

MCA 101: Information Technology and It's Application

Unit I

Que. 01. Draw a block diagram to illustrate the basic organization of computer system and explain in brief the functions of the various units.

Que. 02. (a) Explain briefly the developments in computer technology starting from a simple calculating machine to the first computer.

(b) Write down four limitations of computer

Que. 03.

(a) What do you understand by Computer System? Describe the characteristics of Computer system

(b) Write down four characteristic of third generation of computer.

Que. 04.

(a) What do you understand about analog, digital and hybrid computer?

(b) Explain in brief types of software.

Que. 05. Explain the classification of computer on the basis of technology.

Que. 06. Explain the classification of computer on the basis of processing speed and storage capacity.

Que. 07. Explain in brief the different Generation of computers (I to V).

Que. 08. (a) Explain in detail the input unit of the computer.

(b) Describe the features of the keyboard.

Que. 09.

(a) Write short note on any three point and draw input device.

(b) Explain the working of following

(i) Inkjet printer

(ii) Laser printer

Que. 10.

- (a) Explain the memory hierarchy. What do you know about random access and serial access?
- (b) Differentiate between primary memory and secondary memory.

Que. 11.

- (a) Explain how to store data in magnetic tape and optical disk (CD ROM).
- (b) Give full forms of following.
(1) MICR (2) OCR (3) VGA (4) SASD (5) TFT

UNIT II

Que. 12. Explain following networks with example.

- a) LAN
- b) MAN
- c) WAN

Que. 13. Explain various topologies in detail.

Que. 14. Discuss the advantages and disadvantages of networking.

Que. 15. What do you mean by internet? Explain the components of internet.

Que. 16. Explain the client server architecture and peer to peer architecture of network.

Que. 17. Write short note on following

- (a) TCP/IP
- (b) Host and Terminals
- (c) WWW

Que. 18. Explain the following terms in networking

- (a) Hypertext
- (b) URL
- (c) Web browser

Que. 19. What do you know by IP address and how to use to find out the destination host.

Que. 20. What is Domain Name System? How to obtain the IP address by DNS Server explain.

Que. 21. What is an ISP? Explain three tier architecture of internet service provider.

Que. 22. Explain following terms

- (a) Web Search Engine
- (b) Net Surfing
- (c) Internet Services
- (d) Intranet

Que. 23. Explain the directory manipulations commands with example.

Que. 24. Explain following file manipulation commands

- (a) Creating a file
- (b) Deleting
- (c) Coping
- (d) Renaming a file

Que. 25. Explain the major features of Word Processors.

UNIT III

Que.26 Explain the different commands available in File menu of Word.

Que.27 what are the different types of Graph? Write down steps to create a graph.

Que.28 Describe the various options available in the main menu bar of Ms-Word?

Que.29 what is an external and internal commands in MS DOS.

Que. 30 How we create directory, Sub directory, Renaming, Coping and Deleting the directory? Write down the commands with example.

UNIT IV

Que 31. How are charts useful in Excel? Compare any three chart types available in Excel.

Que.32.What is the difference between Animation and Transition? Which view can be used to insert and test the:

1. Animation effects and
2. Transition effects

Que.33.Briefly explain the steps for creating a Power Point presentation and How will you create a table in MS Access?

Que. 34 Describe the Introduction to Electronic Spreadsheets and Applications of Electronic Spreadsheets.

Que .35 Describe the Introduction to MS-PowerPoint and its contents.

Que.36 Reproduce the following data in the Ms-Excel sheet with Center alignment, Bold , Grid line, bold outside border and Perform the Calculation using formula in Ms –Excel sheet.

Name A B Total	(A+B)	% age of A	with the	total	Average of A & B
E	4800	6000			
F	5000	4500			
G	5800	5000			
H	4600	3200			

- a) Create the Excel sheet using Ms-Excel. Reproduce the heading of each of the column as mentioned in the Sample. All the heading should in Bold.
- b) Calculate the total of A and B using the formula in the desired cell.
- c) Calculate the %age of A with the total using the %age formula in the desired cell.
- d) Calculate the average of A and B using the formula in the desired cell.

Que.37 The following are the salaries of five employees

Pay Roll No	Name	Salary Rs.	Part time Rs.	Accounts
1011	Prasanna	10000	900	1800
1012	Anitha	14000	800	1600
1013	Ravi	18000	700	1700
1014	Saritha	15000	600	1600
1015	Mallika	17000	500	1800

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Using Conditional Formatting list out employees who got

- a) Less than Rs. 15000 as salary
- b) More than Rs. 700 as Part time
- c) Between Rs. 1600 and Rs. 1800 as Arrears

Que.38 What are properties of Reports and Sub-reports ? How can Sub-report be linked to Main report in MS-Access ?

Que.39 Give the output of the following commands in MS-Excel :

- MID (“RANU PRIYA”, 3,7) RTRIM (“RAM”)
- LEFT (“TECHNOLOGY”, 2)
- LEFT (“CYBER LAW”, 3)
- LEFT (“ITACT2000”, 3)

Que.40 How can MS-Access import MS-Excel worksheet ?

COMPUTER ORGANIZATION (MCA 102)

UNIT 1

- Q.1 What is Register transfer language? Explain RTL with examples.
- Q.2 Explain timing and control in the reference of RTL.
- Q.3 Write short notes on:
- a) Instruction codes
 - b) Micro-operations
- Q.4 What do you understand by micro-operation? Explain different types of micro-operations.
- Q.5 Draw the block diagram of arithmetic-logical- shift unit of micro-operations.
- Q.6 Explain different types of instructions.
- Q.7 What is interrupts? Explain different types of interrupts in detail.
- Q.8 What is binary adder? Draw the block diagram of 4- bit binary adder.
- Q.9 Explain:
- a) Memory reference instruction
 - b) Register reference instruction
- Q.10 Explain bus architecture of register transfer language.

UNIT-2

- Q.1 Explain control memory in detail.
- Q.2 What is central processing unit? Explain its stack organization in detail.
- Q.3 Describe General Register Organization in detail.
- Q.4 What do you understand by instruction format? Explain all types of instruction format.
- Q.5 Explain addressing modes with examples.

- Q.6 Define the following:
- Microoperation
 - Microinstruction
 - Microprogram
 - Microcode
- Q.7 What is the difference between a microprocessor and a micro-program? Is it possible to design a microprocessor without a micro-program? Are all micro-programmed computers also microprocessors?
- Q.8 Explain the difference between hardwired control and micro programmed control. Is it possible to have a hardwired control associated with a control memory?
- Q.9 Specify the control word that must be applied to the processor to implement the following microoperations.
- $R1 \rightarrow R2+R3$
 - $R4 \rightarrow R4$
 - $R5 \rightarrow R5-1$
 - $R6 \rightarrow \text{shl}R1$
 - $R7 \rightarrow \text{input}$
- Q.10 Explain micro program sequencer in detail.

UNIT-3

- Q.1 What do you understand by pipeline? Explain with example.
- Q.2 In certain scientific computations it is necessary to perform the arithmetic operation $(A_i + B_i)(C_i + D_i)$ with a stream of numbers. Specify a pipeline configuration to carry out this task. List the contents of all registers in the pipeline for $i= 1$ to 7.
- Q.3 Draw a space-time diagram for a six- segment pipeline showing the time it takes to process eight tasks.
- Q.4 Determine the number of clock cycles that it takes to process 200 tasks in a six segment pipeline.
- Q.5 Differentiate between RISC and CISC.
- Q.6 What is instruction pipelining? Explain its all phases.
- Q.7 Show the step- by- step multiplication process using Booth algorithm, when the following binary numbers are multiplied. Assume 5- bit registers that hold signed numbers. The multiplicand in both cases is +15.
- $(+15)*(+13)$

- b) $(+15)*(-13)$
- Q.8 Why should the sign of the remainder after a division be the same as the sign of the dividend?
- Q.9 Derive an algorithm in flowchart from the adding and subtracting two fixed- point binary numbers when negative numbers in signed- 1's complement representation.
- Q.10 Prove that the multiplication of two n-digit numbers in base r gives a product no more than $2n$ digits in length. Show that this statement implies that no overflow can occur in the multiplication operation.

UNIT- 4

- Q.1 What is the difference between isolated I/O and memory mapped I/O?
What are the advantages and disadvantages of each?
- Q.2 List 4 peripheral devices that produce an acceptable output for a person to understand.
- Q.3 Give at least six status conditions for the setting of individual bits in the status register of an asynchronous communication interface.
- Q.4 How many characters per second can be transmitted over a 1200- baud line in each of the following modes?(Assume a character code of eight bits.)
- a) Synchronous serial transmission.
 - b) Asynchronous serial transmission with two stop bits.
 - c) Asynchronous serial transmission with one stop bit.
- Q.5 What is Direct memory access? Explain with block diagram.
- Q.6 Why does DMA have priority over the CPU when both request a memory transfer?
- Q.7 A DMA controller transfers 16- bit words to memory using cycle stealing. The words are assembled from a device that transmits characters at a rate of 2400 characters per second. The CPU is fetching and executing instructions at an average rate of 1 million instructions per second . By how much will the CPU be slowed down because of the DMA transfer?
- Q.8 Explain modes of transfer.
- Q.9 Describe Input- Output Processor in detail.
- Q.10 Explain:

- a) DMA controller
- b) DMA transfer

UNIT-5

- Q.1 What do you understand by memory Hierarchy? Explain in detail.
- Q.2 A computer uses RAM chips of 1024 * 1 capacity.
- a) How many chips are needed, and how should their address lines be connected to provide a memory capacity of 1024 bytes?
 - b) How many chips are needed to provide a memory capacity of 16K bytes? Explain in words how the chips are to be connected to the address bus.
- Q.3 a) How many 128*8 Ram chips are needed to provide a memory capacity of 2048 bytes?
- b) How many lines of the address bus must be used to access 2048 bytes of memory? How many of these lines will be common to all chips?
- c) How many lines must be decoded for chip select? Specify the size of the decoders.
- Q.4 Obtain the Boolean function for the match logic of one word in an associative memory taking into consideration a tag bit that indicates whether the word is active or inactive.
- Q.5 What additional logic is required to give a no- match result for a word in an associative memory when all key bits are zero?
- Q.6 What is cache memory? And explain:
- a) Associative mapping
 - b) Set- associative mapping
- Q.7 Define:
- a) Locality of reference
 - b) Hit ratio
- Q.8 Explain how to write into cache and cache initialization?
- Q.9 What is virtual memory? How it is different with other memory?
- Q.10 Explain Address space and Memory space in virtual memory.

Programming in C (MCA 103)

UNIT – 1

1. Describe the characteristics of C and explain the types of C constants.
2. Describe the rules for constructing the C variables.
3. Describe the following conditionals with examples-
 - (a) If statement
 - (b) The ? Operator
 - (c) Switch statement
4. Differentiate the while and do-while statements with a simple program.
5. Explain the use of break and continue statements.
6. Explain the single and multi-dimension array?
7. What do you understand by recursion? Write a program in C language in which a function with parameters is use.
8. C is not a specific Language but is a general purpose language. Appreciate the sentence.
9. Write short notes on storage classes in C.
10. Explain in brief-
 - a) Arithmetic operators
 - b) Relational operators
 - c) Logical operators
 - d) Increment and Decrement operators
 - e) Assignment operators

UNIT – 2

11. Differentiate the union and structure. Also describe the Enumerated data types?
12. What do you understand by Type casting? Explain with a C program.
13. Write a short note on –

- (1) Void pointer
- (2) Pointer to array
- (3) Memory allocation functions

14. What is array. Explain the row major and column major representation of arrays. Give address calculation formula for each with example.

