they both preferred exactly two of the three offerings. | 6 | L3 |
| c) Consider drawing five cards from a standard deck of 52 cards. Suppose that Tanya draws five cards, at random, from a standard deck. What is the probability she gets
(a) Three aces and two jacks; (b) three aces and a pair; (c) a full house (that is, three of one kind and a pair)? | 8 | L3 |

Unit – II

- | a) Explain 5 measures of Central tendency that are in common use. | 10 | L1 | | | | | | | | | | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|---|---|---|----|---|---|---|----|----|
| b) Calculate: (i) Quartile deviation (Q.D.), and (ii) Mean Deviation (M.D.) from mean, for the following data: | | | | | | | | | | | | | | | | | | |
| <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; width: 100%;"> <thead> <tr> <th>Marks</th> <th>0-10</th> <th>10-20</th> <th>20-30</th> <th>30-40</th> <th>40-50</th> <th>50-60</th> <th>60-70</th> </tr> </thead> <tbody> <tr> <td>No. of Students</td> <td style="text-align: center;">6</td> <td style="text-align: center;">5</td> <td style="text-align: center;">8</td> <td style="text-align: center;">15</td> <td style="text-align: center;">7</td> <td style="text-align: center;">6</td> <td style="text-align: center;">3</td> </tr> </tbody> </table> | Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | No. of Students | 6 | 5 | 8 | 15 | 7 | 6 | 3 | 10 | L2 |
| Marks | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 | | | | | | | | | | | |
| No. of Students | 6 | 5 | 8 | 15 | 7 | 6 | 3 | | | | | | | | | | | |
| a) For a distribution, the mean is 10, variance is 16, γ_1 is +1 and β_2 is 4. Obtain the first four moments about the origin, i.e., zero. Comment upon the nature of distribution. | 10 | L2 | | | | | | | | | | | | | | | | |
| b) Explain Skewness, absolute measures of Skewness and Prof. Karl Pearson's coefficient of Skewness. | 10 | L1 | | | | | | | | | | | | | | | | |

Unit – III

- | | | |
|---|--------|----|
| a) Suppose that a pair of fair dice is tossed, and let the random variable X denote the sum of the points. Obtain the probability distribution for X. | 5 | L2 |
| b) A random variable X has the density function $f(x) = c/(x^2+1)$, where $-\infty < x < \infty$.
i) Find the value of the constant c. ii) Find the probability that X^2 lies between 1/3 and 1. | | |
| | P.T.O. | |

15MCA205

The joint density function of two continuous random variable X and Y is
 $f(x,y) = \begin{cases} cxy & 0 < x < 4, 1 < y < 5 \\ 0 & \text{otherwise} \end{cases}$

Make up / Supplementary - July 2016

- a) Find the value of the constant c ii) Find $P(1 < X < 2, 2 < Y < 3)$

9 L3

- i) Find $P(X \geq 3, Y \leq 2)$
 iii) Define Mathematical Expectation for discrete and continuous random variable X. Suppose that a game is to be played with a single die assumed fair. In this game a player wins \$20 if a 2 turns up, \$40 if a 4 turns up; loses \$30 if a 6 turns up; while the player neither wins nor loses if any other face turns up. Find the expected sum of money to be won.

6 L2

- b) A continuous random variable X has probability density given by
 $f(x) = \begin{cases} 2e^{-2x} & x > 0 \\ 0 & x \leq 0 \end{cases}$

6 L2

- i) Find (i) $E(X)$, (ii) $E(X^2)$.
 Define variance and standard deviation.

8 L2

- c) Find (i) the variance, (ii) the standard deviation of the sum obtained in tossing a pair of fair dice.

Unit - IV

- a) Find the probability that in five tosses of a fair die, a 3 will appear
 (a) twice, (b) at most once, (c) at least two times.

6 L3

- b) Write the density function of Uniform distribution in the interval $a \leq x \leq b$. Also find mean and variance of Uniform distribution.

6 L2

- c) The mean weight of 500 male students at a certain college is 151 lb and the standard deviation is 15 lb. Assuming that the weights are normally distributed, find how many students weigh (i) between 120 and 155 lb, (b) more than 185 lb.

8 L2

- a) In Sampling theory, what do you mean by population and sample, sampling with and without replacement.

