

Govt. Polytechnic College Rajsamand

Computer Sc. & Engg. Deptt.

Model Test Paper

CS-201 Programming & Problem Solving Through 'C'

MM:15

Duration: 1 Hr.

Q 1.A) What is the difference between static and dynamic memory allocation? Explain register variables? (2)

B) What do you understand by recursion? Explain through suitable example. (3)

Q 2 What is structure? Explain memory allocation of structures (5)

Q 3 A) Explain Unions? (2)

B) What is the use of files? (3)

Solution-

Q.1

a) Static Memory allocation

1. Memory is allocated before the execution of program begins (During Compilation)
2. Variables remain permanently allocated
3. In this type of allocation memory cannot be resize after the initial allocation
4. Implemented using stacks
5. Faster execution than dynamic
6. It is less efficient than dynamic allocation Strategy
7. Implementation of this type of allocation is simple
8. Memory can't be reuse when it is no longer needed

Dynamic Memory Allocation

1. Memory is allocated during the execution of program
2. Allocated only when program it is active
3. In this type of allocation memory can be dynamically expanded and shrunk as necessary
4. implemented using heap
5. slower execution than static
6. it is more efficient than static allocation strategy.

7. Implementation of this type of allocation is complicated
8. Memory can be freed when it is no longer needed& reuse or reallocate during execution

Register Variables

- Registers are faster than memory to access, so the variables which are must frequently used in C program can be put in registers using register keyword.
- The variables of register type modifier in form the compiler for storing the variables in a register of the CPU.
- These variables are stored in registers, so the speed of processing is become more than the normal variables.
- The C language provide the storage class register So that the program can 'suggest' to the compiler that particular automatic variables should be allocated to CPU registers, if possible Thus, register variables provide a certain control over efficiency of program execution variables which are used repeatedly or whose access times are critical, may be declared to be storage class register.

- b) **Recursion** – A method of programming in which a function directly or indirectly call itself. In simple words recursion is a type of function that invoked itself.

Following two conditions are important for recursion-

1. There must be an end condition for which function does not call itself.
2. Every time when function called itself it reached towards the end condition.

We can understood recursion with following example of factorial –

Example: Factorial

```
Intfactorial (inta ) // assumes n>=0
{
    If(n==0)
        return 1;
    Else
        return n* factorial(n-1);
}
```

To see how recursion works, we trace factorial(3)

```
Factorial(3) = 3*factorial(2)
              = 3*(2*factorial(1))
              = 3*(2*(1*factorial(0)))
              = 3*(2*(1*1))
              = 6
```

Q.2

A structure is used to store a number of data types grouped together. There data types may or may not be of the same type. In other words structures are the collection of dissimilar data types.

We can understand structures by following example-

```
struct book
{
    char name[20];
    float Price;
    int pages;
};
```

For this structure we can create and initial a variable as follows-

```
structbook b1={"Let us C",130.00,350};
```

Memory Allocations: Each element of one variable are stored on consecutive memory locations. For example for above variable b1, each element stored in memory as shown below-

b1.name	b1.price	b1.pages

B1 Total $20+4+2=26$ bytes of memory

Q3

(A)**Union**- Union has similar format as structure have. But is different in allocation memory. For structures memory allocated of total memory needed to each element while for union memory allocated of maximum memory of any element we can understood by following example-

```
Union code
{
    int a[2];
    float x;
}
```

For this union total four bytes will be occupied in memory because element x needed four bytes. In other words these four bytes shared by element a and x

Q3(B) **Uses of files** – There may be situations many times when display of data on screen is not enough, because of following reasons-

- 1) If data is large, that cannot be stored in memory.
- 2) Limited amount of data could be displayed on screen.
- 3) Memory is volatile, so content would be lost after termination of program.
- 4) Same data if needed again will be lost and should be entered first

So there comes the necessity of storing data permanently and this can be done by files in C-Language. Data stored on secondary storage and retrieved again when needed using files.

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Model Test Paper

CS-203 Operating System Principles

MM:15

Duration: 1 Hr.

- Q1.(a) Define realtime operating system. Explain with the help of example. (3)
Q1.(b) Describe the purpose of system calls? State two system calls with its functions. (3)
Q2.List and state any four services provided by an operating system. (3)
Q3(a)Describe CPU and I/O burst cycle with the help of diagram. (3)
Q3(b)List & explain any four file attributes. (3)
-

Q1.(a)

Real time systems are used in environment where a large number of events, mostly external to the computer system, must be accepted and processes in a short time or within certain deadlines. Such applications include real-time simulations, flight control, industrial control, military applications etc. A primary objective of real-time systems is to provide quick event response time and thus meet the scheduling deadlines. User convenience and resource utilization are of secondary concern to real-time system designers. In Real time systems, processor is allocated to the highest priority process among those that are ready to execute. Higher priority processes preempt execution of the lower priority processes. This form is called as '**priority –based preemptive scheduling**'.

Example: Satellite application of real time OS

The satellite connected to the computer system sends the digital samples at the rate of 1000 Samples per second. The computer system has an application program that stores these samples in a file. The sample sent by the satellite arrives every millisecond to the application. So computer must store or respond the sample in less than 1 millisecond. If the computer does not respond to the sample within this time, the sample will be lost.

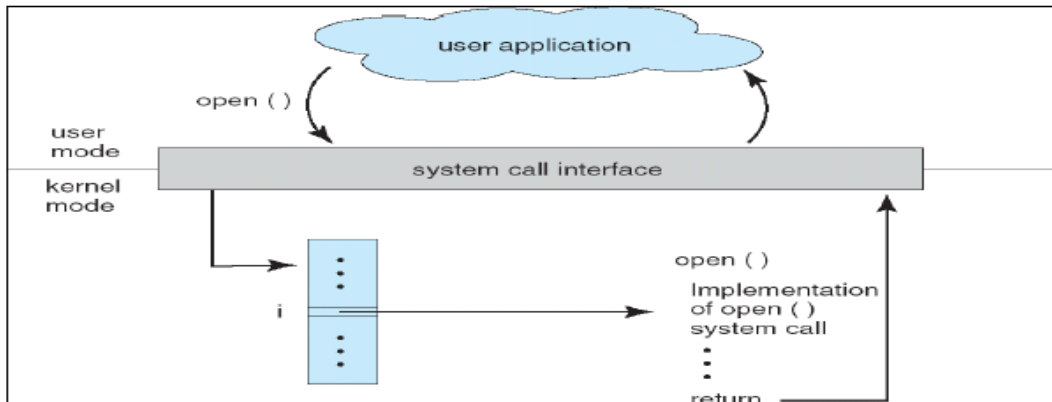
Some of the examples of Real time systems are: A web server, A word processor, An audio/video media center, A microwave oven, A chess computer.

Q 1(b)

System calls provide an interface between the process and the **operating system**.

System calls allow user-level processes to request some services from the **operating system** which process itself is not allowed to do.

System call provides basic functionality to user to operate operating system. System calls are programming interface to the services provided by the Operating system.



System calls-

System calls related to process control: End, Abort Load, Execute Create process, Terminate process Ready process, Dispatch process Suspend, Resume Get Process attribute, set attribute Wait for time Wait event, signal event.

System calls Related to File management: Create file, delete file Open file , Close file Create directory Read, write, Reposition Get file attribute , set file attribute Create a link Change the working directory.

System calls Related to Device Management: Request a device, Release a device Read, Write, Reposition Get device attribute, set device attribute

System calls Related to Information Maintenance: Get Time or Date, Set Time or Date Get System data, Set system data Get process, file or device attributes Set Process, file or Device attributes.

Q 2

OS services provided to the user:-

1. User Interface
2. Program execution
3. I/O operations
4. File system manipulation
5. Communication
6. Error detection

1. User Interface: - All operating systems have a user interface that allows users to Communicate with the system.

There are three types of user interfaces are available:-

1. Command line interface (CLI): - It uses text commands and a method for entering Them. For example working on DOS prompt.

2. Batch interface: - Commands and directives to control that commands, are entered into A file and the file is executed. For example, Combining set of C programming Statements into a file to perform a specific task and executing that file in TURBO C.

3. Graphical user interface (GUI): - This interface is a window system with a pointing device to direct I/O, select from menus and make selections and keyboard to enter the Text. For example, Windows system provides icons for selecting an application. Double Clicking on that icon will open that application. Some system provides to or all three of these variations.

2. Program execution: - The operating system provides an environment where the user can. Conveniently run programs. To run a program, the program is loaded into the main Memory and then CPU is assigned to that process for its execution. Operating system Performs this function for the convenience of the user. It also performs other important Tasks like allocation and de-allocation of

memory, CPU scheduling etc. It also provides Service to end process execution either normally or abnormally by indicating error.