15. Explain the singly and doubly link list.

16. Difference between arrays and pointers?

17. What is static memory allocation and dynamic memory allocation?

18. How pointer variables are initialized?

19. Does mentioning the array name gives the base address in all the integers?

20. How can we check whether the contents of two structure variables are same or not?

UNIT – 3

21. How to switch the values of two variables without using third variable?

22. How to reverse a string using a recursive function, with swapping?

23. Write a short note on –

1) perror()

2) errno

3) exit()

24. Describe the Basic String Handling Functions ?

25. Explain the Character and Line Based I/O.

26. Describe the functions of `<math.h>` with brief description.

27. What are the Advantages of using Linux with C.

28. Write a short note on –

1) #define

2) #undef

3) #include

29. What do the functions atoi(), itoa() and gctv()do?

30. How can we read/write structures from/to data files?

UNIT – 4

31. Write short notes following commands of Linux-

1) access,

2) stat,

3) chmod,

32. Write short notes following commands of Linux-

1) chown

2) chdir,

3) cat

33. Write short notes following commands of Linux-

1) grep,

2) touch,

3) rm,

34. Explain the vi editors in Linux.

35. 33. Write short notes following commands of Linux-

1) fork()

2) the exec family

3) wait()

36. Write a simple Thread program in C?

37. Explain all the stages of threads.

38. Bring out the advantages of Linux Operating systems

39. Name different file permissions that can be assigned to a UNIX file?

40. Interpret the meaning of following commands:

\$ chmod 776

\$ chmod u+rw, g-w, o-x

Management Information System (MCA 104)

UNIT-1

Q.1 Define MIS? Explain structure of MIS.

Q.2 Write short note on:

a) Benefits of MIS

b) Limitations of MIS

c) Requirements of MIS

Q.3 Describe the role of MIS in Organization.

Q.4 What is General support system? Explain its role in organization.

Q.5 State any two advantages of MIS in Marketing Management.

Q.6 List application of MIS in Services Sector.

- Q.7 List three areas of application of MIS.
- Q.8 List common threats & measures required for overcoming threats? State four benefits of good MIS?
- Q.9 Explain Business-to-Business organization.
- Q.10 What is role of MIS in Hotel management?

UNIT-2

- Q.1 What is System development life cycle. Explain its all phases.
- Q.2 Write short notes on:
a) DFD
b) Decision Tree
c) Decision Tables
- Q.3 What is Data dictionary? Explain with its Pros and Cons.
- Q.4 What is system designing models? Explain any two models.
- Q.5 Describe different System analysis Tools.
- Q.6 Explain importance of SDLC process in Organizations.
- Q.7 Give importance of MIS in Banking, i.e. its different functions under Account opening utility.
- Q.8 Differentiate between Structured English and Data dictionary.
- Q.9 Explain difference between Decision table and Decision tree.
- Q.10 Why system study required in any organization?

UNIT-3

- Q.1 What do you understand by Information?
- Q.2 Explain Information Quality. And discuss types of information in brief.
- Q.3 What is Data base management system? How it is differ from file system.
- Q.4 Explain managerial overview of Computer hardware & software.
- Q.5 Write short note on:
a) Kinds of system
b) Dimension of Information
- Q.6 What are the applications of information system.
- Q.7 What do you understand by Telecommunication?
- Q.8 Explain different types of DBMS.
- Q.9 Write short note on:
a) Computer hardware
b) Computer Software
- Q.10 What is the role of Information system in MIS?

UNIT-4

- Q.1 Discuss Business application of Information technology.
- Q.2 Differentiate between internet, intranet and extranet.

- Q.3 What is the role of Information system for Business applications.
- Q.4 State components of decision support system and give significance of each?
- Q.5 How many types of decision in organization? Explain in brief.
- Q.6 What is E- commerce? Write its applications.
- Q.7 What is the role of internet in E- commerce?
- Q.8 Explain benefits of E- commerce?
- Q.9 Identify use of Decision Making System.
- Q.10 What is business Strategy? Explain in short the types of strategies.

UNIT-5

- Q.1 Which are phases of Customer Relationship Management with blocks?
- Q.2 Explain main challenges forced by CRM.
- Q.3 Enlist benefits of Enterprise Resource Planning in an organization?
- Q.4 Explain Business-to-Business organization.
- Q.5 Write short note on:
- Procurement management system
 - Customer Relationship management
- Q.6 Explain IS security and Ethical responsibility.
- Q.7 Describe Supply chain management with an example.
- Q.8 Explain how business planning is different than conventional IT planning?
- Q.9 Explain concept of Data warehousing?
- Q.10 What is corporate planning in MIS?

System Analysis & Design (MCA 105)

Unit-1

- Q 1. What is system?
- Q 2. Write the characteristic of system?
- Q 3. Write the elements of a system?
- Q 4. Difference between physical and abstract system?
- Q 5. Write characteristics of open system?
- Q 6. Explain different types of system?
- Q7. What is an information system & explain types of information system?
- Q8. Explain the role of system analyst.
- Q9. Explain Role and Need of System Analyst.

Q10. Describe various components of business system.

Unit-2

Q1. What is System Development Life Cycle?

Q2. What is the need of SDLC?

Q3. Discuss the different phases of waterfall model.

Q4. What is Feasibility Study?

Q5. What is Analysis?

Q6. What is Post-Implementation?

Q7. What is Maintenance?

Q8. Define types of Software Lifecycle Models.

Q9. Write the requirements for form designing?

Q10. Write the advantages of structured design?

Unit-3

Q1. What is structured analysis?

Q2. Write the tools of structured analysis?

Q3. Explain DFD?

Q4. Define structured design? How it is related to DFD?

Q5. Write the advantages of structured design?

Q6. Write the requirements for form designing?

Q7. Write several categories of form?

Q8. What is decision table?

Q9. What is decision tree?

Q10. What is data dictionary?

Unit-4

Q1. What is data dictionary?

Q2. What is physical design?

Q3. What is logical design?

Q4. What is E-R Model?

Q5. What is the importance of file system?

- Q6. Define various kind of file structure.
- Q7. Describe outline design for input.
- Q8. Describe outline design for output.
- Q9. Write the advantages of structured design?
- Q10. Write the purpose of design methodologies?

Unit-5

- Q1. What is system testing?
- Q2. Write the basic terms in system testing?
- Q3. Describe the various types of system testing?
- Q4. Write the factors by which quality are specified?
- Q5. Write the various levels of quality assurance?
- Q6. Write the steps to create test files?
- Q7. Write the elements of user training?
- Q8. Discuss difference between maintenance and enhancement? What are primary activities of a maintenance Procedure?
- Q9. Discuss maintenance reduction plan phases?
- Q10. Discuss difference between maintenance or enhancement? What are primary activities of a maintenance Procedure?

Communication Skills- Scientific and Technical Writing (MCA106)

UNIT-I

- 1) Define communication. Explain the main objective of communication.
- 2) Discuss the general principles of effective communication.
- 3) Write a detailed note on the importance of communication in modern times.
- 4) Discuss the essentials of good communication.
- 5) Write a short note on Evolution of Communication.
- 6) Explain the characteristics of communication in detail.
- 7) Explain the concept of process of communication. Describe the elements of process of communication in scientific and technical organizations.
- 8) “Downward channel of communication may be the one most commonly used, but it is also

the one most inadequate and unsatisfactory.” Do you agree?

- 9) Upward communication is very useful but very difficult; could you suggest some methods of increasing its effectiveness?
- 10) What do you mean by grape wine? What is its importance?

UNIT-II

- 1) Discuss the communication process in scientific and technical organizations.
- 2) Explain the formal and informal communication taking place in an organization.
- 3) What are the problems faced in regarding communication in large organizations?
- 4) Write a detailed note on various scientific and technical developments.
- 5) What are the various communication networks formed in technical organizations?

UNIT-III

- 1) What do you mean by ‘interview’? Discuss the execution features and purpose of an interview.
- 2) Do you think it is necessary for the interview also to prepare for the interview? What kind of preparation would you recommend for him?
- 3) What is an appraisal interview? What points should the manager keep in mind to make the appraisal interview a constructive exercise?
- 4) How should a candidate prepare for an interview?
- 5) What kind of questions should a candidate be asked during an interview?

UNIT-IV

- 1) What are the Do’s and Don’ts of technical writing?
- 2) What are the barriers of scientific and technical communication? Explain with an example.
- 3) Explain the primary and secondary resources used in technical writing.
- 4) How to evaluate resources for credibility for technical writings?
- 5) Define report. State the main points to be considered in drafting a report.
- 6) Distinguish between special and routine reports. Discuss the briefly principle that should be applied in preparing special reports.
- 7) Explain the characteristics of a good report.

- 8) As the secretary of a company write a report to the Managing Director about a foreign collaboration proposal to be undertaken in India subject to the approval of the Central Government.

UNIT-V

- 1) What are the characteristics of a good press release? Discuss in detail.
- 2) Discuss in detail what points should be kept in mind while writing a press release.
- 3) Discuss in detail the benefits of organizing a press conference.
- 4) What precautions should be taken while conducting a press conference? Discuss in detail.
- 5) Discuss the different types of press releases in detail. Give suitable examples.
- 6) What are the characteristics of a good press release? Discuss in detail.
- 7) Discuss in detail what points should be kept in mind while writing a press release.
- 8) Discuss the characteristics of a good speech. What points should be kept in mind while drafting a speech?
- 9) Discuss the guidelines for preparing speech.
- 10) As the Union Minister, you have been requested to address a batch of computer graduates. Draft a suitable speech.

Subject: Data and File Structures (MCA 201)

UNIT – 1

1. Explain type of data structure and operations which are performed on data structure.
2. Explain the Types of Link list? Describe the singly and doubly link list?
3. How the Algorithms play important role in Data Structure.

4. Explain the time and space complexity and the Asymptotic Notation (Big 'O') of Algorithms?

5. Write Algorithms for conversion of infix expression into postfix conversion.

6. Convert the following expression into postfix

$$A*(B+D)/E-F*(G+H/K)$$

7. Evaluate the following expression which is in postfix

$$12, 7, 3, -, /, 2, 1, 5, +, *, +$$

8. Explain the stack with its operations?

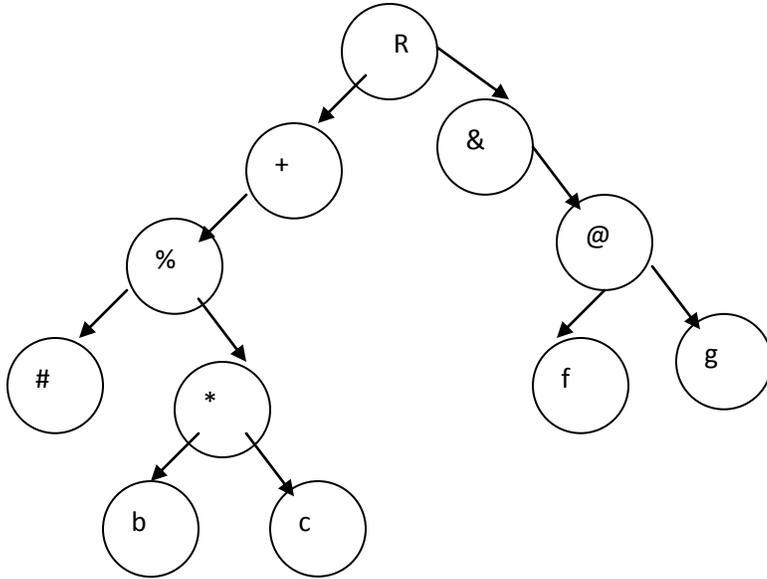
9. Describe the Priority queue with example?