4 L1

- b) A population consists of the five numbers 2, 3, 6, 8, 11. Consider all possible samples of size two which can be drawn with replacement from this population. Find (i) the mean of the population, (ii) the standard deviation of the population, (iii) the mean of the sampling distribution of means, (iv) the standard deviation of the sampling distribution of means, i.e., the standard error of means.

8 L2

- c) Assume that the heights of 3000 male students at a university are normally distributed with mean 68.0 inches and standard deviation 3.0 inches. If 80 samples consisting of 25 students each are obtained, what would be the mean and standard deviation of the resulting sample of mans if sampling were done (i) with replacement, (ii) without replacement?

8 L2

Unit - V

- a) Define Markov process, Markov chain and discrete-parameter Markov chain.

6 L1

- b) Explain how to compute n-Step transition probabilities.

4 L2

- c) In a 24 hour Service station, vehicles arrive at the rate of 20/day on the average. The average service time for a vehicle is 30 minutes. Find

10 L3

- i) Mean queue size ii) Idle time of the server.
 iii) The probability that queue size exceeded 9.

8 L1

- a) Define different states of Markov Chain.

12 L3

- b) Consider a game of ladder climbing. There are 5 levels in the game, level 1 is the lowest and level 5 is the highest. A player starts at the bottom. Each time a fair coin is tossed, the player moves up one rung if head comes up. If tail comes up, the player moves down to the very bottom. Once at the top level, the player moves to the very bottom if a tail turns up.

- i) Find transition probability matrix.
 ii) Find the steady state distribution of the chain.

NMAM INSTITUTE OF TECHNOLOGY, NITTE
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Third Semester M.C.A. (Credit System) Degree Examinations
Supplementary Examinations – July 2016
14MCA302- OPERATING SYSTEMS

Duration: 3 Hours

Note: Answer **Five full** questions choosing **One full** question from each Unit.

Max. Marks: 100

Unit – I

- a) Illustrate the Dual Mode Operation in Operating Systems.
- b) Describe the client-server and peer to peer computing environments.
- c) Explain the Caching mechanism in computer system.
- a) Explain the layered approach design of an operating system with a neat diagram. State its advantages.
- b) Interpret virtual machines concept and list its benefits.
- c) Describe the various methods of Interprocess communication in operating systems.

Marks	BT*
6	L*4
8	L2
6	L1
6	L1
8	L2
6	L2

Unit – II

- a) Discuss the ways of handling signals in multithreaded programs.
- b) Discuss the various metrics used to evaluate the scheduling algorithms.
- c) Assume you have the following jobs to execute with one processor, And consider the set of Processes, Priorities, CPU burst time as given in table

Process	Burst time	Priority
1	10	3
2	1	1
3	2	4
4	4	5
5	8	2

Draw a Gantt chart and calculate average waiting time and turnaround time of each process, Using FCFS, SJF, Priority and RR scheduling algorithms.
(Time quantum=1)

10 L6

- a) What is critical section problem? What are the requirements which are to be satisfied by solution to critical section problem?
- b) Describe the readers-writers problem.
- c) Consider the following Snapshot of the system

6 L1
4 L1

	Allocation	Max	Available
	ABCD	ABCD	ABCD
P0	0012	0012	1520
P1	1000	1750	
P2	1354	2356	
P3	0632	0652	
P4	0014	0656	

Answer the following questions using Banker's Algorithm

- i) What is the content of Need Matrix?
- ii) Is the system in Safe state?
- iii) If request from P1 arrives for (0 4 2 0) can the request be granted immediately?

10 L6

- 5. a) Swapping increases the operating system overhead .Justify.
- b) Explain the concept of paging in memory management.
- c) Describe the Hashed page tables in paging.

P.T.O.

5 L5
8 L2
7 L2

Supplementary - July 2016

14MCA302
Describe the Demand paging concept in virtual memory systems.

5 L1

Define Page fault. Explain the steps taken by an operating system in handling page faults.

5 L2

Consider the following reference string:

1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6

How many page faults would occur for the following replacement algorithms

i)LRU Replacement ii)FIFO Replacement iii)Optimal Replacement

Assuming three and four frames? Remember that all frames are initially empty.

So the unique page will cost one page fault each.

10 L6

Explain the Tree structure directories and acyclic graph directory structures.

10 L5

List and explain the attributes of a file.