3. I/O operations: - When a program is running, it may require input/output resources such As a file or devices such as printer. For specific devices, special functions may be required. Such as recording to a CD drive. For efficiency and protection users usually cannot control I/O devices directly. So the operating system provides a service to do I/O.

4. File system manipulation: - Programs may need to read and write data from and to the Files and directories. Operating system manages the secondary storage. User gives a Command for reading or writing to a file. Operating system makes it easier for user programs to accomplish their task such as opening a file, saving a file and deleting a file From the storage disk. It also provides services for file permission management to allow or Deny access to files or directories based on file ownership.

5. Communication: - In the system, one process may need to exchange information with Another process. Such communication may occur between processes that are executing on different computer systems tied together by a computer network. Communication can be implemented via shared memory or through message passing, in which packets of Information are moved between processes by the operating system.

6. Error detection: -The operating system needs to be constantly aware of possible errors.

Errors can occur in:

1. CPU and memory hardware such as a memory error or power failure
2. I/O devices such as parity error on tape, a connection failure on a network or lack of paper in the printer
3. The user program such as an arithmetic overflow, an attempt to access an illegal Memory location or a too-great use of CPU time.

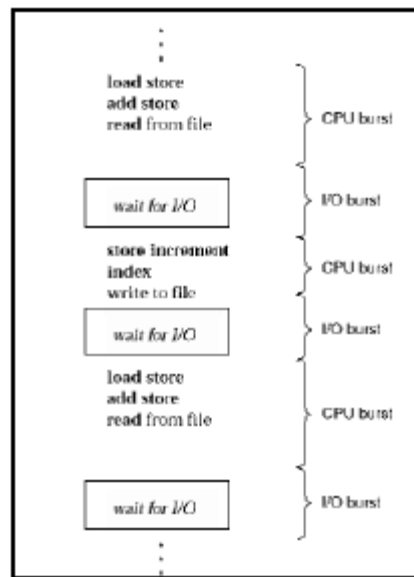
For each type of error, the operating system should take the appropriate action to Ensure correct and consistent computing. Debugging facilities can greatly enhance The user's and programmers abilities to use the system efficiently.

Q3(a).

Processes require alternate use of processor and I/O in a repetitive fashion. Each cycle consist of a CPU burst followed by an I/O burst .A process terminates on a CPU burst. CPU-bound processes have longer CPU bursts than I/O-bound processes.

I/O bound process: The process which spends more time in I/O operation than computation (time spends with CPU) is I/O bound process.

CPU bound process: The process which spends more time in computations or with CPU and very rarely with the I/O devices is called as CPU bound process.



Q3(b)

A file's attributes vary from one operating system to another but typically consists of these:

- **Name:** The symbolic file name is the only information kept in human readable form. Name of the file is usually a string of characters such as abc.c. When a file is named it becomes independent of the process, the user, and even the system that created it.
- **Identifier:** This unique tag, usually a number, identifies the file system; it is the non-human-readable name for the file.
- **Type:** This information is needed for systems that support different types of files. File types include text file, source file, object file, executable file, etc.
- **Location:** This information is a pointer to a device and to the location of the file on that device.
- **Size:** The current size of the file (in bytes, words, or blocks) and possibly the maximum allowed size are included in this attribute.
- **Protection:** Access-control information determines who can do reading, writing, executing, and so on. It indicates protection permissions such as (r, w, and x) for each file or directory.
- **Time, date and user identification:** This information may be kept for creation, last modification, and last use. These data can be useful for protection, security, and usage monitoring.

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Model Test Paper

CS-302 Object Oriented Programming C++

MM:15

Duration: 1 Hr.

Q 1 Write characteristics of procedure oriented programming. (4)

Q2 Difference between OOP and POP. (4)

Q3 Explain how memory is allocated to an object of a class with diagram. (4)

Q4(b) Write any four rules to define constructor in a class. (3)

Q1 Ans:

1. Emphasis is on data rather than procedure.
2. Programs are divided into objects.
3. Data structures are designed such that they characterize the objects.
4. Functions that operate on data of an object are tied together in the data structure.
5. Data is hidden and cannot be accessed by external functions.
6. Objects communicate with each other through functions.
7. New data and functions can be easily added whenever necessary.
8. Follows bottom-up approach in program design.

Q2 Ans:

Procedure oriented programming	Object oriented programming
1.Focus is on procedure.	1. Focus is on data.
2.Large programs are divided into multiple functions.	2.Programs are divided into multiple objects.
3.Data move openly around the system from function to function.	3. Data is hidden and cannot be accessed by external functions.
4.Functions transform data from one form to another by calling each other.	4. Objects communicate with each other through function.

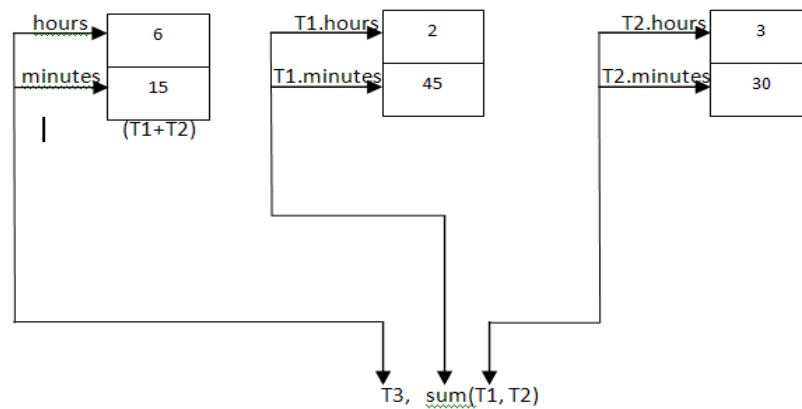
5. Employs top-down approach in program design.	5. Employs bottom-up approach in program design
6. Procedure oriented approach is used in C language.	6. Object oriented approach is used in C++ language.

Q 3 Ans:

Description:

Memory space for objects is allocated when they are declared. The member functions are created and placed in the memory space only once when they are defined as a part of class specification. Since all the objects belonging to that class use the same member functions, no separate space is allocated for member functions when the objects are created. Only space for member variables is allocated separately for each object.

Diagram:



Q 4 Ans:

Rules to define constructor:

1. Constructors should be declared in the public section.
2. They are invoked automatically when the objects are created.
3. They do not have return type, not even void and therefore they cannot return values.
4. They can accept arguments.
5. They cannot be inherited, though a derived class can call the base class constructor.
6. They cannot be virtual.
7. One cannot refer to their addresses.
8. An object with a constructor cannot be used as a member of a union.
9. They make implicit calls to the operators new and delete when memory allocation is required.

Govt. Polytechnic College – Rajsamand

Session 2017-18

Class Test-II

Database Management Systems (CS-207)

Duration: 1 Hr.

MM: 15

Note: Attempt any 3 questions.

- | | |
|--|---|
| Q1. What is DBA? Explain. | 5 |
| Q2. Draw Database System Structure. | 5 |
| Q3. What is Relational database? Explain Schema. | 5 |
| Q4. Explain NULL and Domain constraints. | 5 |

ANSWER 1.

Database Administrator

Coordinates all the activities of the database system; the database administrator has a good understanding of the enterprise's information resources and needs.