10. Convert the expression $((A + B) * C - (D - E) ^ (F + G))$ to equivalent Prefix and Postfix notations.

UNIT – 2

11. Define the complete binary tree.

12. Find the preorder, post order and in order of the following binary tree



13. Write an algorithm for preorder traversal in binary tree.

14. Explain the Binary search tree.

15. Write an algorithm for find the location of a given item in BST.

16. Differentiate the B tree and B+ tree?

17. Describe the memory allocation in Heaps .and construct the max heap from the array-
10,17,9,65,23,47,44,88,40,12 .

18. Describe the priority queues, threaded binary tree?

19. Explain the multi way trees?

20. What do you understand AVL tree?

UNIT – 3

21. Explain the minimum spanning tree.
22. Write the Prim's algorithm for minimum spanning tree.
23. Write the krushkal's algorithm for minimum spanning tree.
24. Explain the Floyd Warshall's Algorithm.
25. Explain single source path problem with example.
26. Explain the Quick short with algorithms.
27. Explain the bucket short with algorithms.
28. Explain the insertion short, selection short and bubble short with algorithms.
29. Explain hasing and symbol table. Also describe Radix short with example.
30. Write an algorithm for binary search?

UNIT – 4

31. Describe the advantages and disadvantages of sequential file organization?

32. What will happen if you execute following program?

```
#include<stdio.h>

int main(){

    unsigned char c;

    FILE *fp;

    fp=fopen("test.text", "r");

    while((c=fgetc(fp))!=EOF)

        printf("%c",c);

    fclose(fp);

    return 0;

}
```

33. What will be output of following program?

```
#include<stdio.h>

int main(){

    FILE *fp;

    char *str;
```

```
fp=fopen("c:\\tc\\bin\\world.txt", "r");
while(fgets(str,5,fp)!=NULL)
puts(str);
fclose(fp);
return 0;
}
```

34. What will happen if you execute following program?

```
#include<stdio.h>
int main(){
FILE *fp1,*fp2;

fp1=fopen("day.text", "r");
fp2=fopen("night.txt", "r");
fclose(fp1,fp2);
return 0;
}
```

35. Differentiate the double buffering and block buffering?

36. Write a Simple C Program to show how file handling works?

37. What is FILE pointer?

38. What is buffer?

39. How can we know read/write permission any given file?

40. What is difference between file opening mode r+ and w+?

Object oriented Programming using C++ (MCA 202)

UNIT-1

- Q.1 What are the features of Object Oriented Programming?
- Q.2 Distinguish between Procedure Oriented Programming and Object Oriented Programming.
- Q.3 Define Object Oriented Programming (OOP) and List out the basic concepts of Object Oriented Programming.
- Q.4 What is the return type of main ()?
- Q.5 Define token. What are the tokens used in C++?
- Q.6 Define the 2 memory management operators and List out the memory differencing operator.
- Q.7 Define manipulators. What are the manipulators used in C++?
- Q.8 What are the Merits and Demerits of Object Oriented Methodology.
- Q.9 Define manipulators. What are the manipulators used in C++?
- Q.10 Explain the features of object oriented programming with example.

UNIT-2

- Q.1 What are the difference between reference variables and normal variables?
- Q.2 Explain about call-by-reference and return by reference.
- Q.3 What is function overloading? Explain with an example program.
- Q.4 What is friend function? What is the use of using friend functions in c++? Explain with a Program.
- Q.5 What are the advantages of using default arguments? Explain with an example program.
- Q.6 Explain copy constructor and destructor with suitable C++ coding.
- Q.7 What is a virtual destructor? Explain the use of it.
- Q.8 Define an examiner class. Provide all necessary data and function members to provide the following: The examiner must access answer sheets of at least one subject; He may examine answer sheets of multiple subjects; The examiner represents a college and also a university; Most of the examiners are local and represent local university; and have more than one constructor including one default and one with default argument. Provide a meaningful copy constructor
- Q.9 Write a program to demonstrate how a static data is accessed by a static member function.
- Q.10 Write a program to get the student details and print the same using pointers to objects and pointers to members of a class. Create a class student. And use appropriate functions and data members.

UNIT-3

- Q.1 Explain about Unary Operator and Binary Operator Overloading with program.
- Q.2 List out the rules for overloading operators with example.
- Q.3 How will you overload Unary & Binary operator using member functions?
- Q.4 How will you overload Unary and Binary operator using Friend functions?
- Q.5 How an overloaded operator can be invoked using member functions?
- Q.6 What is meant by casting operator and write the general form of overloaded casting operator?
What is the Difference between Overriding vs. overloading.
- Q.8 For a supermarket, define a bill class. All the bill objects will contain bill number, name of clerk preparing the bill, each item with quantity and price and total amount to be paid. Total items in the bill are varying. Define dynamic memory allocation constructor for bill class such that any number of items from 1 to 50 can be accommodated in a single bill. There is an array describing each item with a price. The price is to be picked up from that array. Now overload = operator and provide reason for the need of such operator.
- Q.9 Write a program to create prime number using operator overloading.
- Q.10 Write a program to explain inheritance using example.

UNIT-4

- Q.1 What are the virtual functions? Explain their needs using a suitable example. What are the rules associated with virtual functions?
- Q.2 What are the different forms of inheritance supported in c++? Discuss on the visibility of base class members in privately and publicly inherited classes.
- Q.3 Discuss about Streams and stream classes.
- Q.4 Write notes on Formatted and Unformatted Console I/O Operations.
- Q.5 Explain about File Pointers and Manipulations with example.
- Q.6 Write notes on Formatted and Unformatted Console I/O Operations.
- Q.7 Explain about File Pointers and their manipulations with example.
- Q.8 What is the differences between Manipulators and ios Functions.
- Q.9 Define a student class. Inherit that into MCA Student class and Non MCA Student. MCA Students inherits into GLSStudents and Non GLS Students. A function Show Practical Hours can only be applied to MCA Students. We have a base class Student pointer to a GLS Student object. Use dynamic_cast to check that Non MCA Students do not Show Practical Hours.
- Q.10 Write a program to create virtual functions.

UNIT-5

- Q.1 What is Generic programming? Describe it.
- Q.2 What is Template? Explain the types of template as you know.
- Q.3 What is Exception? Explain the types of Exception handling technique in C++.
- Q.4 What is the difference between Exception & Error? Describe it.
- Q.5 What are the container classes? Explain the concept of STL in generic Programming.
- Q.6 What is Runtime type casting? Explain it with suitable example.
- Q.7 Write a C++ program to handle exception using **try () catch ()** block.
- Q.8 What is Namespace? Write a sample C++ program using namespaces.
- Q.9 Write a program of function template in C++.
- Q.10 Write a program of Class template in C++.

Subject: Operating Systems (MCA203)

UNIT – 1

1. What do you understand by Operating system? Also explain the role of operating system in computer.
2. Write short notes on following:
 - a) Time Sharing Systems
 - b) Main Frame Systems
 - c) Parallel Systems
 - d) Real Time systems
 - e) Dual Mode Operation
3. What are the various services provided by Operating System? Explain in brief.
4. What do you understand by System Calls? Also explain the various types of system calls.
5. What do you understand by process and also write down the process states in detail.
6. What is the role of PCB (Process Control Block)? Also explain each component of PCB.
7. What do you understand by Schedulers? Also explain the various types of it.
8. What do you understand by Inter Process Communication?
9. Why CPU scheduler is needed in Operating system? Also explain the role of dispatcher.
10. What are various criteria to be considered when scheduling is performed?
11. Write Short Note on following Scheduling:
 - a) FCFS(First Come First Serve)
 - b) Preemptive SJF(Shortest Job First)
 - c) Non-Preemptive SJF(Shortest Job First)
 - d) Round Robin
12. Suppose a system having five processes with following information.

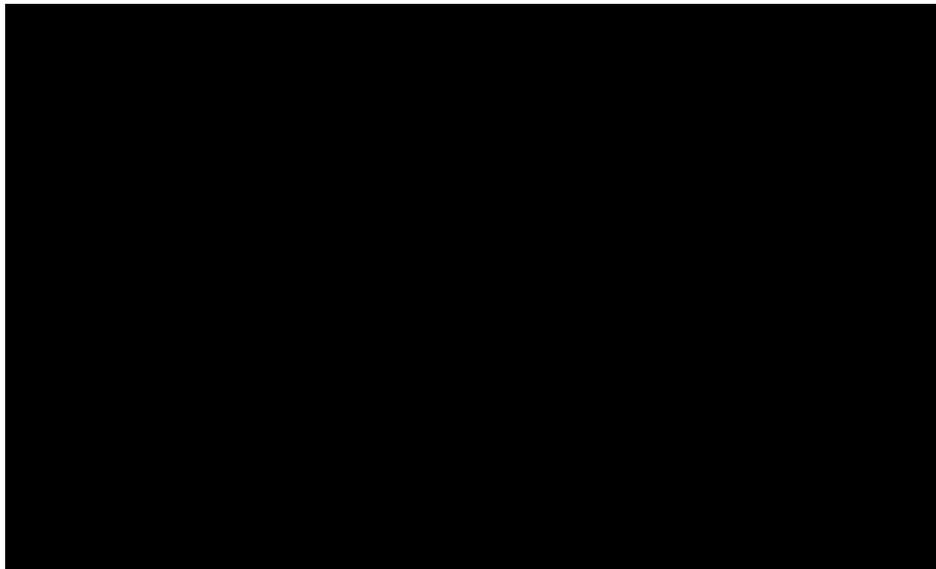
Process Burst	Arrival Time	Burst Time
P1	0.0	8
P2	2.0	2
P3	0.0	1
P4	3.0	4
P5	1.0	3

Calculate Waiting time for each process, Average waiting time and also draw the Gantt chart for scheduling of process of following schemes.

- a) FCFS
 - b) Preemptive SJF
 - c) Non-Preemptive SJF
 - d) Round Robin (quantum=2)
13. Explain the concept of priority scheduling in detail.
14. What do you understand by Multilevel Queue?
15. Explain the concept of Multilevel Feedback queue.

UNIT – 2

16. What do you understand by critical section problem? Explain with suitable example.
17. Explain “Semaphore as a General Synchronization Tool”.
18. Write Short note on following classical problems of synchronization:
- a) Bounded-Buffer Problem
 - b) Readers and Writers Problem
 - c) Dining-Philosophers Problem
19. What do you understand by Dead Lock? Explain the various conditions which may lead to a Deadlock.
20. Explain Resource Allocation Graph in detail. How it can lead to determine a deadlock.
21. How a dead lock can be prevented to enter into the system.
22. What do you understand by dead lock avoidance? Explain Banker’s Algorithms in detail with suitable example.
23. How a systems can be recovered from dead lock.
24. Consider the following system



Use Banker’s Algorithms to check whether this system is in safe state or not. Also state the sequence of process if it is in safe state.

Comment on following request by processes

- a) P1 (1, 0, 2)
- b) P2 (0, 2, 0)
- c) P3 (3, 3, 0)

- 25. What do you understand by Logical Addressing and Physical addressing?
- 26. What do you understand by Swapping? Explain Schematic View of Swapping in detail.
- 27. Write Short Note on following:

- a) Contiguous Allocation scheme : Best Fit, Worst Fit, First Fit
- b) Fragmentation
- c) Paging

- 28. What do you understand by Paging? Explain with suitable example.
- 29. Explain the implementation of paging in detail.
- 30. Explain segmentation in detail.
- 31. What do you understand by Virtual Memory.? How it can be implemented by Demand Paging.
- 32. How a page fault is handled in demand paging.
- 33. What is the need of page replacement?
- 34. Consider the following String

reference string

7 0 1 2 0 3 0 4 2 3 0 3 2 1 2 0 1 7 0 1

Perform the following page replacement algorithms with frame size of four and also compare their page faults.

- a) FIFO (First In First Out)
 - b) Optimal
 - c) LRU (Least Recently Used)
- 35. Write short note on following:
 - a) Thrashing
 - b) Belady's Anomaly
 - c) Segmentation with paging

UNIT – 3

- 36. What do you understand by Device Management? Also explain the functions performed by it.
- 37. How many categories are there in system's peripheral devices? Explain each category in detail.