5 L1

Describe the Indexed Allocation of disk space.

5 L1

Suppose a disk drive has 200 cylinders numbered 0 to 199. The queue of pending request in FIFO order is 98, 183, 37, 122, 14, 124, 65, 67.

Starting from the head position at 53, what is the total distance the disk arm moves to satisfy all the pending requests for each of the following disk scheduling algorithms?

i)FCFS ii)SSTF iii)SCAN iv)C-SCAN

12 L6

3 L4

Describe the Domain Structure of a system.

5 L4

Explain how protection is achieved using Access Matrix.

Unit – V

List and explain the Security Violation Categories and Security violation methods.

10 L1

Describe the Asymmetric encryption Technique.

10 L2

Describe the components of the Linux System.

10 L2

Describe the Virtual File system and Linux Proc file systems.

10 L

n's Taxonomy, L* Level

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Fourth Semester M.C.A. (Credit System) Degree Examinations
Make up / Supplementary Examinations – July 2016
14MCA401 – ENTERPRISE JAVA

USN []

Time: 3 Hours

Note: Answer Five full questions choosing One full question from each Unit.

Max. Marks: 100

Unit – I

- a) Discuss the factory methods and instance methods used in InetAddress of Java.
- b) Discuss the implementation of UDP protocol in Java.
- c) Explain the different types of TCP/IP sockets in Java.
- d) What is RMI? Explain the steps involved in RMI Java.

Marks	BT*
10	L2
10	L3
10	L2
10	L2

Unit – II

- a) Discuss the various constructors used in Check boxes and Combo boxes of Java Swings.
- b) Explain the steps involved in JDBC process with suitable exception handling blocks.
- c) Explain the following implementation of Java Swings i) Tabbed Panes ii) Scroll Panes.
- d) What is JApplet? Explain.
- e) Discuss the constructors used in Radio Buttons of Java Swings.

10	L2
10	L4
10	L3
5	L2
5	L2

Unit – III

- a) What is Java Beans? Explain the advantages and capabilities of Java Bean Tools.
- b) Explain the steps involved in developing a simple bean with example.
- c) Discuss the purpose of Bean Introspection. Illustrate with suitable example.
- d) What is JAR File? Explain the operations of JAR files.

10	L4
10	L3
10	L4
10	L2
10	L2

Unit – IV

- a) What are Servlets? Discuss the advantages and different stages of life cycle of a servlets.
- b) Explain the various methods defined by HttpServletRequest.
- c) List and explain the various interfaces and classes involved in javax.servlet package.
- d) What is JSP? Discuss the various types of JSP tags.

10	L4
10	L2
10	L2
10	L4
10	L2

Unit – V

- a) Explain the layers of J2ME architecture and also list the attributes of Manifest File.
- b) Describe MIDlet Programming in detail.
- c) Describe MIDlet Programming in detail.
- d) Explain the steps involved in creating an Alert class Dialog Box in High Level Display.
- e) Write a note on i) Screen Class ii) Item Class

10	L2

**Bloom's Taxonomy, L* Level*

NMAM INSTITUTE OF TECHNOLOGY, NITTE
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Fourth Semester M.C.A. (Credit System) Degree Examinations
Make up / Supplementary Examinations – July 2016
14MCA402 – DATA COMMUNICATION AND COMPUTER NETWORKS

Duration: 3 Hours

Note: Answer **Five full questions** choosing **One full question from each Unit.**

Max. Marks: 100

Unit – I

- a) Differentiate between a Service and a Protocol.
- b) What are the functions of a Network Interface card?
- c) What is the difference between a circuit switching and a packet switching network?
- d) What is channel capacity? What are the factors that affect channel capacity?
- e) Explain the characteristics that distinguish optical fibre from a co-axial cable.
- f) List two major advantages and disadvantages of microwave transmission.

Marks	BT*
6	L'2
6	L2

Unit – II

- a) Consider the bit stream 01001110, sketch the wave form for the following encoding.
 - (i) NRZ
 - (ii) bipolar AMI
 - (iii) Manchester and differential manchester
- b) For P=110011 and M=11100011, find the CRC using modulo 2 arithmetic.
- c) Explain the stop and wait method for flow control.
- d) Explain the important phases in circuit switching networks.
- e) Describe the frame structure supported by HDLC.
- f) Is it possible to design an ECC that will correct some double bit errors but not all double bit errors? Why or why not?