Database administrator's duties include:

Schema definition

Storage structure and access method definition

Schema and physical organization modification

Granting user authority to access the database

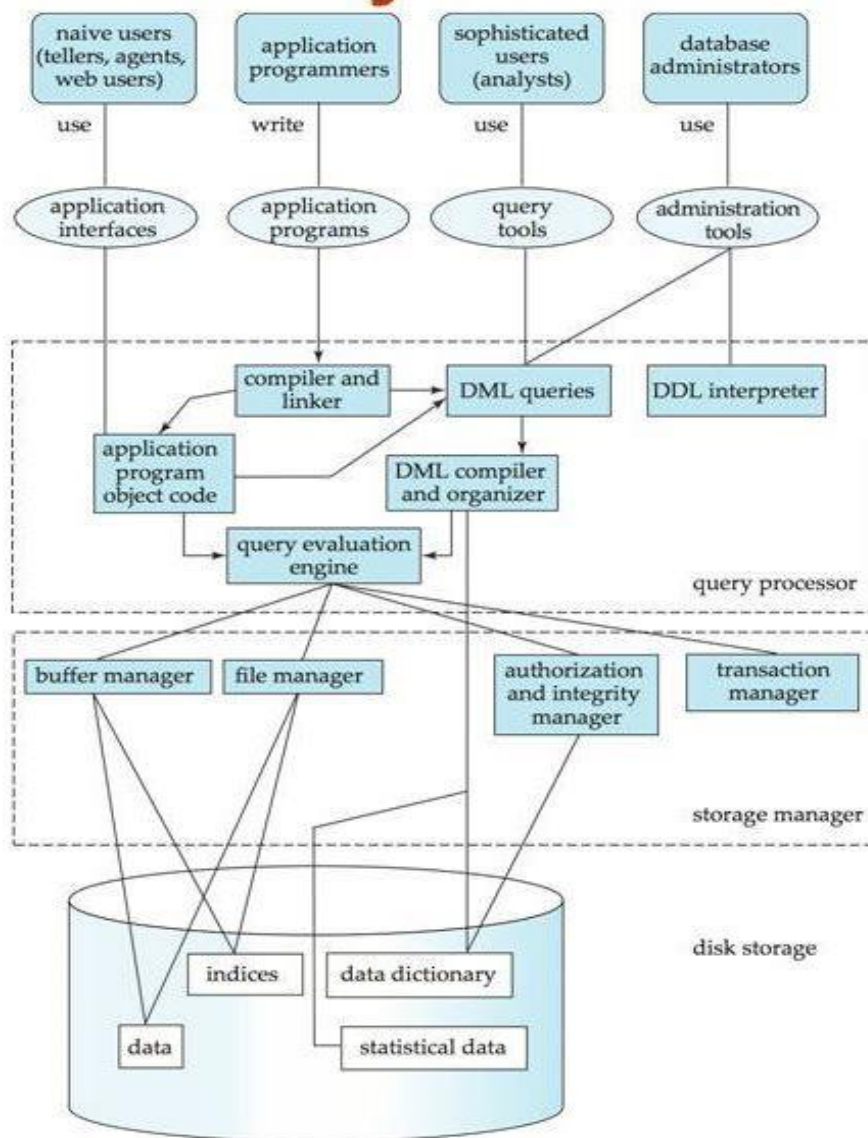
Specifying integrity constraints

Acting as liaison with users

Monitoring performance and responding to changes in requirements

ANSWER: 2

Database System Internals



ANSWER 3.

A Relational Database (RDB) is a collective set of multiple data sets organized by tables, records and columns. RDBs establish a well-defined relationship between database tables. Tables communicate and share information, which facilitates data search ability, organization and reporting.

RDBs organize data in different ways. Each table is known as a relation, which contains one or more data category columns. Each table record (or row) contains a unique data instance defined for a corresponding column category. One or more data or record characteristics relate to one or many records to form functional dependencies. These are classified as follows:

- One to One: One table record relates to another record in another table.
- One to Many: One table record relates to many records in another table.
- Many to One: More than one table record relates to another table record.
- Many to Many: More than one table record relates to more than one record in another table.

RDB performs "select", "project" and "join" database operations, where select is used for data retrieval, project identifies data attributes, and join combines relations.

A relational database schema is the tables, columns and relationships that make up a relational database. A schema is often depicted visually in modeling software such as ERwin or drawing software such as Viso.

ANSWER 4.

A field with a NULL value is a field with no value.

If a field in a table is optional, it is possible to insert a new record or update a record without adding a value to this field. Then, the field will be saved with a NULL value.

NULL can hold value for any domain.

Domain constraints are user defined data type and we can define them like this:
Domain Constraint = data type + Constraints (NOT NULL / UNIQUE / PRIMARY KEY / FOREIGN KEY / CHECK / DEFAULT)

Domain defines the possible values to be put in a field of database.

Govt. Polytechnic College – Rajsamand

Session 2017-18

Class Test-II

INTERNET AND WEB TECHNOLOGIES (CS-209)

Duration: 1 Hr.

MM: 15

Note: Attempt any 3 questions.

- | | |
|--|---|
| Q1. How to define colors on web page? Explain? | 5 |
| Q2. How to define internal(embedded) CSS? | 5 |
| Q3. Explain borders and margins in CSS ? | 5 |
| Q4. What is CSS? Explain types of CSS. | 5 |

ANSWER 1.

There are several ways to add background color to your web site. You can add some HTML in the <body> tag such as:

```
<body bgcolor="#000000">
```

This provides a solid black background to the web page. If you use black font on your site, suddenly your web page looks like someone turned out the lights. You'll still see any other images and graphic elements you've used, but all of your text will not appear. At this point, you could change your font to white, or you could change the back ground color to a light gray, such as E0E0E0. That eliminates the sometimes harsh glare of a bright white web page, but then again, some web sites look very good using a plain white background.

Most likely, you'll want the same background color on all of your pages. Open your CSS file and type:

```
body  
{  
background: #E0E0E0;  
}
```

Provided that your CSS file is linked to your htm docs, you now have a light gray background on all of your pages

ANSWER 2.

An internal stylesheet holds the CSS code for the webpage in the head section of the particular file. This makes it easy to apply styles like classes or id's in order to reuse the code. The downside of using an internal stylesheet is that changes to the internal stylesheet only effect the page the code is inserted into.

Internal CSS Stylesheet

When creating a stylesheet internally in the web page, you will need to use the HTML tags in the Head section of your webpage. All the code for the Internal CSS stylesheet is contained between the section of your websites code. Below is an example of what an Internal stylesheet looks like.

```
<head> <br />
<style type="text/css">

  h1 {color:blue;}

  h2 {color:red;}

  p {color:green;}

</style><br />

</head>
```

Embedded Style

Embedded styles are styles that are embedded in the head of the document. Embedded styles affect only the tags on the page they are embedded in. Once again, this approach negates one of the strengths of CSS. Since every page would have styles in the if you wanted to make a site wide change, like changing the color of links from red to green, you would need to make this change on every page, since every page uses an embedded style sheet. This is better than inline styles, but still problematic in many instances

ANSWER 3. Borders

The CSS border properties allow you to specify the style, width, and color of an element's border.

The border-style property specifies what kind of border to display.

The following values are allowed:

- dotted - Defines a dotted border

- dashed - Defines a dashed border
- solid - Defines a solid border
- double - Defines a double border
- groove - Defines a 3D grooved border. The effect depends on the border-color value
- ridge - Defines a 3D ridged border. The effect depends on the border-color value
- inset - Defines a 3D inset border. The effect depends on the border-color value
- outset - Defines a 3D outset border. The effect depends on the border-color value
- none - Defines no border
- hidden - Defines a hidden border

The border-style property can have from one to four values (for the top border, right border, bottom border, and the left border).

Margins

The CSS margin properties are used to create space around elements, outside of any defined borders.

With CSS, you have full control over the margins. There are properties for setting the margin for each side of an element (top, right, bottom, and left).

CSS has properties for specifying the margin for each side of an element:

- margin-top
- margin-right
- margin-bottom
- margin-left

All the margin properties can have the following values:

- auto - the browser calculates the margin
- *length* - specifies a margin in px, pt, cm, etc.
- % - specifies a margin in % of the width of the containing element
- inherit - specifies that the margin should be inherited from the parent element

ANSWER 4.

CSS stands for Cascading Style Sheets

CSS describes how HTML elements are to be displayed on screen, paper, or in other media

CSS saves a lot of work. It can control the layout of multiple web pages all at once

External stylesheets are stored in CSS files

There are 3 types of CSS

1. Inline styles
2. Embedded styles
3. External styles

Inline CSS

Inline styles are styles that are written directly in the tag in the HTML document. Inline styles affect only the specific tag they are applied to. Here is an example of an inline style applied to a standard link, or anchor, tag:

```
<a href="/index.html" style="text-decoration: none;">
```

Embedde Style

Embedded styles are styles that are embedded in the head of the document. Embedded styles affect only the tags on the page they are embedded in. Once again, this approach negates one of the strengths of CSS. Since every page would have styles in the if you wanted to make a site wide change, like changing the color of links from red to green, you would need to make this change on every page, since every page uses an embedded style sheet. This is better than inline styles, but still problematic in many instances.

External CSS

Each page must include a reference to the external style sheet file inside the <link> element. The <link> element goes inside the <head> section:

Example

```
<head>  
<link rel="stylesheet" type="text/css" href="mystyle.css">  
</head>
```

An external style sheet can be written in any text editor. The file should not contain any html tags. The style sheet file must be saved with a .css extension.

Govt. Polytechnic College – Rajsamand

Session 2017-18

Class Test-II

UNIX, SHELL PROGRAMMING AND ADMINISTRATION (CS-303)

Duration: 1 Hr.

MM: 15

Note: Attempt any three questions.