38. What do you understand by Dedicated Devices? List their pros and cons.
39. What do you understand by Shared Devices? List their pros and cons.
40. What do you understand by Virtual Devices? List their pros and cons.
41. Explain Disk Scheduling with any suitable algorithm.
42. Consider the following sequence
Queue - 98, 183, 37, 122, 14, 124, 65, 67
With Request queue 0-199 and Head Pointer at 53
Perform the Disk Scheduling using FCFS (First Come First Serve) manner and also calculate total head movement.
43. Consider the following sequence
Queue - 98, 183, 37, 122, 14, 124, 65, 67
With Request queue 0-199 and Head Pointer at 53
Perform the Disk Scheduling using SSTF manner and also calculate total head movement.
44. Consider the following sequence
Queue - 98, 183, 37, 122, 14, 124, 65, 67
With Request queue 0-199 and Head Pointer at 53
Perform the Disk Scheduling using SCAN algorithm and also calculate total head movement.
45. Consider the following sequence
Queue - 98, 183, 37, 122, 14, 124, 65, 67
With Request queue 0-199 and Head Pointer at 53
Perform the Disk Scheduling using C-SCAN algorithm and also calculate total head movement.
46. Write a short note on Swap-Space Management.

UNIT – 4

47. Describe File system and their attributes in detail.
48. What are the various operations performed over files?
49. Write short note on File Access Methods.
50. Explain file system structure in detail.
51. What are the various allocation methods in contrast to File System? Also list their pro and cons.
52. How free space management improves the efficiency and performance of the system.
53. What do you mean by attack? Also explain the type of attacks.
54. Write a short note on Cryptography.
55. List the advantages of Linux Operating System.
56. Compare the Linux operating system and windows operating system.

Web Technology (MCA 204)

UNIT-1

- Q.1 What is internet? Explain meaning of term World Wide Web.
- Q.2 What is Website? What are the applications or advantages of a website?
- Q.3 What are differences between HTML & XML?
- Q.4 Specify the tag and attributes used to create a textbox which can accept maximum of 20 characters with a default value "Enter Name".
- Q.5 Write the HTML code to generate a Web Page in the format given below:

Consider the following while writing the HTML code:

1. Background colour of the page should be "Cyan".
2. Text style should be Comic Sans MS and colour should be Red.
3. Picture used in the page is the file "activity.jpg"
4. Table should have a border of color blue.
5. Use the concept of nested lists for creating the list given in the web page with specified bullets.
6. Pages linked to :
 - Indoor Activities as "in.html"
 - Outdoor Activities as "out.html"
7. Bottom message should be of size 2.

- Q.6 What are the differences between HTML & DHTML?
- Q.7 (a) Explain the significance of any two predefined objects of JavaScript.
- (b) Give the output of the following code segment:

```
<BODY>

<SCRIPT LANGUAGE="JavaScript">

var sum = new Array(6);

var Total = 0;

sum[0] = 0;

for(var icount = 1; icount < 4; icount++)

{
```

```
Total += icount;
sum[icount] = Total;
document.write(sum[icount]+"<br>")
}
document.write(Total)
</SCRIPT>
</BODY>
```

- Q.8 Define CSS, What are the advantages of CSS?
- Q.9 Write down the DHTML syntax for bind an image to the data and sort the data.
- Q.10 What is the mean of scripting language? What is difference between server side scripting and client side scripting?

UNIT-2

- Q.1 How data is accessed with ADO.NET? Give the code of connection string to connect with MS access database.
- Q.2 What is the benefit of using Java script code in an HTML document?
- Q.3 What is “Active server page”? Elaborate the difference between ASP & ASP.NET.
- Q.4 What is form? Create a form using HTML code that has following

company name

contact no

- Q.5 Distinguish between ADO and ADO.NET .
- Q.6 Write short note on
- (a) ASP.net validation control with example.
 - (b) Data list
 - (c) Data Grid

- Q.7 Explain the different type of web server control in Asp.net.
- Q.8 What is validation server control? Describe uses of different type of control in asp.net.
- Q.9 What is Theme? Differentiate between CSS and skin file. Give ASP.Net code to define theme and also give code to apply it in webpage.
- Q.10 What is Data set? How it is created? Explain the working with data set.

UNIT-3

- Q.1 Design a Login page for a website in asp.net which contains username text box and password text box and a submit button.
- Q.2 What is Master Page, what are the advantages? Give ASP.Net code to demonstrate the usage of nested master page.
- Q.3 Write short note on
- (a) PostBack
 - (b) Round Trip
 - (c) Page life Time
- Q.4 What are the differences between client side validation and server side validation?
- Q.5 What is Session state? Explain Session Events and Properties with example.
- Q.6 Explain Web.config file in detail with it's structure.
- Q.7 List and explain properties of SessionState element in Web.config file.
- Q.8 How data is encrypted by SSL over network in asp.net page?
- Q.9 How to configure web application of asp.net in windows based authentication?
- Q.10 Describe the different aspects of error handling in asp.net.

UNIT-4

- Q.1 What is XML? Explain the advantages of using XML & Explain XML namespace.
- Q.2 What is Web Services? Steps to create Web Service/Web Service Life Cycle.
- Q.3 Write short note on
- (a) WSDL

- (b) SOAP
- (c) UDDI
- Q.4 (a) Explain foundational elements of Web Services.
(b) List and explain Web Service attributes.
- Q.5 Explain the service oriented architecture in detail.
- Q.6 Write short note on following
 - (a) Grid computing
 - (b) Cloud computing
- Q.7 What is CSS in ASP.NET? Compare CSS with HTML.
- Q.8 Write a code to insert, delete, update, select record from the database using ADO.NET Class method (Connection class, command class, etc.).
- Q.9 What is a Data List control? Explain all its Templates & Styles Members.
- Q.10 Explain the SOAP message structure with its all element.

Software Engineering (MCA 205)

UNIT – 1

1. Explain the software engineering, what do you understand by the term “software”?
Discuss its characteristics and components of software engineering?
2. Discuss the software process and product metrics with the help of examples and explain the SDLC.
3. What are the major phases in the water fall model and spiral model? Where is spiral model beneficial?
4. What is a prototype model? Under what circumstances is it beneficial to construct a prototype model?

5. Describe the Spiral Model of software development with strength, weakness. Define the reasons for using Spiral Model.
6. What is System Development Life Cycle (SDLC)? Explain its Phases.
7. What are the fundamental activities of a software process?
8. Which is more important-the product or process? Justify your answer.
9. What do you understand by Software measurements? Why it is necessary for Software.
10. (a) What is the software engineering? What are the characteristics of the software?
(b) What are the various categories of software?
11. What are the fundamental activities of a software process?
12. What is the role of project manager? Describe the closed system and embedded system?
13. What is feasibility study? What are the contents we should contain in the feasibility report?
14. What are the purposes of Data Flow diagrams, Entity-Relationship diagrams? Give example diagram of each.
15. Write short notes on:-
 - (a) FAST
 - (b) QFD
 - (c) SRS
 - (d) DFD

UNIT – 2

1. Describe the COCOMO Model of Software engineering.
2. How we Estimate cost of a software by Constructive Cost model (COCOMO). Explain all three modes of COCOMO Model with example.
3. Suppose that a system is developed and line of source instructions is 100KLOC. Compute the nominal effort and development time for each of the three development modes i.e. Organic, Semidetached and Embedded.

Note:- Nominal effort means all the 15 Cost driver attribute have nominal values = 1.
And Effort & Time Constant are given:-

Modes	a	b	c	d
Organic	3.2	1.05	2.5	0.38
Semidetached	3.0	1.12	2.5	0.35
Embedded	2.8	1.20	2.5	0.32

4. Explain the Putnam resource allocation model and what are the limitations of this model?
5. What do you mean by Risk Analysis? Explain different steps of Risk Analysis.
6. Why requirement analysis is important in the development of software? Describe analysis principles in details.
7. What is Requirement Analysis? Write Requirement Analysis principles. Also Explain FAST & DFD Techniques for requirement Analysis.
8. What do you understand by SRS? Describe the desirable characteristics of a good SRS document.
9. What is the difference between Function-Oriented Design and Object-Oriented Design?
10. Draw the Data flow diagram for library/banking management system. Clearly describe the working of the system.
11. What do you understand by Coupling? Explain the different types of Coupling?
12. What types of Design Patterns are available for the software Engineering?
13. Draw a translating diagram for analysis model into a software design. Brief about each translations.
14. Define Cohesion and Coupling in the context of design. Also explain different type of Cohesion and Coupling used in modular design.
15. Write short notes on:-
 - (a) Function Oriented Design
 - (b) Object Oriented Design

UNIT – 3

1. Explain the fundamental software measurement concepts in detail.
2. What are the advantages and disadvantages of size measure?
3. Explain about the various design concepts considered during design?
4. Explain data architectural and procedural design for software.
5. What is Reliability? Explain the Importance of Hardware Reliability and Software Reliability?
6. Explain Logarithmic Poisson Model of Reliability.
7. Discuss various key process areas of CMM at various maturity levels and what the shortcomings of ISO 9001 certifications are?
8. Comparison between ISO & SEI CMM and explain the Software crises.
9. What is Software Quality Assurance? What are the measures of software quality?
10. Describe the importance of software reliability.
11. Write short notes on:-
 - (a) Data Structure Metrics
 - (b) Information Flow Metrics.
 - (c) Token Count

UNIT – 4

1. What is Software Testing? Why it is required? Explain different types of testing techniques.
2. Explain Unit Testing and Integration Testing with suitable diagram.
3. What are the attributes of the good test? Explain the test case design.
4. Explain the basis path testing in detail. Explain the Alpha and Beta Testing.
5. Discuss the differences between black box and white box testing.
6. Explain the different integration testing approaches.

7. What are all formulas for cyclomatic complexity? Calculate cyclomatic complexity for all these greatest numbers.
8. What is the difference between testing and debugging? Explain the debugging techniques.
9. Write a short notes on:-
 - (a) Black Box testing.
 - (b) Regression testing.
 - (c) White Box testing
 - (d) Integration testing.
10. What are the maintenance activities to be focused while evolving the system explain.
11. What do you understand by Software maintenance? Discuss the various problems related to maintenance.
12. Explain in details about maintenance techniques and tools.
13. Discuss the concept of software maintenance process.
14. Explain the Reverse Engineering and software re-engineering.
15. What do you understand by Regression testing, functional testing and structural testing?
16. Describe the configuration management and documentation in software maintenance.
17. What are the steps that constitute configuration management?

COMPUTER GRAPHICS (MCA302)

UNIT-I

Que. 01. How random scan is different from raster scan display ? Also explain how we generate a raster image.

Que. 02. Digitize the line from (12, 16) to (1, 24) by using bresenham's line drawing algorithm.

Que. 03. Define the terms Translation and scaling in two dimensional with their matrices.

Que. 04. Explain line drawing DDA method and also give algorithm of it.

Que. 05. Derive the decision parameter to draw line using Bresenham's algorithm.

Que. 06. Derive the decision parameter to draw circle using Bresenham's algorithm (Mid Point).

Que. 07. Consider a rectangle A(30, 10), B(60, 10), C(60, 30), D(30, 30). Work out a transformation to rotate the rectangle about point B by 60° anti clockwise. What will be the new coordinate of point D?

Que. 08. (a) Standard TV has 480 scan lines if the aspect ratio is $\frac{3}{4}$ what is the capacity of frame buffer needed in 2 bits per pixel is used?

(b) Consider a raster system with a resolution of 1024 by 768, what is the size of the raster needed to store 8 bits per pixel?

Que. 09. What are drawbacks of DDA line drawing algorithm? How they are removed or minimized in Bresenham's algorithm?

Que. 10. Find the points lying on the circle centered at (5, 10) and having radius 8 using Bresenham's circle algorithm (Mid Point).

Que. 11. Explain following three dimensional transformations with their matrix.

- (a) Translation
- (b) Scaling
- (c) Rotation
- (d) Reflection

Que. 12. Explain following terms in Raster Scan System: -

- (a) Refreshing
- (b) Flicking
- (c) Interlacing
- (d) Resolution

Que. 13. Why is homogeneous coordinates used for transformation computations in CG?