6	L3
8	L3
6	L2
8	L2
6	L2

Unit – III

- a) Explain the principle of optimality with respect to routing algorithms.
- b) Explain distance vector routing.
- c) Compare the datagram subnet and virtual circuit subnets.
- d) Explain the configuration of Bridges in LANs.
- e) Explain the implementation of connection oriented service.
- f) Write a note on IEEE 802.3 LAN standard for Ethernet.

6	L2
8	L2
8	L1
6	L2
6	L2

Unit – IV

- a) What is congestion? Explain the congestion prevention policies at various levels.
- b) What is Quality of service? What are the techniques for achieving good QoS?
- c) Write a Short note on tunneling.
- d) Explain IPV 6 header structure.
- e) Explain Jitter Control.
- f) Write a short note on token bucket algorithm.
- g) Explain how the token bucket algorithm differs from leaky bucket algorithm.

8	L2
6	L2
6	L'
6	L
8	L

Unit – V

- a) Discuss the 3-way handshake protocol for connection establishment and connection release.
- b) Write a Short note on
 - (i) UDP protocol
 - (ii) Remote procedure call
- a) Explain the important components of TCP segment.
- b) Write a short note on
 - (i) Domain Name Server
 - (ii) Socket Programming

10

10

10

NMAM INSTITUTE OF TECHNOLOGY, NITTE
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Fifth Semester M.C.A. (Credit System) Degree Examinations
Supplementary Examinations - July 2016
13MCA511 - DATA WAREHOUSING AND DATA MINING

USN

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3 Hours

Note: Answer Five full questions choosing One full question from each Unit.

Max. Marks: 100

- Unit - I**
- a) What is operational Data Store? Explain the ODS design and implementation with a neat diagram. Marks BT*
- b) What are the benefits of implementing a data warehouse? 6 L3
- c) List and describe the characteristics of OLAP systems. 4 L2
- d) What are the steps involved in implementing a data warehouse? 10 L2
- e) Explain the different type of data cube operation with example using appropriate diagram. 10 L2
- Unit - II**
- a) What is Data Mining? Explain the Data Mining tasks in detail. 10 L2
- b) List all the data preprocessing technique used in DM and explain any four. 10 L2
- c) What is Data Mining? Explain the challenges that motivated the development of Data Mining. 10 L4
- d) Explain the different types of attributes used in data mining. 6 L2
- e) Compute the Cosine and Jaccard similarity values for given X & Y vectors:
 $X=(1,1,0,1,0,1)$ and $Y=(1,1,1,0,0,1)$ 4 L3
- Unit - III**
- a) What is frequent itemset generation? Explain the frequent itemset generation using apriori principle. 10 L3
- b) Consider the following transactions Data Set:
- | TID | 1 | 2 | 3 | 4 | 5 |
|------|-----------|---------|-----------|---------|---------|
| ITEM | {a,b} | {b,c,d} | {a,c,d,e} | {a,d,e} | {a,b,c} |
| TID | 6 | 7 | 8 | 9 | 10 |
| ITEM | {a,b,c,d} | {a} | {a,b,c} | {a,b,d} | {b,c,e} |
- Construct FP tree. Show the trees separately after reading each transaction. 10 L5
- Unit - IV**
- a) What is Association Rule? Explain the basic terminology used in association analysis. 10 L2
- b) With a suitable example, illustrate the process of reducing the number of candidate itemsets using apriori principle. 10 L4
- Unit - V**
- a) What is Classification? Explain how Classification technique with a Decision Tree works. 10 L3
- b) Explain the Bayesian Classification algorithm in detail. 10 L2
- a) Define Classification. Explain the classification models with examples. 8 L2
- b) Define Rule-Based classifier. Compare the Rule - Based and Class - Based ordering schemas. 6 L4
- c) Explain the Random Sampling & Holdout methods commonly used to evaluate the performance of a classifier. 6 L2
- a) What is cluster analysis? Explain the various types of clusters. 10 L2
- b) Explain the Basic Agglomerative hierarchical algorithm for clustering. 10 L4
- a) How does K-Means algorithm for compute clusters? 10 L1
- b) Discuss the Supervised measures of Cluster Validity. 10 L1

Bloom's Taxonomy, L* Level