Q1. What is umask? Explain (5)

Q2. What is the meaning of .(dot) and ..(double dot) in UNIX. (5)

Q3. Explain bc and expr commands. (5)

Q4. Explain cat and chmod commands. (5)

ANSWER: 1

umask, as the man page says, stands for **User file creation mask** which is used for determining the default permission for a new file creation. The new file creation could either be a file creation through a normal process or a file copy. umask command is a shell built-in meaning it is an internal command.

The three file permission attributes are read, write and execute. These 3 are mapped to octal values as shown below:

read	- 4
write	- 2
execute	- 1

In UNIX, the default file creation value is 666. 6 is 4+2(read + write). Permission 666 means 6 for the User, 6 for the group and 6 for others. Hence, a new file creation by default is meant to have read and write permission for User, group and others. This is the place where the umask comes into the picture. It is a kind of filter wherein we can choose to retain or block some of the default permissions from being applied on the file.

Say, the umask value is 0022. umask is by default displayed in Octal form, and hence the first 0 in the umask value is the indication for octal value. So, the actual umask is 022. This value together with the default file value(666) decides the final permission to be given to the file.

Assume we create a file say "file1". The permissions given for this file will be the result coming from the subtraction of the umask from the default value :

Default: 666
umask : 022

Result : 644

644 is the permission to be given on the file "file1". 644 means read and write for the User(644), read only for the group(644) and others(644).

```
$ touch file1

$ ls -l file1

-rw-r--r-- 1 guru None 0 Apr 22 18:53 file1
```

The same rule is applied while creating a directory as well.

Let us have some FAQ:

1. What is umask?

umask is a number which defines the default permissions which are not to be given on a file. A umask of 022 means not to give the write permission to the group(022) and others(022) by default.

2. How to find out the umask value?

```
$ umask

0022
```

The option -S gives in more readable format.

```
$ umask -S

u=rwx,g=rx,o=rx
```

This means umask, at the max, allows all permissions for the user, read and execute alone for the group and others.

3. How to set the umask value?

```
$ umask 033
```

The same can be given in this below form as well:

```
$ umask u=rwx,g=r,o=r
```

ANSWER 2.

Single dot "." stands for current directory and double dots ".." mean parent directory. Similarly "~" stands for home directory. These shortcuts come in very handy because you don't have to type in complete path of any file you want to access in a particular (or current) directory.

For Example- typing `cd ..` takes you one directory up the Hierarchy.

The *dot*, which is the same character as the *period*, has several important roles in computer software.

Perhaps the most familiar to most computer users is to indicate the start of a filename extension. This is a short string (i.e., sequence of characters) that is added to the end of the base name (i.e., the main part of the name) of a file or directory in order to indicate the type of file or directory. Extensions are used for all files on the Microsoft Windows operating systems, although the systems are often configured so that they are not visible to users. Extensions are not necessary for most types of files on Linux and other Unix-like operating systems.

Dots are also used in all URLs (universal resource locators), which are addresses of documents and other resources on the Internet. They are used to separate the protocol (e.g., *www* or *ftp*) from the domain name (e.g., *yahoo.com*) as well as in the domain name extension (e.g., *.com* or *.org*). In addition, virtually every web page has an extension that is preceded by a dot (e.g., *.html* or *.php*), although web servers are typically configured so that the extensions are not visible for some pages, particularly home pages.

ANSWER 3.

Arithmetic operations are the most common in any kind of programming language. Unix or linux operating system provides the `bc` command and `expr` command for doing arithmetic calculations

The `bc` command evaluates expressions similar to the `c` programming language. The `bc` command supports the following features.

- Arithmetic operators
- Assignment operators
- Comparison or Relational Operators
- Logical or Boolean operators

Arithmetic operator Examples:

The following example shows how to use various arithmetic operators. The examples are pretty straight forward. So, I will provide explanation only when required. In most of the examples the echo statment is used to provide the expressions to the bc command.

Finding Sum of Two expressions

```
> echo "2+5" | bc
```

```
7
```

Relational Operators Examples:

Relational operators are used to compare two numbers. If the comparison is true, then it returns 1. Otherwise (false), it returns 0. The relational operators are mostly used in conditional statements like if. The list of relational operators supported in bc command are shown below:

- `expr1 < expr2` : Result is 1 if expr1 is strictly less than expr2.
- `expr1 <= expr2` : Result is 1 if expr1 is less than or equal to expr2.
- `expr1 > expr2` : Result is 1 if expr1 is strictly greater than expr2.
- `expr1 >= expr2` : Result is 1 if expr1 is greater than or equal to expr2.
- `expr1 == expr2` : Result is 1 if expr1 is equal to expr2.
- `expr1 != expr2` : Result is 1 if expr1 is not equal to expr2.

```
> echo "10 > 5" | bc
```

```
1
```

```
> echo "1 == 2" | bc
```

```
0
```

Logical Operator Examples:

Logical operators are also mostly used in conditional statements. The result of the logical operators is either 1 (True) or 0 (false) ! `expr` : Result is 1 if expr is 0.

- `expr && expr` : Result is 1 if both expressions are non-zero.
- `expr || expr` : Result is 1 if either expression is non-zero.

```
> echo "4 && 10" | bc
```

1

```
> echo "0 || 0" | bc
```

0

ANSWER 4.

The cat command (short for “**concatenate**”) is one of the most frequently used command in Linux/Unix, Apple Mac OS X operating systems. **cat** command allows us to create single or multiple files, view contain of file, concatenate files and redirect output in terminal or files. It is a standard Unix program used to concatenate and display files. The cat command display file contents to a screen. Cat command concatenate FILE(s), or standard input, to standard output. With no FILE, or when FILE is -, it reads standard input. Also, you can use cat command for quickly creating a file. The cat command can read and write data from standard input and output devices. It has three main functions related to manipulating text files: creating them, displaying them, and combining them.

The basic syntax of cat command is as follows:

```
$ cat filename
```

chmod is used to change the permissions of files or directories.

On Linux and other Unix-like operating systems, there is a set of rules for each file which defines who can access that file, and how they can access it. These rules are called file permissions or file *modes*. The command name **chmod** stands for "change mode", and it is used to define the way a file can be accessed.

In general, **chmod** commands take the form:

```
chmod options permission file name
```

If no *options* are specified, **chmod** modifies the permissions of the file specified by *file name* to the permissions specified by *permissions*.

permissions defines the permissions for the owner of the file (the "user"), members of the group who owns the file (the "group"), and anyone else ("others"). There are two ways to represent these permissions: with symbols (alphanumeric characters), or with octal numbers (the digits **0** through **7**).

Govt. Polytechnic College – Rajsamand

Session 2017-18

Class Test-II

Java Tools (CS-309)

Duration: 1 Hr.

MM: 15

Note: Attempt any 3 questions.

- | | |
|--|---|
| Q1. What are applets program? Explain. | 5 |
| Q2. Explain drawRect() and drawOval()? | 5 |
| Q3. WAP in java to draw triangle using applet? | 5 |
| Q4. Draw and explain applet life cycle. | 5 |

ANSWER 1.

An applet is a small Java program that is a part of a web page and is downloaded automatically from a server when the client requests that web page.

An applet doesn't contain a *main()* method like the Java console programs. An applet is used to display graphics or to display a GUI (ex: login form, registration form) to the users.

Creating an Applet

An applet can be created by extending either *Applet* class or *JApplet* class. First let's see how to create an applet using the *Applet* class. The *Applet* class is available in *java.applet* package. An applet which displays "Hello World" is shown below:

```
1 import java.awt.*;
2 import java.applet.*;
3 public class MyApplet extends Applet
4 {
```

```

5      public void paint(Graphics g)
6      {
7          g.drawString("Hello World!", 20, 20);
8      }
9  }
10 /*
11      <applet code="MyApplet" height="300" width="500"></applet>
12 */

```

ANSWER 3.