UNIT-II

Que. 14. Explain Bezier curve with its properties and compare this curve with B-sp-line curve.

Que. 15. One Bezier curve is specified through control points A,B,C,D and the other Bezier curve is specified through P,Q,R,S. What restrictions must be specified on the choice of the points such that the two curves join smoothly?

Que. 16. Explain the first and second order continuities for joining the curves.

Que. 17. Write down the Bezier curve equations and Blending function.

Que. 18. Explain how to design Bezier surfaces.

Que. 19. Give the conditions for smoothly joining curve segments.

Que. 20. Write down short notes on.

- (a) Bernstein Polynomials
- (b) Cubic B-Spline Curve
- (c) Geometrical Construction

UNIT-III

Que. 21. Explain 2-D viewing. Is there any difference between windowing and view port? Answer with justification.

Que. 22. Consider a clipping window A(0,0), B(30,0), C(30,20), D(0,20). Using the outcodes of the end points of the line X(-10,30) – Y(35,8), show that the line is partially visible.

Que. 23. Why line clipping algorithms are not used for clipping a polygon on line to line basis? Explain in detail Sutherland-Hodgeman polygon clipping algorithm.

Que. 24. Using Cohen-Sutherland algorithm find the co-ordinates of the line joining (-1, 2) and (9, 7) which is visible in the rectangle (0, 0), (0, 5) and (10, 5), (10, 0).

Que. 25. Why are homogeneous coordinates needed in transformation matrices? Derive the transformation matrix for rotation about origin by angle in a anticlockwise direction.

Que. 26. What do you mean by projection? Differentiate between parallel and perspective projection.

Que. 27. Derive the expression for perspective projection.

Que. 28. What is perspective projection? What do you mean by vanishing point and perspective fore shortening?

Que. 29. An object is to be rotated about 45° about a c axis passing through origin and point (12, 20, 10). Work out transformation to carry out.

Que. 30. Show that two successive reflections about either of the coordinate's axes is equivalent to a single rotation about the coordinate origin.

Que. 31. Write short notes on

- (a) Solid Modeling-Boundary Representation
- (b) Octrees
- (c) Constructive Solid Geometry

UNIT-IV

Que. 32. Develop the illumination model which takes into account both diffuse reflection as well as specular reflection for an object lying at a distance of D units from a unit light source.

Que. 33. Explain various light sources also discuss the effects of ambient lighting and distance.

Que. 34. Explain following polygon rendering methods.

- (a) Constant Intensity Surface Rendering
- (b) Gouraud Surface Rendering
- (c) Phong Surface Rendering

Que. 35. What is the difference between Gouraud shading and Phong shading? Explain any one rendering method.

Que. 36. Explain the Z-Buffer algo. What are the advantages of using z-buffer algo ?

Que. 37. How to eliminate the hidden surfaces by an object space method?

Que. 38. Explain the depth buffer methods for hidden surface removal. Give the difference between Z-buffer and A-buffer method.

Que. 39. Explain the BSP tree method for visible surface detection.

Que. 40. How to eliminate the hidden surfaces by area subdivision method?

Java Programming (MCA 303)

Unit I

1.

- a) Explain the features of Java Language
- b) Differentiate between class, abstract class and interface with examples.

2.

- a) What are the different components of JDK? Explain.
 - b) Differentiate between String and StringBuffer classes. Also explain three methods of each class with examples.
3. Write short notes on:
- a) Difference between Java and C++.
 - b) Explain the concepts JDK, JRE and JVM.
4. Explain working of Java Virtual Machine (JVM). Also explain how java is architectural neutral.
5. Write a program to implement the inheritance property by using the example of bank, where **Bank** is a base class and **Saving** and **Current** are two classes derived from bank. Member functions like deposit(), withdraw(), and display() should be implemented.
6. Write short notes on:
- a) Wrapper Classes
 - b) Use of 'super' and 'this' in java with example codes
7. You want subclasses in any package to have access to members of a superclass. Which is the most restrictive access modifier that will accomplish this objective? Explain with example.
8. Create a base class called **shape**. Use this class to store two double type values that could be used to compute the area of figures. Derive two specific classes called **triangle** and **rectangle** from the base **shape**. Add to the base class, a member function **get_data()** to initialize base class data members and another member function **display_area()** to compute and display the area of figures. Make **display_area()** as a virtual function and redefine this function in the derived classes to suit their requirements. Using these three classes design a program that will accept dimensions of a triangle or rectangle interactively and display the area.
9. Differentiate between a class, an abstract class and an interface with the help of appropriate codes.
10. Write short notes on:
- a) Multidimensional arrays in Java
 - b) Usage of 'final' keyword in Java

Unit II

1.

- a) Explain the complete life cycle of thread.
 - b) Create a program to implement three child threads making use of *Runnable* interface. Illustrate use of *sleep()* method in the program.
2. Differentiate between the following with appropriate codes:
 - a) throw and throws
 - b) finally and finalize
 3. Explain the concepts – process, multitasking, thread and multithreading.
 4. With suitable examples explain the difference between *yield()* and *join()* methods.
 5. What is an exception? Discuss Exception hierarchy. Also write a detailed note on checked and unchecked Exceptions.
 6. Define an exception called “NoMatchException” that is thrown when a string is not equal to “India”. Write a program that uses this exception.
 7. Write down a detailed note on the usage of *jav.net* package.
 8. Differentiate between Byte and Character stream. Explain the utility of each with five predefined methods used for each stream.
 9. Write down two programs one using Thread class and the other using Runnable interface to implement the concept of multithreading.
 10. Write a program to read 10 integer values provided by the user. Write them into a file named “abc.txt”. From the file “abc.txt”, read the contents and transfer the odd integer values to a new file “final.txt”.

Unit III

1.
 - a) What are the advantages of using JDBC?
 - b) Write a note on Inner Classes.
2. Answer the following:
 - a) What is JDBC? Explain the features of JDBC.
 - b) Explain the various kinds of JDBC drivers.
3. Write short notes on:
 - a) Adapter Classes
 - b) Layout Managers
4. Write down a program using adapter classes to control the working of mouse inside a window frame.
5. Develop an applet which runs a banner with text “Welcome to Jagan Nath University” making use of multithreading.
6. Write short notes on any two:
 - a) Collection framework
 - b) Event Delegation Model
 - c) JDBC two tier and three tier models
7. How is Java applet better than a Java application? Explain the difference and significance of both java application and java applet.
8. Explain by making a program the working of the methods under WindowListener interface.
9. Write a detailed note on the working of Maps and Sets.
10. Write a program using JDBC to access an ODBC compliant database and
 - a) show the records in the standard output device
 - b) demonstrate the use of SQL queries through the program.

Unit IV

1. Draw the inheritance hierarchy for the frame and component classes in AWT and Swing.
2. Explain the process for implementation of RMI connection using java.
3. Describe the features of Java Beans.
4. Write short note on:

- a) Bean Architecture
- b) JDK
5. What are the advantages of using swing over awt? Explain any 5 swing components with examples.
6. Explain the features of AWT and Swings. Give advantages and disadvantages of both.
7. Write short notes on:
 - a) JFC
 - b) RMI architecture
8. Answer the following:
 - a) What is a Serializable class? What is its use in java programming?
 - b) Explain the Remote classes and Interfaces used in RMI.
9. Write a program to implement RMI and as output give the product of two numbers input by the user.
10. What are jar files? What is their utility in Java Beans?

Data Communications and Networking (MCA304)

UNIT – 1

1. What do you understand by Data Communication? Also Explain the Data Communication System and their Components.
2. Explain the OSI (Open System interconnection) reference model and its each layers function in detail.
3. What are the various topologies in Network Systems?
4. What do you understand by guided and unguided transmission Media? Explain with suitable examples.
5. Write Short Notes On Following:
 - a) NRZ
 - b) NRZ-L
 - c) NRZ-I
 - d) Bipolar AMI
6. Write Short Notes On Following:
 - a) Amplitude Shift Key
 - b) Frequency Shift Key
 - c) Phase Shift Key
7. Perform the following encodings

Reference String - 0 1 0 0 1 1 1 0

- a) Unipolar NRZ
 - b) NRZ-L
 - c) NRZ-I
8. Perform the following encodings
Reference String - 0 0 1 0 0 1 1
- a) RZ
 - b) Manchester
 - c) Differential Manchester
9. Write Short Notes On Following
- a) PCM(Pulse Coded Modulation)
 - b) Delta Modulation
10. Write Short Notes On Following
- c) AM(Amplitude Modulation)
 - d) FM(Frequency Modulation)
 - e) PM(Pulse Modulation)

UNIT – 2

11. Write Short Notes On Following
- a) Error Control
 - b) Flow Control
12. Explain Selective Repeat ARQ for noisy channel.
13. Explain sliding window protocol in detail.
14. How a Go-back-N process helps in Flow Control.
15. What do you understand by HDLC? Explain HDLC frames in detail.
16. What do you mean by Random Access Protocol? Explain frames in pure ALOHA Network.
17. Explain the frames concept in Slotted ALOHA.
18. Explain the Space/time model of the collision in CSMA.
19. Write Short Note on following:
- a) Collision free protocols
 - b) Ethernet
20. Write Short Note on following:
- a) Wireless LAN's
 - b) Bluetooth

UNIT – 3

21. What do you understand by IP address? Compare IPv4 with IPv6 in detail.
22. What do you understand by class less and class full addressing?
23. What is the role of ICMP protocol? Explain its message format.
24. How a routing protocol help in choosing a best path. Also explain the RIP protocol in detail.
25. Explain the Distant Vector Routing in detail.
26. Explain Link State Routing in detail.
27. What do you understand by inter-domain routing? Explain BGP routing in detail.
28. Find the class of given IP address
 - a) 00000001 00001011 00001011 11101111
 - b) 11000001 10000011 00011011 11111111
 - c) 14.23.120.8
 - d) 252.5.15.111
29. A block of addresses is granted to a small organization. Suppose the addresses are 205.16.37.39/28. What is the first address in the block?
30. Explain the network layer functions in detail.

UNIT – 4

31. What are the different design issues occurs at transport layer.
32. What do you understand by Process to Process Delivery?
33. Explain UDP (User Data Gram Protocol) in detail.
34. What do you understand by TCP (Transmission Control Protocol)?
35. What is the role of handshaking procedure in transmission control protocol.
36. Explain the TCP segment structure in detail.
37. What are the various performance issues occurs at transport layer?
38. What is the role of DNS in naming resolution?
39. Explain the concept of basic email handling. Also explain MIME in contrast to Emails.
40. Write Short Notes on following
 - a) HTTP
 - b) Cryptography
 - c) Attacks

C # and .Net Programming (MCA 305)

UNIT – 1

1. Explain the characteristics of .NET architecture in detail.

2. Explain multi-file assemblies in detail . How can I produce an assembly?
3. How Dot Net is Platform independent? Explain by Mono / Portable .NET distributions.
4. What is Metadata?
5. Explain type distinction with example.
6. Explain Common Intermediate Language (CIL).
7. What is the role of the Common Type System (CTS) in Dot net architecture?
8. What is the CTS, and how does it relate to the CLS?
9. Explain Common Language Runtime (CLR) in detail.
10. What is Namespace? List out the Namespaces of .NET Framework.

UNIT – 2

1. What is the exception? Describe how exception handling is done in C#. Explain with an example.
2. Define inter-operability. How does .net achieve this?
3. Explain about various value and reference types supported by c#.
4. What is jagged array? Explain its use with simple example.
5. Explain about Enumerators and structures in C#.
6. Explain in detail about various operators available in C#.
7. What are boxing and unboxing. Explain Access modifiers in detail?
8. Describe specialization and generalization.
9. Explain Date Time classes with suitable examples.
10. Explain String in C# programming with properties.

UNIT – 3

1. Explain Anonymous delegates.
2. Describe lambda expression with example.
3. What are indexers? Explain overloading of indexers with suitable example.
4. Explain IEnumerable, IEnumerator, IList, IComparer and their Generic equivalent in C# dot net.
5. How you can build a WPF application? Explain.
6. What is Delta Modulations?
7. Explain the Working with generic List, Stack, Dictionary and Queue.
8. Explain Dot NET framework for handling GUI events.
9. What are Generic collections? Explain with detail.
10. What do you mean by structured error handling?

UNIT – 4

1. Distinguish between ADO and ADO.NET with special reference to objects, data and records.
2. Explain the relation between LINQ and C#.

3. How we can define and execute a Query in LINQ and C#.
4. What are implicitly typed local variables? Explain.
5. What are Anonymous Types? Explain with example.
6. Explain Extension Methods and Lambda Expressions with example in detail.
7. Explain the relation between LINQ to SQL.
8. How you can Update data using LINQ to SQL
9. How you can Retrieve data using LINQ to SQL
10. How you can Delete data using LINQ to SQL

Design Analysis & Algorithm (MCA401)

UNIT-I

1. (a) What is an algorithm? Explain in short characteristic of an algorithm?
 (b) What do you understand by analyzing an algorithm? Explain types of analysis.
2. (a) What do you understand by space and time complexity of an algorithm?
 (b) Calculate the space and time complexity of selection sorting algorithm.
3. What is the importance of notations in the analysis of algorithm? Explain the various notations in brief.
4. Explain Master Theorem for solving recurrence of the form:

$$T(n) = aT(n/b)+f(n)$$

5. Prove the following with proper value of constant C and n_0

- (i) $7n+5 = O(n)$
- (ii) $10n^2+4n+2 = O(n^2)$
- (iii) $10n^2+7 = \Omega(n^2)$
- (iv) $3n+2 = \theta(n)$

6. How do we analyze the time complexity of the algorithm that are based on divide and conquer techniques?
7. Derive the recurrence for time complexity of binary search and solve it.

8. a) What do you understand by Asymptotic Notations? Explain the notation big 'O' , big Theta and big Omega with suitable example.
- b) Explain merge sort with an example.
9. Write an algorithm for searching an element using Binary search method. Give an example.
10. Sort the following set of elements using merge sort
12, 24, 8, 71, 4, 23, 6, 89, 56.

UNIT –II

11. What are the applications of binary search? State advantages & Disadvantages of binary search.
12. Describe matrix chain multiplication problem. Write algorithm for getting optimal paranthesization of matrix chain multiplication. Compute the complexity of this algorithm.
12. Find an optimal solution of a matrix chain multiplication whose sequence of dimension is 5, 10, 3, 12, 5.
14. What is principal of optimality? Explain 0/1 knapsack problem using dynamic programming.
15. Solve the following instance of 0/1 knapsack problem using dynamic programming method. Find out optimal load and included objects. Knapsack Capacity = 5

Item	1	2	3	4
Profit	3	4	5	6
Weight	2	3	4	5

16. (a) Discuss the solution of LCS problem using dynamic programming method.
- (b) Consider two string A = “MOON” and B = “MORN”. Find longest common subsequence.
17. What do you understand by branch and bound techniques?
18. Solve the following instance of Traveling Salesperson (TSP) using branch and bound technique. Given below is the cost matrix.

∞	8	8	11	6
11	∞	4	10	9
10	7	∞	5	5
9	3	4	∞	5
6	9	5	5	∞

19. What is backtracking? Explain with an example.
20. What is lower bound theory? Explain where it is applicable.

UNIT-III

21. What is the basis approach behind solving any problem using Greedy method?
22. How fractional knapsack problem can be solved using Greedy method? Discuss with an example. Also discuss its time complexity.
23. (a) Discuss the Greedy solution for the optimal merge pattern problem.
24. (a) What do you mean by Huffman code?
 (b) Explain single L-Rotation & of the double RL-Rotation with general form.
25. How to obtain Huffman's Code? What are the applications of Huffman trees?
26. For the following files with number of records as shown, draw the optimal merge pattern tree: 4, 3, 5, 8, 11, 13.
27. Write Short note on:
- a. Greedy Algorithms
 - b. Pattern matching techniques.
28. Why we perform amortize analysis? Explain with an example.
29. Explain Accounting method with suitable example.
30. Explain Potential method with suitable example.

UNIT-IV

31. What do you understand by pattern matching? Discuss the algorithm for Naïve string matching. Also discuss its complexity.
32. Search the pattern “nath” in the string “jagannath university” by the Naive string matching algorithm.
33. What is Rabin-Karp string matching algorithm? Discuss the concept behind it. Also give the complexity of it.
34. Find out the pattern P=31415 in the text T=2359023141526739921 by Rabin Karp method.
35. How failure function helps in string matching in KMP matcher. Discuss the complexity of KMP algorithm.
36. What do you understand by Good Suffix and Bad Character heuristics used by Boyer-Moore algorithm? Discuss them using an example.
37. Find out the failure function for the pattern P = abababbabaabba.

38. (a) What is assignment problem? What are the applications of it?

(b) Solve the following assignment problem, where Jobs with costs of M are disallowed assignments.

	J1	J2	J3	J4	J5
M1	M	8	6	12	1
M2	15	12	7	M	10
M3	10	M	5	14	M
M4	12	M	12	16	15
M5	18	17	14	M	13

39. Solve the following assignment problem.

A company has 4 machines available for assignment to 4 tasks. Any machine can be assigned to any task, and each task requires processing by one machine. The time required to set up each machine for the processing of each task is given in the table below.

TIME (Hours)

Machine/ Task	Task 1	Task 2	Task 3	Task 4
Machine 1	13	4	7	6
Machine 2	1	11	5	4
Machine 3	6	7	2	8
Machine 4	1	3	5	9

The company wants to minimize the total setup time needed for the processing of all four Tasks.

40. Explain Quadratic assignment problem with example.

JAGAN NATH UNIVERSITY

Question Bank

Subject: Advance Database Management System (MCA 402)

UNIT – 1

1. What is DBMS? What are the advantages and disadvantages offered by data base management system?
2. Discuss the main characteristics of the database approach and how it differs from file processing system?
3. What is Relational algebra? Explain various relational algebra operators with suitable example.
4. (a) What is a JOIN Operation? How 'Natural –Join' operation is performed?
(b) How many types of Join Operation? Describe the benefits of joins?
5. Differentiate between Cartesian product and natural join operations used in relational algebra.
6. What is relational calculus? Describe the Domain and Tuple calculus with suitable assumptions.
7. Describe the SELECT and PROJECT operation using example in relational algebra.
8. Describe the UNION and INTERSECTION Operation using suitable example.

9. What is Normalization? Explain the various normalization techniques with suitable example.
10. What do you understand by backup and recovery? How you can recover data from catastrophic failures?
11. What are ACID properties? Explain the ACID properties of a transaction management.
12. Justify the need for normalization with examples. Explain 1NF, 2NF, 3NF and BCNF with simple example.
13. What are the concurrency control schemes? What happened when a Deadlock occurs?
14. Define the locking techniques for concurrency control. Distinguish between Shared and Exclusive locks.
15. What is database recovery? Why backups are important in transaction management?
16. (a) Discuss why concurrency control is required in a DBMS?
(b) Explain any one method by which concurrency is achieved in a DBMS.

UNIT – 2

1. (a) What is Difference between Normalization and de-normalization?
(b) Distinguish between specialization and generalization.
(c) Describe the Mapping in database system.
2. (a) List the different types of constraints that can be specified in a relational database.
(b) Define functional dependency and state the Normal Form based on this.
3. (a) What is Object oriented Model? Explain inheritance property in OODBMS.
(b) Explain the modeling process in database. Describe the semantic data model.

4. Explain the three schema architecture in DBMS. Highlight the difference between physical and logical data independence.
5. What is an Entity Relationship diagram, describe its components using suitable example.
6. Describe the Candidate Key, Primary Key and super key? How Primary Key is different from foreign key.
7. (a) Explain and draw the overall structure of a database system.

(b) Compare a file based system and RDBMS system.
8. What are inference rules in a functional dependency? Explain the types of functional dependency.
9. Write short notes on:

(a) Data warehousing

(b) Data Mining

(c) OLAP
10. Draw an E-R diagram on Bank Management System, take the suitable assumptions.
11. Draw an E-R diagram for Airline Schema with suitable assumptions.
12. Draw an E-R diagram for Library Management System using suitable assumptions.
13. (a) What are the results of data mining? Give examples for each.

(b) What are the goals of Data mining?

1. Describe the Architecture of SQL. How the DDL and DML are different? Explain.
2. Describe the functionality of SQL server and Oracle Server.
3. What do you understand by the SQL server tuning and Oracle Server Tuning explain it in detail.
4. What is structured query language? Describe the various operations in DDL and DML.
5. Why use the constraints in SQL? Explain the different types of constraints used in SQL.
6. Describe the various operations which can be performed in SQL with their syntax.
7. Consider the relational table given below and answer the following SQL queries.

Employee (SSN-No, Name, Department, Salary)

- (a) List all the employees whose name starts with the letter 'L'.
- (b) Find the maximum salary given to employees in each department.
- (c) Find the number of employees working in 'accounts' department.
- (d) Find the second maximum salary from the table.
- (e) Find the employee who is getting the minimum salary.

8. Consider the employee database, where the primary keys are underlined.

Employee (empname, street, city)

Works (empname, companyname, salary) Company (companyname, city)

Manages (empname, managername)

- (a) Find the names of all the employees who work for First Bank Corporation.

- (b) Find the names, street addresses, and cities of residence of all employees who work for First Bank Corporation and earn more than 200000 per annum.
 - (c) Find the names of all employees in this database who live in the same city as the companies for which they work.
 - (d) Find the names of all the employees who earn more than every employees of Small Bank Corporation.
9. Explain the different types of indexes. Describe how indexing works.
10. Describe the following commands with their syntax:-
- (a) CREATE
 - (b) ALTER
 - (c) DROP
 - (d) SELECT
 - (e) INSERT

UNIT – 4

1. What is Distributed Database Management System? Describe the features of Distributed database.
2. Explain the levels of data and process distribution in data base system.
3. Define the followings:-
 - (a) Network Transparency
 - (b) Fragmentation Transparency
 - (c) Data Replication
4. Explain the 2-phase commit protocol for distributed database.
5. Describe the client server architecture system in distributed system.
6. Describe the design issues related to data fragmentation, replication, and distribution.
7. (a) Distinguish between horizontal and vertical fragments of relations.
 - (b) Describe types of DDBMS.

8. What is Distributed Data Base System? Describe the Advantages and Disadvantages of Distributed Databases.
9. What do you understand by ODBC and ADO? Explain both in detail.
10. Write short notes on:-
 - (a) JDBC
 - (b) JSQL
 - (c) OLAP
11. Why is data replication useful in DDBMSs? What typical units of data are replicated?
12. What is meant by data allocation in distributed database design? What typical units of data are distributed over sites?
13. How is a horizontal partitioning of a relation specified? How can a relation be put back together from a complete horizontal partitioning?

Artificial intelligence (MCA 403)

UNIT – 1

1. What is AI and what is the role of AI in computer science.
2. What do you mean by intelligent agent and describe the behavior of agent.
3. Explain the structure of Intelligent Agent.
4. Discuss the following search Technique with the help of an example. Also discuss the benefits and shortcoming of each.
 - a) Breadth First Search.
 - b) Depth First Search.

5. List down the characteristics of intelligent agent.
6. Explain in detail on the characteristics and applications of learning agents.
7. What are the task environment natures?
8. a. Explain in detail Model based reflex agent.
b. Explain in detail Goal based reflex agent.

9. Explain how solutions are searched by a problem solving agent.
10. a. Write short notes on Depth limited search.
b. State how repeated states are avoided and give an algorithm.

11. a. Write the environment characteristics of any four agent type. (8)
b. Explain in detail Simple reflex agent.