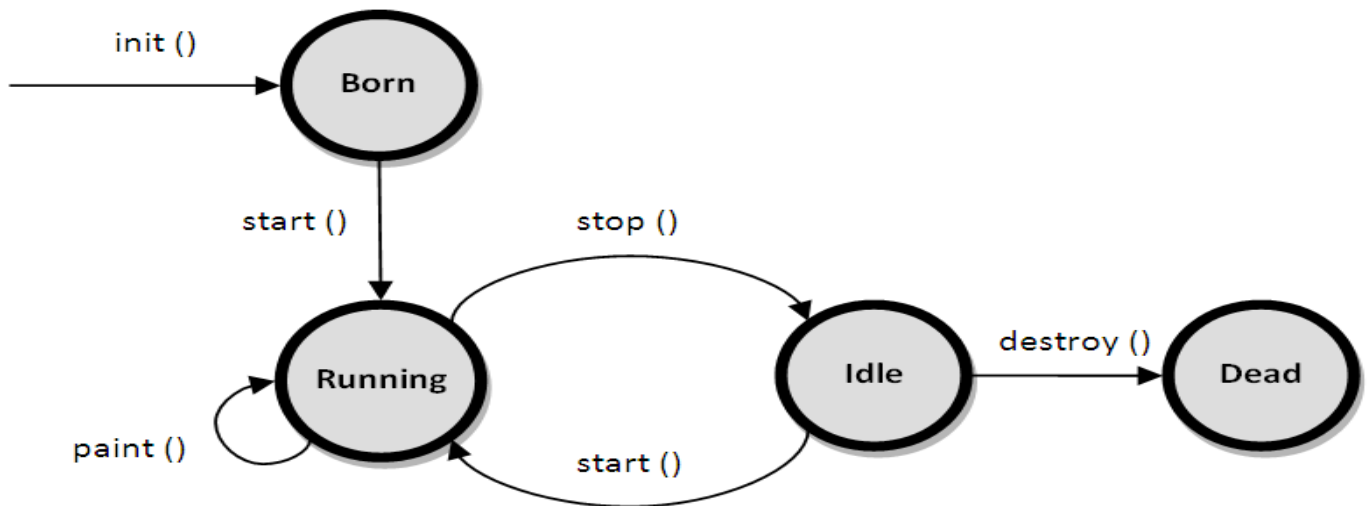
```

import java.awt.*;
import javax.swing.*;
import java.awt.event.*;
import java.awt.geom.Line2D;

public class DrawTriangleUsingLine2D extends JApplet {
    public void init() {
        setBackground(Color.lightGray);
    }
    public void paint(Graphics g) {
        Graphics2D g2d = (Graphics2D) g;
        g2d.setPaint(Color.red);
        g2d.draw(new Line2D.Double(50,150,150,150 ));
        g2d.draw(new Line2D.Double(50,50,150,150 ));
        g2d.draw(new Line2D.Double(50,50,50,150 ));
    }
    public static void main(String s[]) {
        JFrame frame = new JFrame("Show Triangle");
        JApplet applet = new DrawTriangleUsingLine2D();
        frame.getContentPane().add("Center", applet);
        applet.init();
        frame.setSize(300, 250);
        frame.show();
    }
}

```

ANSWER 4.



Following is the brief description of the Life Cycle methods.

1. `public void init():` This method is called at the time of starting the execution. This is called only once in the life cycle. This method initializes the Applet and it helps to initialize variables and instantiate the objects and load the GUI of the applet. This is invoked when the page containing the applet is loaded. It is the born state of a thread.
 2. `public void start():` Even though applet object is created by the `init()` method, it remains in inactive state. The `init()` method calls `start()` method. It starts the execution of Applet. In this state, the applet becomes active.
 3. `public void stop():` In this method the applet becomes temporarily inactive. It is invoked when the Applet stops or when the browser is minimized. The Applet frequently comes to this state in its life cycle and can go back to its active state. It is equivalent to the blocked state of the thread.
 4. `public void paint() :` This method takes a `java.awt.Graphics` object as parameter. This method helps to create Applet's GUI such as a colored background, drawing and writing. `paint()` method is called by the `start()` method. This is called number of times in the execution. This is equivalent to runnable state of thread.
 5. `public void destroy():` This destroys the Applet and is also invoked only once when the active browser page containing the applet is closed. It is equivalent to the dead state of the thread.
- The `init()` and `destroy()` methods are called only once in the life cycle. But, `start()`, `paint()` and `stop()` methods are called a number of times.

Govt. Polytechnic College – Rajsamand

Session 2017-18

Class Test-II

PHP and MYSQL (CS-310)

Duration: 1 Hr.

MM: 15

Note: Attempt any 3 questions.

Q1. What is Cookies? How to create a cookie?

5

Q2. What is form processing? Explain.

5

Q3. Explain DDL and DML?

5

Q4. How cookies can be retrieved and deleted?

5

ANSWER 1. Cookie is often used to identify a user. A cookie is a small file that the server embeds on the user's computer. Each time the same computer requests a page with a browser, it will send the cookie too. With PHP, you can both create and retrieve cookie values.

A cookie is created with the `setcookie()` function.

Syntax

```
setcookie(name, value, expire);
```

The following example creates a cookie named "user" with the value "John Doe". The cookie will expire after 30 days (86400 * 30). The "/" means that the cookie is available in entire website (otherwise, select the directory you prefer).

We then retrieve the value of the cookie "user" (using the global variable \$_COOKIE). We also use the isset() function to find out if the cookie is set:

Example

```
<?php
$cookie_name = "user";
$cookie_value = "John Doe";
setcookie($cookie_name, $cookie_value, time() + (86400 * 30), "/"); // 86400 = 1 day
?>

<html>
<body>

<?php
if(!isset($_COOKIE[$cookie_name])) {
    echo "Cookie named '" . $cookie_name . "' is not set!";
} else {
    echo "Cookie '" . $cookie_name . "' is set!<br>";
    echo "Value is: " . $_COOKIE[$cookie_name];
}
?>

</body>
</html>
```

ANSWER 2.

We need to create an HTML form that will send information to your PHP script. There are two methods for sending data: POST and GET. These two types of sending information are defined in your HTML form element's method attribute. Also, you must specify the location of the PHP file that will process the information.

Below is an HTML form that will send the data using the POST method. Information sent from a form with the POST method is invisible to others and has no limits on the amount of information to send. Copy and paste this code and save it as *form.html*.

```
<html>
<head>
    <title>Process the HTML form data with the POST method</title>
```

```

</head>
<body>
  <form name="myform" action="process.php" method="POST">
    <input type="hidden" name="check_submit" value="1" />
    Name: <input type="text" name="Name" /><br />
    Password: <input type="password" name="Password" maxlength="10" /><br />
    Select something from the list: <select name="Seasons">
      <option value="Spring" selected="selected">Spring</option>
      <option value="Summer">Summer</option>
      <option value="Autumn">Autumn</option>
      <option value="Winter">Winter</option>
    </select><br /><br />
    Choose one:
      <input type="radio" name="Country" value="USA" /> USA
      <input type="radio" name="Country" value="Canada" /> Canada
      <input type="radio" name="Country" value="Other" /> Other
    <br />
    Choose the colors:
      <input type="checkbox" name="Colors[]" value="green" checked="checked"
/> Green
      <input type="checkbox" name="Colors[]" value="yellow" /> Yellow
      <input type="checkbox" name="Colors[]" value="red" /> Red
      <input type="checkbox" name="Colors[]" value="gray" /> Gray
    <br /><br />
    Comments:<br />
    <textarea name="Comments" rows="10" cols="60">Enter your comments
here</textarea><br />
    <input type="submit" />
  </form>
</body>
</head>
</html>

```

The example HTML page above includes different form elements: input fields, select list, text area, radio buttons, checkboxes and a submit button. When a user fills in this form and clicks on the submit button, the form data is sent to the *process.php* file.

Notice that we have added square brackets [] to the name of the checkbox element. The reason for the square brackets is that it informs PHP that the value may be an array of information. Users can select multiple values, and PHP will place them all into an array of the value of the name attribute.

For example, if you pick Green and Yellow and submit the form, then `$_POST['Colors']` is itself an array. `$_POST['Colors'][0]` is Green and `$_POST['Colors'][1]` is Yellow. That's because the name attribute of the checkbox element is `Colors[]`. If the name was just `Colors`, then `$_POST['Colors']` would be a string, holding only one of the selected values.

Processing the Form Data (PHP Code)

Next, we are going to create our PHP file that will process the data. When you submit your HTML form PHP automatically populates two superglobal arrays, `$_GET` and `$_POST`, with all the values sent as GET or POST data, respectively. Therefore, a form input called 'Name' that was sent via POST, would be stored as `$_POST['Name']`.