UNIT – II

12. Explain any two heuristic searches in detail.
 - a) Explain Hill climbing in detail.
 - b) Explain A* search in detail.
13. a. Explain simulated annealing search in detail.
b. Explain Memory bounded heuristic search in detail.
14. Explain any two local search algorithms in detail.
15. a. Explain genetic algorithm as a local search.
b. Explain online search agent working using depth first exploration.
16. a. Write in detail the learning of an agent in online search method.
b. Explain constraint satisfaction problem with an example.
17. Describe alpha-beta pruning and give the other modifications to the minmax procedure to improve its performance.
18. Explain the Constraint Satisfaction Problem(CSP). how can you formulate them as search problem?
19. (a) What are Production Systems? Explain.

(b) How can you define 'Problem' as a State Space Search. Consider the following Water Jug Problem-

You are given two jugs, a 4-gallon one and a 3-gallon one. Neither has any measuring marker on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 gallons of water into the 4-gallon jug. Also write all the production rules for this problem.

20. Consider and solve the following block world problem.

Start on (C,A) goal on (A,B)

On table (A) on (B,C)

On table (B)

21. Explain the block world problem in robotics?

22. Write in detail about any two informed search strategies?

UNIT – 3

23. Explain how Bayesian statistics provides reasoning under various kinds of uncertainty.

24. Construct semantic net representations for the following.

- pomepeian (marcus), blacksmith(marcus)
- mary gave the green flowered vase to her favorite cousin.

25. Give the semantic representation of "john loves Mary".

26. Describe about the frames with example.

27. Elaborate forward and backward chaining.

28. Explain the probabilistic reasoning with reference of AI.

29. Elaborate conceptual dependency.

30. Prove what course would steve like

31. Assume the foil facts

32. Steve only likes easy courses.

33. Science courses are hard.

34. All the courses in the basket weaving departments are easy.

35. BK301 is a basket weaving course.
36. Use resolution to prove “what course would steve like”.
37. What is Ontological Engineering and describe the Categories and objects.
38. Describe the Simulation and events and differentiate with example Mental events and mental objects.

UNIT – 4

39. Explain in detail about Learning with Decision Tree?
40. Write about Explanation Based Learning?
41. Explain about Statistical Learning?
42. Explain in detail about Reinforcement Learning?
43. Give a brief overview on decision tree inductive learning algorithm.
44. Discuss the following:
 - (i) Passive reinforcement learning.
 - (ii) Active reinforcement learning.
45. What are the various methods of logical formulation in logical learning?
46. Explain the nonparametric learning methods.
47. How learning is done on a complete data using statistical methods?
48. Describe the Learning with hidden data-EM Algorithm.
49. .What do you mean by artificial neural network. And also explain the different types of neural networks? Explain.
50. Briefly Explain the supervised and unsupervised learning.

Object Oriented Analysis and Design(MCA 404)

UNIT – 1

16. What do you mean by object oriented analysis and design? Draw a diagram of object oriented model.
17. Describe Object Oriented concept with an example.
18. Explain the specialization and generalization with appropriate examples.
19. Describe the object oriented life cycle model with its different steps.
20. What do you mean by OOA and OOD? Explain these methodologies in brief.

21. What do you mean by OMT and OOSE? Explain these methodologies in brief.
22. Briefly explain Object Oriented Analysis (OOA) procedure.
23. Describe the CRC modeling accomplished under the object oriented analysis process.
24. Draw and explain the notations for class diagrams, object diagrams, module diagrams and process diagrams.
25. Explain the concept of OOSD and OORASS methodologies.

UNIT – 2

16. Describe the concept of system development in model building.
17. Define the concept of model architecture.
18. Explain the development process in software development.
19. Describe the requirements model with their concept.
20. Explain the analysis model with any structure example.
21. Why the requirements model is structured in the analysis model.
22. Explain the concept of Design model. Also explain the working process with the design model.
23. Describe the implementation model with suitable example.
24. Explain the test model in object oriented.
25. What is analysis process and why an analysis process?

UNIT – 3

12. Explain the fundamental design concepts in detail.
13. Explain working of construction phase?
14. Explain about the various design concepts considered during design?
15. Write short note on interaction diagram?
16. Describe the block diagram of design process and working.
17. What do you mean by Testing? Why it's required? Also explain different type of testing techniques.
18. Explain the testing objectives and its principles.
19. Explain Unit Testing & Integration Testing with suitable diagram.
20. Explain the system testing process concept.
21. What is system testing. Why we need system testing explain.

UNIT – 4

18. Define UML. Mention the primary goals in the design of the UML
19. Describe 4+1 view architecture of UML.
20. What is unified modeling language? Explain all the diagrams of UML
21. Explain the benefits of UML.
22. Describe all the UML diagrams with suitable examples.
23. Explain the conceptual model of UML.
24. What is the basic building blocks of UML. Explain with suitable diagram.
25. Why analysis is a major part in Object designing?
26. What is the different types of relationship composition that exists?
27. Write short note on

1. Use Case Diagram
2. Class Diagram
3. Activity Diagram
4. Sequence Diagram
5. Deployment Diagram
6. State chart Diagram
7. Collaboration Diagram

Data Warehousing and Data Mining (MCA 405)

UNIT- I

- Q. 1 How is a data warehouse different from database? How are they similar?
- Q. 2 Why data transformation is essential in the process of knowledge discovery?
- Q. 3 Describe the steps involved in the design and construction of data warehouse.
- Q. 4 Enumerate the building blocks of data warehouse. Explain the importance of metadata in a data warehouse environment.
- Q. 5 Diagrammatically illustrate and discuss the data warehousing architecture with briefly explain components of data warehouse
- Q. 6 (a) Discuss the components of data warehouse.
(b) List out the differences between OLTP and OLAP.
- Q. 7 Discuss the various schematic representations in multidimensional model.

- Q. 8 (a) Explain the OLAP operations I multidimensional model.
(b) Explain the design and construction of a data warehouse.
- Q. 9 Explain the three-tier data warehouse architecture.
- Q. 10 (a) Write notes on metadata repository.
(b) Discuss the business requirement of data warehouse.
- Q. 11 Explain the features of data warehouses and data marts.

UNIT-II

- Q. 1 With the neat scratch discuss the STAR schema modeling for a student academic fact database.
- Q. 2 Explain the evolution of Database technology?
- Q. 3 Discuss the advantages of the STAR Schema Dimensional Modeling.
- Q. 4 Explain the steps of knowledge discovery in databases?
- Q. 5 Why ER is not suitable for Data Warehouses? Comparison between ER and Dimensional Modeling
- Q. 6 Explain the steps in designing a Dimensional Model.
- Q. 7 Write short note on
(a) Snowflake Schemas
(b) Starflake Schemas
- Q. 8 Discuss the three important application areas of Multi-Dimensional Data Models.
- Q. 9 (a) Explain the types of OLAP Servers.
(b) Explain regression in predictive modeling?
- Q. 10 Discuss the following in brief
(a) Aggregate fact tables
(b) ROLAP
(c) MOLAP

UNIT-III

- Q. 1 Discuss the typical OLAP operations with an example.
- Q. 2 List and discuss the basic features that are provided by reporting.
- Q. 3
(i) Explain the various primitives for specifying Data mining Task.
(ii) Describe the various descriptive statistical measures for data mining.
- Q. 4 Explain the steps involve in Data Mining.
- Q. 5 Write a short note on web mining taxonomy.
- Q. 6 Explain the different activities of text mining.

Q. 7 Discuss and elaborate the current trends in data mining.

Q. 8 Write short note on

(a) Knowledge discovery process (KDD)

(b) OLAP versus data mining

© Data mining functionalities

Q. 9 Explain in brief the data processing steps.

Q. 10 (a) Write short notes on patterns?

(b) Explain mining single –dimensional Boolean associated rules from transactional databases?

Q. 11 Explain in brief the following.

(a) Classification Systems

(b) Data Mining Task

(c) Data Reduction

UNIT- IV

Q. 1 (a) What is cluster analysis?

(b) What are the requirements of clustering?

© What are the two data structures in cluster analysis?

Q. 2 List out the five categories of decision support tools.

Q. 3 Discuss the requirements of clustering in data mining.

Q. 4 Explain the partitioning method of clustering.

Q. 5 Explain data mining applications for Biomedical and DNA data analysis.

Q. 6 Explain data mining applications fro financial data analysis.

Q. 7 Explain the types of data mining.

Q. 8 Explain classification by Decision tree induction?

Q. 9 Decision tree induction is a popular classification method. Taking one typical decision tree induction algorithm, briefly outline the method of decision tree classification.

Q. 10 Consider the following training dataset and the original decision tree induction algorithm (ID3). Risk is the class label attribute. The Height values have been already discredited into disjoint ranges. Calculate the information gain if Gender is chosen as the test attribute. Calculate the information gain if Height is chosen as the test attribute. Draw the final decision tree (without any pruning) for the training dataset. Generate all the “IF-THEN rules from the decision tree.

Q. 11 Explain data mining applications for following areas.

- (a) Telecommunication industry.
- (b) Health care analysis.
- (c) Banking industry.

Q. 12 With relevant example discuss constraint based cluster analysis.

Q. 13 Write short note on

- (a) Memory-based reasoning
- (b) Neural networks
- © Genetic algorithms

Linux Environment (MCA501)

Unit-I

1. What is operating system? Describe task of operating system in detail.
2. Differentiate between different types of shells available in UNIX.
3. Explain the kernel data structure for shared memory with a neat diagram. Also explain the APIs associated for creating and destroying a shared memory.
4. Discuss the major task of operating system in details.
5. Discuss the advantages and disadvantages of linux in comparisons to other operating systems.
6. Differentiate between following linux commands
 - (a) ls and ls -l
 - (b) rmdir and rm -r
 - (c) cd and pwd
 - (d) cp and mv
 - (e) w and who
7. Differentiate between following linux commands
 - (a) grep and egrap
 - (b) sort and tsort
 - (c) hard and soft link
 - (d) echo and printf
8. Discuss the architecture of Linux operating system.
9. What are the different modes of operation of vi editor? What is the importance of .exrc file in the behavior of vi editor?

10. Explain the concept of caching and paging in Linux.

Unit-II

11. Compare the IPC functionality provided by pipes and message queues. What are the advantages and drawbacks of each? Explain briefly.

12. Explain the sequence of steps to process various socket functions using TCP protocol.

13. Write a program and explain how to transfer a large amount of data between two Processes using: Pipes

14. List any five system calls used for process management.

15. Explain the steps that a shell follows while processing a command.

16. Explain various system calls relate to directory management.

17. Differentiate PS and KILL command with suitable example.

18. Discuss the methods for write to standard output (the screen) and take their input from standard input (the keyboard) with suitable example.

19. Describe the method through which Jobs can either be in the foreground or the background with suitable example

20. Explain pipes in Linux. What is role of pipes in inter process communication? Explain in detail with suitable example.

Unit-III

21. Discuss about various file handling utilities available in LINUX. Quote various options and examples for each.

22. (a) Explain /etc/shadow file used under Linux or UNIX?

(b) Describe how you would find files in Linux using 'find' command.

(c) How would you use head and tail in a pipeline to display lines 25 through 75 of a file?

23. Explain Linux file structure and hierarchies in detail.

24. Mentions the operations carried out on a file also describe the system calls that handle these operations.

25. Explain various file permissions with example.

26. Describe the file system structure and different file types in Linux system.

27. How the read, write and execute permissions are attached with a file are different from that attached to a directory? – Explain.
28. What are environment variable in Linux. Explain any two environment variable in detail.
29. Explain the role of following subdirectories in Linux
 - (a) ./bin
 - (b) /dev
 - (c) /etc
 - (d) /home
 - (e) /lib
 - (f) /tmp
30. Discuss the following commands in detail with options.
 - (a) pwd
 - (b) mkdir
 - (c) cd
 - (d) rmdir and
 - (e) ls

Unit-IV

31. Explain with a program how to copy _le data from server to client using shared memory.
32. Write a shell script to implement background process that will continually print current time in upper right corner of the screen, while user can do his/her normal job at prompt.
33. Write the syntax of six versions of exec functions and also explain how these functions differ from each other.
34. What is Deadlock? Explain the situation when will the mutex lock creates a deadlock condition within a process and also give the solution to prevent such deadlock condition.
35. Describe the problems with single threaded programming and how it is overcome by multithreaded programming.
36. What is meant by a coprocess? Illustrate the coprocess example by taking a simple filter to convert uppercase characters to lower case letters using popen() and pclose().
37. Discuss the interrupt handling in Linux with suitable example.
38. Write short note:
 - (a) Multiprocessing

(b) Spooling

39. What is second extended file system is a file system for the Linux [kernel](#)? How it is different from ordinary file system?
40. Explain Linux /proc File System (/proc directories, /proc files). What type of information it display when we execute ls -l /proc command?

Enterprise Computing with Java (MCA 503)

UNIT – 1

26. What is J2EE? What are J2EE components and services?
27. Explain the J2EE 3-tier or n-tier architecture? Also Explain MVC architecture relating to J2EE?
28. Why use design patterns in a J2EE application?
29. What is the difference between a Web server and an application server?
30. What is the difference between CGI and Servlet?
31. HTTP is a stateless protocol, so how do you maintain state? How do you store user data between requests?
32. Explain the life cycle methods of a servlet?
33. What is the difference between doGet () and doPost () or GET and POST? Also Explain Servlet URL mapping?
34. What are the ServletContext and ServletConfig objects? What are Servlet environment objects?
35. How do you make a Servlet thread safe? What do you need to be concerned about with storing data in Servlet instance fields?

UNIT – 2

26. What is a JSP? What is it used for? What do you understand by the term JSP translation phase or compilation phase?
27. Explain the life cycle methods of a JSP?
28. What are the main elements of JSP? What are scriptlets? What are expressions?
29. What are the differences between static and a dynamic include?
30. What are implicit objects and list them? Also Explain hidden and output comments?
31. Explain JSP URL mapping? What is URL hiding or protecting the JSP page?
32. Give an overview of Struts?How do you implement internationalization in Struts?
33. What is a synchronizer token pattern in Struts or how will you protect your Web against multiple submissions?
34. Are Struts action classes thread-safe? Justify for answer. Also Explain How do you upload a file in Struts?
35. What is an action mapping in Struts? How will you extend Struts?
36. What design patterns are used in Struts?

UNIT – 3

22. What is the role of EJB 2.x in J2EE?
23. What is the difference between EJB and JavaBeans?
24. Explain EJB architecture?
25. What is the difference between Container Managed Persistence (CMP) and Bean Managed Persistence (BMP)?
26. How does an EJB interact with its container and what are the call-back methods in entity beans?
27. What are the implicit services provide by an EJB container?
28. Explain exception handling in EJB?
29. How do you rollback a container managed transaction in EJB?
30. What are not allowed within the EJB container?
31. Discuss EJB container security?

UNIT – 4

28. What are the different kinds of enterprise beans?
29. What is the difference between session and entity beans?
30. What is the difference between stateful and stateless session beans?
31. Explain lifecycle of session beans.
32. What is the difference between Container Managed Persistence (CMP) and Bean Managed Persistence (BMP)?
33. How to design transactional conversations with session beans?
34. What is a distributed transaction? What is a 2-phase commit?
35. Give an example of a J2EE application using Message Driven Bean with JMS? Describe 4+1 view architecture of UML.
36. What type of messaging is provided by JMS?
37. What is Message Oriented Middleware? What is JMS?

Theory of Computation (MCA504)

Unit I

- Q1. What is a compiler? Explain the various phases of compiler in detail, with a neat sketch.
- Q2. What do you mean by System Software?
- Q3. Explain Chomsky classification of languages in detail.
- Q4. Draw a NFA for $a^*|b^*$.
- Q5. What is an ambiguous grammar? Give an example.
- Q6. Define the context free grammars in the 4 tuple form. (V, T, P, S) for the given languages on $\Sigma (a, b)$.
 - i. All strings having atleast two 'a's.
 - ii. All possible strings not containing triple 'b's.
- Q7. Find the context free grammar with no useless symbols equivalent to $S \rightarrow AB/Ca, B \rightarrow BC/AB, A \rightarrow a, C \rightarrow aB/b$.
- Q8. State in English about the language corresponding to below given grammar $S \rightarrow aB/bA, A \rightarrow a/aS/bAA, B \rightarrow b/bS/aBB$.
- Q9. The set of strings over alphabet $\{0,1,\dots,9\}$ such that the final digit has not appeared before.

Q10. The set of strings of 0's and 1's such that there are two 0's separated by a number of positions that is a multiple of 4. Note that 0 is an allowable multiple of 4.

Unit II

Q1. What do you mean by Greibach Normal Form (GNF).

Q2. When is a CFG said to be in GNF?

Q3. Convert the following grammar into GNF :

$$\begin{aligned} S &\rightarrow AB \\ A &\rightarrow BS/b \\ B &\rightarrow SA/a \end{aligned}$$

Q4. Find the PDA with only one state that accepts the language $\{a_m b_n : n > m\}$

Q5. Construct the PDA that recognizes the languages $L = \{x \in \{a, b\}^* : |x| \text{ is even}\}$.

Q6. Obtain a CFG to generate unequal number of a's and b's.

Q7. Obtain a CFG to obtain balanced set of parentheses. (i.e every left parentheses should match with the corresponding right parentheses).

Q8. Reduce the Grammar G given by $S \rightarrow aAa$

$$\begin{aligned} A &\rightarrow Sb/bcc/DaA \\ C &\rightarrow abb/DD \\ E &\rightarrow ac \end{aligned}$$
$$D \rightarrow aDA$$

into an equivalent grammar by removing useless symbols and useless productions from it.

Q9. Convert the following grammar into CNF.

$$\begin{aligned} S &\rightarrow aAD \\ A &\rightarrow aB/bAB \\ B &\rightarrow b \\ D &\rightarrow d. \end{aligned}$$

Q10. Let G be the grammar given by

$$\begin{aligned} S &\rightarrow aABB/aAA, \\ A &\rightarrow aBB/a, \\ B &\rightarrow bBB/A \end{aligned}$$

Construct the PDA that accepts the language generated by this grammar G.

Unit III

- Q1. What are the types of Turing Machines explain in brief;
- Q2. Explain the importance of Turing machine concept
- Q3. Give a Turing machine for the following:
- (a) That computes ones complement of a binary number
- (b) That shifts the input string, over the alphabet $(0,1)$ by one position right by inserting '#' as the first character.
- Q4. Design a T.M for copying of information from one place to the other place. Assume all the necessary assumptions. Give Example of the working of your T.M.
- Q5. Explain Turing reducibility machines.
- Q6. What is the difference between a recursive and recursively enumerable Languages?
- Q7. What do you mean by saying that the halting problem of TM is undecidable ?
- Q8. Construct a Turing machine that can accept the set of all even palindromes over $\{0,1\}$.
- Q9. Construct a Turing machine that convert a binary string into its equivalent unary strings.
- Q10. Construct a Turing machine that enumerates $\{0^n1^n \mid n \geq 1\}$.

Unit IV

- Q1. What are NP-complete and NP-hard problems? Explain them with examples.
- Q2. Explain Savich theorem with an example.
- Q3. If L is a recursive language then prove that \bar{L} is also recursive.
- Q4. What is Post correspondence problem? Explain with an example.
- Q5. The set of all languages whose complements are in **NP** is called **CO-NP**. Prove that **NP = CO-NP** if and only if there is some *NP*-complete problem whose complement is in **NP**
- Q6. Define Turing machine formally; explain how Turing machine can be used to compute integer functions. Design the Turing machine to compute following function, Show its transition diagram also $f(x,y)=xy$ where x and y are positive integers represented in unary.
- Q7. Show that if L and L^c are recursively enumerable, and then L is recursive.
- Q8 Explain Church- Turing Thesis.
- Q9 (a) Define Turing machine for computing $f(m,n) = m - n$ (proper subtraction).
- (b) Construct a Turing machine that accepts $L = \{0^{2^n} \mid n \geq 0\}$

Q10 (a) Design a Turing Machine to compute $f(m + n)$, $\forall m, n \geq 0$ and simulate their action on the input 0100.

(b) Explain how a Turing machine with multiple tracks of the tape can be used to determine if the given number is prime or not?

Unit V

Q1 a) Illustrate that Linear Bound Automata is special case of TM with bounded tape.

(b) Show that every type 1 grammar can have corresponding TM.

Q2. (a) Show that each of the classes of language $l_0, l_{scl}, l_{cfl}, l_{rl}$ is closed under transpose, transitivity, idempotent operation.

(b) Define Chomsky hierarchy of languages.

Q3. (a) Show that RE a Type 3 language is Acceptable by Finite Automata?

(b) Show that LBA is a special case of universal Turing machine?

Q4. (a) Show that every Type 2 grammar can have corresponding PDA?

(b) Show that each of the classes $l_0, l_{cs1}, l_{cfl}, l_{rl}$ is closed under transpose operation.

Q5. What are NP-complete and NP-hard problems? Explain them with examples.

Q6. Define linear bounded automaton (LBA). List out the constraints of LBA.

Q7. Discuss the Chomsky classification.

Q8. Explain post correspondence problem with an example.

Q9. Show that AMBIGUITY problem is undecidable. What are the different types of grammars/languages?

Q10. (a) When we say a problem is decidable? Give an example of undecidable problem?

(b) What are (a) recursively enumerable languages (b) recursive sets?

(c) When a recursively enumerable language is said to be recursive? Is it true that the language accepted by a non-deterministic Turing machine is different from recursively enumerable language?

Advance Computer Network (MCA 505)

UNIT – 1

1. What is TCP/IP Model? Explain the functions and protocols and services of each layer?
Compare it with OSI Model.
2. What are the applications of Computer Networks?
3. Explain the following:-
 - a) LAN
 - b) MAN
 - c) WAN
4. What is OSI Model? Explain the functions and protocols and services of each layer?
5. Explain Mac protocol for high speed LANS, MAN's & WIRELESS LANs like-FDDI,DQDB.
6. Define ADSL in detail.
7. What is cable modem and how to use it?
8. Explain the concept of wi-fi.
9. Explain the concept of Wimax.
10. Describe wireless Ethernet.

Unit-2

1. What is IPv6 addressing? How the addressing is performed?
2. Explain the advantages of IPv6 over IPv4.
3. Explain the frame format for IPv6.
4. How to support for quality system in IPv6.
5. How to perform auto configuration in IPv6.
6. What is routing? How it works in IPv6.
7. What is ATM. Draw the reference model with brief description.

8. Describe various ATM layers.
9. How to perform security in IPv6.
10. How to discover neighbor using IPv6.

Unit-3

1. Describe mobility in network.
2. What is IP multicasting.
3. Define various Multicasting routing protocols.
4. How to perform address assignment IP multicasting.
5. How to perform session discovery.
6. Can dynamic multicast addresses be assigned within my domain?
7. Does multicast support Network Address Translation (NAT)?
8. What management options are available for a multicast network?
9. What is Source Specific Multicast?
10. Where are multicast addresses available?

Unit-4

1. Define network security in Secure-HTTP.
2. How to perform network security in SSP and ESP.
3. Define key distribution protocol.
4. What is a Digital Signature Certificate?
5. Why is Digital Signature Certificate (DSC) required?
6. Who issues the Digital Signature Certificate?
7. What is the legal status of a Digital Signature?
8. How to register Digital Signature Certificate for Bank Officials?
9. What is the difference between RA(Registration Authority) and CA(Certifying Authority)?
10. What are the different classes of Digital Signature Certificates?