Copy and paste this code and save it as *process.php* in the same directory as *form.html*.

```
<?php
//Check whether the form has been submitted
if (array_key_exists('check_submit', $_POST)) {
    //Converts the new line characters (\n) in the text area into HTML line breaks (the
    <br /> tag)
    $_POST['Comments'] = nl2br($_POST['Comments']);
    //Check whether a $_GET['Languages'] is set
    if (isset($_POST['Colors'])) {
        $_POST['Colors'] = implode(' ', $_POST['Colors']); //Converts an array into a
        single string
    }

    echo "Your name: {$_POST['Name']}<br />";
    echo "Your password: {$_POST['Password']}<br />";
    echo "Your favourite season: {$_POST['Seasons']}<br /><br />";
    echo "Your comments:<br />{$_POST['Comments']}<br /><br />";
    echo "You are from: {$_POST['Country']}<br />";
    echo "Colors you chose: {$_POST['Colors']}<br />";
} else {
    echo "You can't see this page without submitting the form.";
}
?>
```

Let's give a little explanation. At the first line we check whether the form has been submitted and the php script has not been called directly. Next we convert the new line characters in the text area into HTML line breaks. Then we check whether a `$_POST['Colors']` is set and if so we use *implode()* function to convert `$_POST['Colors']` array into a single string. Finally, we print out all received values in the browser.

ANSWER 3.

DDL

DDL is short name of Data Definition Language, which deals with database schemas and descriptions, of how the data should reside in the database.

- CREATE – to create database and its objects like (table, index, views, store procedure, function, and triggers)
- ALTER – alters the structure of the existing database
- DROP – delete objects from the database
- TRUNCATE – remove all records from a table, including all spaces allocated for the records are removed
- COMMENT – add comments to the data dictionary
- RENAME – rename an object

DML

DML is short name of Data Manipulation Language which deals with data manipulation and includes most common SQL statements such SELECT, INSERT, UPDATE, DELETE etc, and it is used to store, modify, retrieve, delete and update data in a database.

- SELECT – retrieve data from a database
- INSERT – insert data into a table
- UPDATE – updates existing data within a table
- DELETE – Delete all records from a database table

ANS 4.

PHP Create/Retrieve a Cookie

The following example creates a cookie named "user" with the value "John Doe". The cookie will expire after 30 days (86400 * 30). The "/" means that the cookie is available in entire website (otherwise, select the directory you prefer).

We then retrieve the value of the cookie "user" (using the global variable \$_COOKIE). We also use the isset() function to find out if the cookie is set:

Example

```
<?php
$cookie_name = "user";
$cookie_value = "John Doe";
setcookie($cookie_name, $cookie_value, time() + (86400 * 30), "/"); // 86400 = 1 day
?>
<html>
<body>
<?php
if(!isset($_COOKIE[$cookie_name])) {
    echo "Cookie named '" . $cookie_name . "' is not set!";
```

```
} else {  
    echo "Cookie '" . $cookie_name . "' is set!<br>";  
    echo "Value is: '" . $_COOKIE[$cookie_name];  
}  
?>  
</body>  
</html>
```

Delete a Cookie

To delete a cookie, use the `setcookie()` function with an expiration date in the past:

```
<?php  
setcookie("user", "", time() - 3600);  
?>  
<html>  
<body>  
<?php  
echo "Cookie 'user' is deleted.";  
?>  
</body>  
</html>
```

EL 201

Electronic Components & Shop Practice

Time 1 hr

M.M. 15

1. Define passive component. What are the characteristics of passive components?

Ans. A passive component is an electronic component that consumes energy in the form of voltage but does not supply energy.

1. Passive components cannot increase the power of an electrical signal.
2. Passive components temporarily store the electrical energy in the form of [electric field](#) or magnetic field.
3. Passive components do not depend on the external source of voltage to perform a specific task.

2. Define fixed resistor. List different types of fixed resistors

Ans. Fixed resistor is a type of resistor which provides fixed resistance to the electric current.

The different types of fixed resistors include:

1. [Carbon film resistor](#)
2. [Carbon composition resistor](#)
3. [Metal film resistor](#)
4. [Metal oxide film resistor](#)
5. [Wire wound resistor](#)

6. Thick film resistor
7. Thin film resistor
8. [Metal glaze resistor](#)
9. [Foil resistor](#)

3. Define carbon composition resistor. What are the advantages and disadvantages of carbon composition resistors?

Ans. Carbon composition resistor is a type of fixed resistor which reduces the flow of electric current by using its resistive element.

Advantages

- Able to withstand at high energy pulses.
- Low cost

Disadvantages

- Generate high noise
- Low accuracy
- Poor stability

EL 204

Electronic devices & circuits

Time 1 hr

M.M. 15

Note: Attempt any three

1. Differentiate semiconductors, conductors and insulators on the basis of band gap.

Ans The distinction between conductors, insulators and semiconductors is largely concerned with the relative width of the forbidden energy gaps in their energy band structures. There is a wide forbidden gap (more than 5eV) for insulators, narrow forbidden gap (about 1eV) in case of semiconductors and no forbidden gap in case of conductors.

2. What is the forbidden energy gap? How does it occur? What is its magnitude for Ge and Si? Is a hole a fundamental particle in an atom?

Ans. The energy gap between the valence band and conduction band is known as forbidden energy gap. It is a region in which no electron can stay as there is no allowed energy state. Magnitude of forbidden energy gap in germanium and silicon is 0.72 eV and 1.12 eV respectively at 300 K and 0.785 eV and 1.21 eV respectively at absolute zero

temperature. Hole is not a fundamental particle in an atom. Holes may be thought of as positive particles, and as such they move through an electric field in a direction opposite to that of electrons.

3. Describe the difference between P-type and N-type semiconductor materials. What do you mean by donor and acceptor impurities?

Ans. When a small amount of trivalent impurity (such as boron, gallium, indium or aluminium) is added to a pure semiconductor crystal during crystal growth, the resulting crystal is called a P-type semiconductor.

When a small amount of pentavalent impurity (such as arsenic, antimony, bismuth or phosphorous) is added to a pure semiconductor crystal during crystal growth, the resulting crystal is called the N-type semiconductor. Donor impurities (such as arsenic, antimony, bismuth or phosphorous) when added to a pure semiconductor lattice, form N-type extrinsic semiconductor. The pentavalent impurities are called donor impurities as such impurities donate electrons to the lattice.

Acceptor impurities (such as boron, gallium, indium or aluminium) when added to a semiconductor lattice form P-type extrinsic semiconductor. The trivalent impurities are called acceptor impurities because such impurities accept electrons from the lattice.

4. Explain the term doping and its need.

Ans The electrical conductivity of intrinsic semiconductor, which has little current conducting capability at room temperature and so is of little use, can be increased many times by adding very small amount of

impurity (of the order of one atom per million atoms of pure semiconductor) to it in the process of crystallization. This process is called doping.

EL 307

Linear integrated circuits

Time 1 hr

M.M. 15

1.State assumptions made for analyzing ideal op-amp.

Ans.Assumptions made for analyzing ideal op-amp are :

- Infinite open-loop gain
- Infinite input impedance
- Zero output impedance
- Perfect balance
- Infinite frequency bandwidth

- Infinite slew rate
- Infinite common-mode rejection ratio
- Nil drift of characteristics with temperature

2. Define CMRR. Why does an op-amp have high CMRR?

Ans. CMRR is defined as the ratio of differential voltage gain to common-mode voltage gain and it is given as $CMRR = A_d/A_{cm}$

High CMRR ensures that the common mode signals such as noise are rejected successfully and the output voltage is proportional only to the differential input voltage.

3. Why open-loop op-amp configurations are not used in linear applications? List the parameters that should be considered for ac and dc applications.

Ans When an op-amp is operated in the open-loop configuration, the output either goes to positive saturation or negative saturation levels or switches between positive and negative saturation levels and thus clips the output above these levels. So open-loop op-amp configurations are not used in linear applications.

The parameters to be considered for dc applications are:

- Input offset voltage
- Input offset current
- Input bias current
- Drift

The parameters to be considered for ac applications are:

- Gain bandwidth product (GBW)
- Rise time
- Slew rate
- Full-power response
- AC noise

EL 303

Advance Communication Systems

Time 1 hrM.M. 15

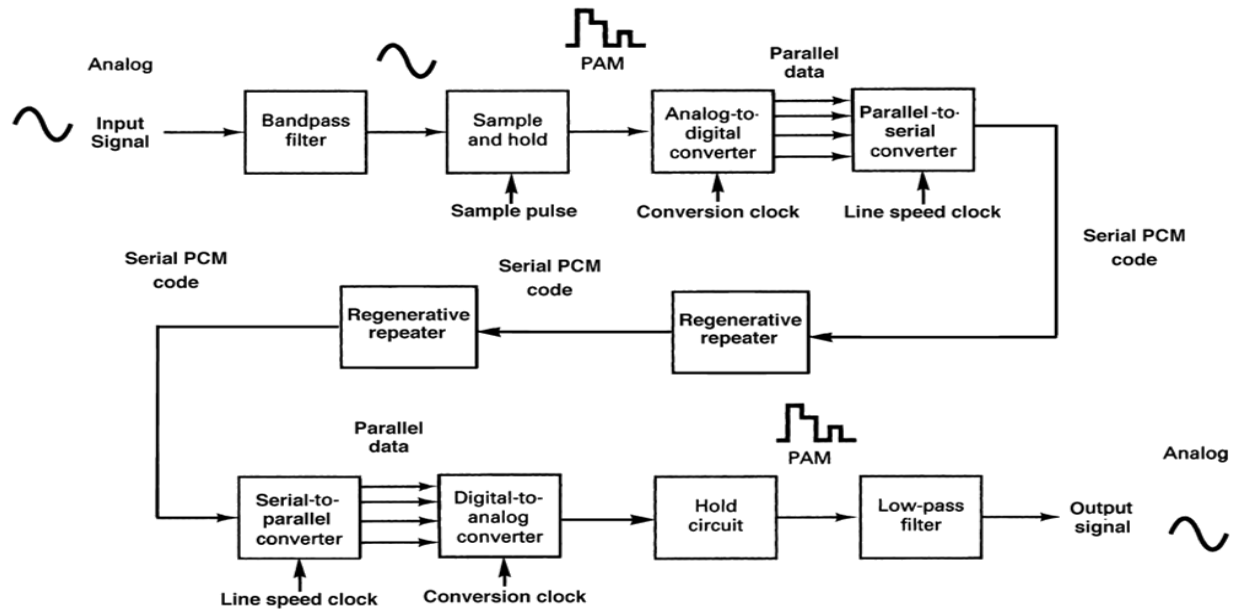
Q1. Draw the block diagram of a PCM system, indicating the function of each block.

Pulse Code Modulation

1. PCM is the preferred method *of* communications within the public switched telephone network because with PCM it is easy to combine digitized voice and digital data into a single, high-speed digital signal and propagate it over either metallic or optical fiber cables.
2. With PCM, the pulses are of fixed length and fixed amplitude.
3. PCM is a binary system where a pulse or lack of a pulse within a prescribed time slot represents either a logic 1 or a logic 0 condition.
4. PWM, PPM, and PAM are digital but seldom binary, as a pulse does not represent a single binary digit (bit).

PCM system Block Diagram

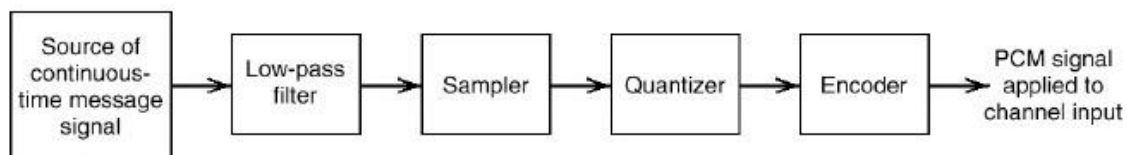
1. The band pass filter limits the frequency of the analog input signal to the standard voice-band frequency range of 300 Hz to 3000 Hz.
2. The sample- and- hold circuit periodically samples the analog input signal and converts those samples to a multilevel PAM signal.
3. The analog-to-digital converter (ADC) converts the PAM samples to parallel PCM codes, which are converted to serial binary data in the parallel-to-serial converter and then outputted onto the transmission line as serial digital pulses.
4. The transmission line repeaters are placed at prescribed distances to regenerate the digital pulses.
5. In the receiver, the serial-to-parallel converter converts serial pulses received from the transmission line to parallel PCM codes.
6. The digital-to-analog converter (DAC) converts the parallel PCM codes to multilevel PAM signals.
7. The hold circuit is basically a low pass filter that converts the PAM signals back to its original analog form.



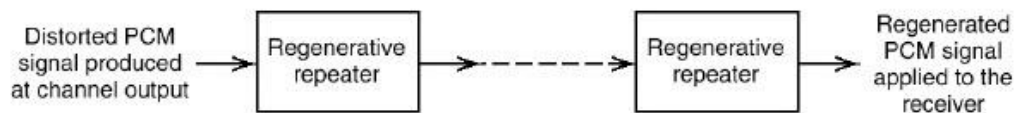
The block diagram of PCM system.

Q.2 What is a digital Modulation? Explain digital Modulation Theory

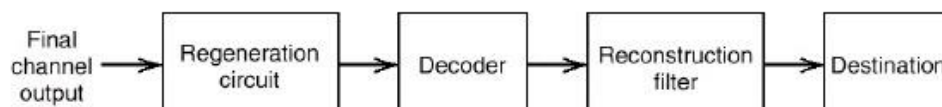
Ans. To get a digital modulated waveform from an analog waveform at the transmitter end (source) of a communications circuit, the amplitude of the analog signal samples at regular time intervals. The sampling rate or number of samples per second is several times the maximum frequency. The message signal converted into binary form will be usually in the number of levels which is always to a power of 2



(a) Transmitter



(b) Transmission path

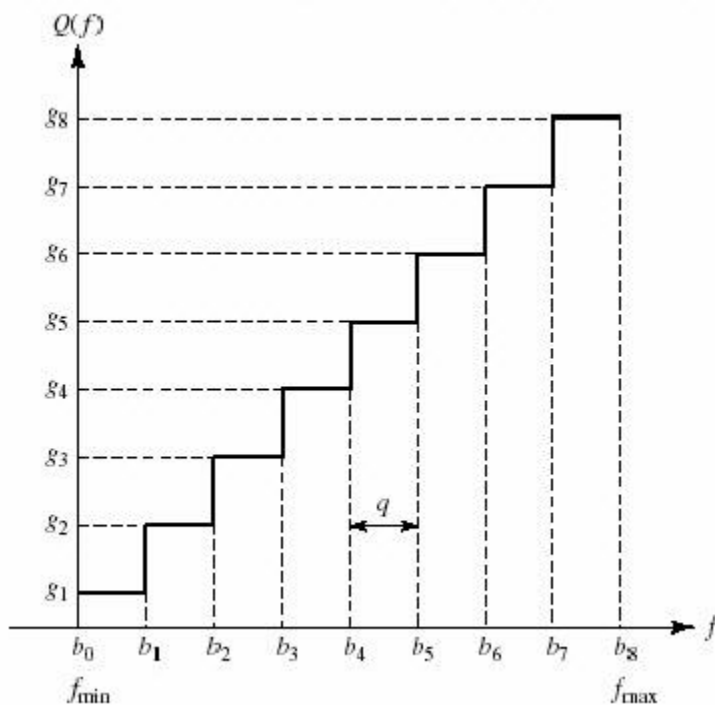


(c) Receiver

Q3. What is Quantization Explain?

In quantization, an analog sample with an amplitude that converted into a digital sample with an amplitude that takes one of a specific defined set of quantization values. Quantization is done by dividing the range of possible values of the analog samples into some different levels, and assigning the center value of each level to any sample in quantization interval. Quantization approximates the analog sample values with the nearest quantization values. So almost all the quantized samples will differ from the original samples by a small amount. That amount is called as quantization error. The result of this quantization error is we will hear hissing noise when play a random signal. Converting analog samples into binary numbers that is 0 and 1.

In most of the cases we will use uniform quantizers. Uniform quantization is applicable when the sample values are in a finite range (F_{\min} , F_{\max}). The total data range is divided into 2^n levels, let it be L intervals. They will have an equal length Q . Q is known as Quantization interval or quantization step size. In uniform quantization there will be no quantization error.



Uniformly Quantized Signal

As we know, $L=2^n$, then Step size $Q = (F_{\max} - F_{\min}) / L$

Interval i is mapped to the middle value. We will store or send only index value of quantized value.

An Index value of quantized value $Q_i(F) = [F - F_{\min} / Q]$

Quantized value $Q(F) = Q_i(F) Q + Q / 2 + F_{\min}$

Govt. Polytechnic College – Rajsamand

Session 2017-18

Class Test-II

MODEL TEST PAPER EL-310

SUBJECT: MANAGEMENT AND ENTREPRENEURSHIP

CODE-EL-310

M.M.: 15

TIME :1 HR.

Q 1. Explain Entrepreneur and Entrepreneurship.

2*2=4

Ans. **Entrepreneur:** An entrepreneur is someone who has an idea and who works to create a product or service that people will buy, by building an organization to support those sales.

Entrepreneurship: Entrepreneurship is the process of designing, launching and running a new [business](#), which is often initially a [small business](#).

Q2. What are the characteristics of a good entrepreneur ?

5

Ans.: The characteristics of a good entrepreneur as follows:

- | | |
|--|------------------------------------|
| 1. Passion and Motivation | 2. Not Afraid to Take Risks |
| 3. Self-belief, Hard Work and Disciplined Dedication | 4. Adaptable and Flexible |
| 5. Product and Market Knowledge | 6. Strong Money Management |
| 7. Effective Planning Skills | 8. The Right Connections |
| 9. Exit Preparedness | 10. Ability to Question Themselves |

Q3. Clasify industries on basis of size or capital investment.

6

Ans. Industries are classified as follows on the basis of capital investment

Manufacturing Sector	
Enterprises	Investment in plant machinery
Micro Enterprises	Does not exceed 25 lakh rupees
Small Enterprises	More than 25 lakh rupees but does not exceed 5 crore rupees
Medium Enterprises	More than 5 crore rupees but does not exceed 10 crore rupees
Large Enterprises	More than 10 crore rupees
Service Sector	
Enterprises	Investment in equipments
Micro Enterprises	Does not exceed 10 lakh rupees:
Small Enterprises	More than 10 lakh rupees but does not exceed 2 crore rupees
Medium Enterprises	More than 2 crore rupees but does not exceed 5 crore rupees
Large Enterprises	More than 5 crore rupees

Govt. Polytechnic College – Rajsamand

Session 2017-18

Class Test-II

MODEL TEST PAPER EL-310

SUBJECT: Microwave and Optical Engineering

CODE-EL-304

M.M.: 15

TIME :1 HR.

Q 1. How PIN Diode works? Explain.

5

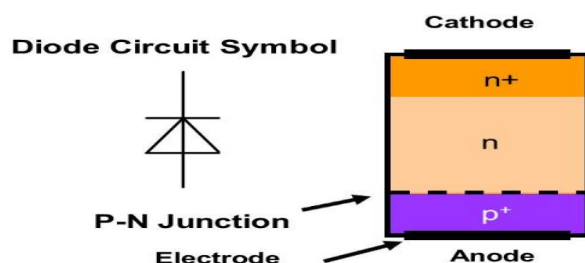
Ans.

The term PIN diode gets its name from the fact that includes three main layers. Rather than just having a P-type and an N-type layer, it has three layers such as P-type layer, Intrinsic layer, N-type layer.

The working principle of the PIN diode exactly same as a normal diode. The main difference is that the depletion region, because that normally exists between both the P & N regions in a reverse biased or unbiased diode is larger. In any PN junction diode, the P region contains holes as it has been doped to make sure that it has a majority of holes. Likewise the N-region has been doped to hold excess electrons.

The layer between the P & N regions includes no charge carriers as any electrons or holes merge. As the depletion region of the diode has no charge carriers it works as an insulator. The depletion region exists within a PIN diode, but if the PIN diode is forward biased, then the carriers come into the depletion region and as the two carrier types get together, the flow of current will start.

When the PIN diode is connected in forward biased, the charge carriers are very much higher than the level of intrinsic carrier's attention. Due to this reason the electric field and the high level injection level extends deeply into the region. This electric field assists in speeding up of the moving of charge carriers from P to N region, which consequences in quicker operation of the PIN diode, making it an appropriate device for high frequency operations.

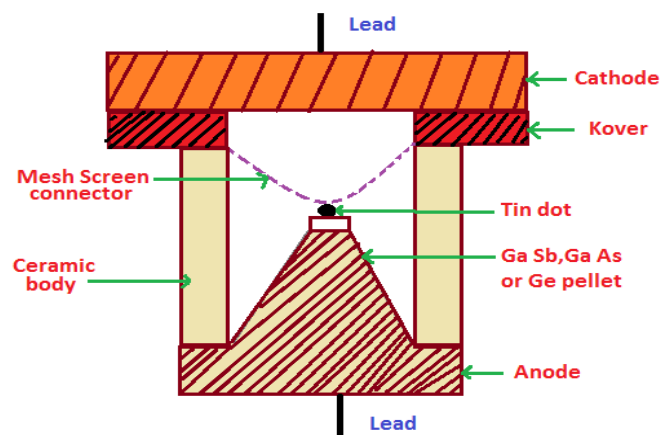


Q2. Explain construction and working of tunnel diode.

5

Construction:

Tunnel diodes are usually fabricated from germanium, gallium or gallium arsenide. These all have small forbidden energy gaps and high ion motilities. Silicon is not used in the fabrication of tunnel diodes due to low (I_p, I_v) value.



A small tin dot is soldered or alloyed to a heavily doped pellet of n-type Ge, GaSb or GaAs. The pellet is then soldered to anode which is also used for heat dissipation. The cathode contact is connected to the tin dot via a mesh screen used to reduce inductance. The diode has a ceramic body and a hermetically sealing lid on top.

Working: Tunnel diode can operate either in a forward direction or reverse direction. Here we are explaining the operation of tunnel diode in both biasing. Operation with the help of V-I characteristics curve is explained in next heading below.

Forward biasing:

In forward bias operation, when the voltage increases electrons at the first tunnel start to flow through the narrow p-n junction barrier and got aligned with empty valence band holes on the p-side of the p-n junction. As voltage increases, this state becomes misaligned and, as a result, current starts falling. The region into which the current drops is known as negative resistance region. By increasing voltage further,

diode begins to operate as a normal diode into which electrons starts moving across the p-n junction through conduction and no longer by tunnelling through the p-n junction barrier.

Reverse Biasing:

In Reverse bias operation, filled state on the p-side of the junction becomes increasingly aligned with empty states at the n-side. When they get properly aligned electrons starts tunnel through the p-n junction barrier in the reverse direction. In the reverse direction, these are also known as back diodes and can act as fast rectifiers with extreme linearity for power signals and zero offset voltage.

Q3. What are the applications of Gunn Diode?

5

Ans.: Applications of GUNN Diode are as follows:

- (i) Used as Gunn oscillators to generate frequencies ranging from 100mW 5GHz to 1W 35GHz outputs. These Gunn oscillators are used for radio communications, military and commercial radar sources.
- (ii) Used as sensors for detecting trespassers, to avoid derailment of trains.
- (iii) Used as efficient microwave generators with a frequency range of up to hundreds of GHz.
- (iv) Used for remote vibration detectors and rotational speed measuring tachometers.
- (v) Used as a microwave current generator (Pulsed Gunn diode generator).
- (vi) Used in microwave transmitters to generate microwave radio waves at very low powers.
- (vii) Used as fast controlling components in microelectronics such as for the modulation of semiconductor injection lasers.
- (viii) Used as sub-millimeter wave applications by multiplying Gunn oscillator frequency with diode frequency.
- (ix) Some other applications include door opening sensors, process control devices, barrier operation, perimeter protection, pedestrian safety systems, linear distance indicators, level sensors, moisture content measurement and intruder alarms.

Govt. Polytechnic College – Rajsamand

Session 2017-18

Class Test-II

MODEL TEST PAPER EL-310

SUBJECT: Power and industrial electronics

CODE-EL-305

M.M.: 15

TIME :1 HR.

Q1. What is meant by dc chopper? What are the advantages and applications of dc chopper? **5**

A dc chopper is a high speed static switch used to obtain variable dc voltage from a constant dc voltage.

The advantages of dc chopper

Chopper provides

- a. High efficiency
- b. Smooth acceleration
- c. Fast dynamic response
- d. Regeneration

Applications of DC Chopper:

- a. Battery operated vehicles
- b. Traction motor control in electric traction
- c. Trolley cars
- d. Marine hoists
- e. Mine haulers

Q2. What is meant by inverter? What are the types and applications of an inverter? **5**

A device that converts dc power into ac power at desired output voltage and frequency is called an inverter.

Types:

- a. Voltage Source Inverter
- b. Current Source Inverter

The applications of an inverter

- i. Adjustable speed drives
- ii. Induction heating
- iii. Stand-by aircraft power supplies
- iv. UPS
- v. HVDC transmission

Q3. What is meant by cyclo-converter? what are different types and applications of cycloconverter? **5**

It converts input power at one frequency to output power at another frequency with one-stage conversion. Cyclo converter is also known as frequency changer.

Types:

a. Step-up cyclo-converters b. Step-down cyclo-converters

Applications:

a. Induction heating b. Speed control of high power ac drives c. Static VAR generation d. Power supply in aircraft or ship boards.

Govt. Polytechnic College – Rajsamand

Session 2017-18

Class Test-II

MODEL TEST PAPER EL-310

SUBJECT: Digital Electronics

CODE-EL-205

M.M.: 15

TIME :1 HR.

Q1. Design a full adder.

5

Ans. Truth table of full adder.

Inputs			Outputs	
A_n	B_n	C_{n-1}	S_n	C_n

Ans. Truth table of full adder.

Inputs			Outputs	
A_n	B_n	C_{n-1}	S_n	C_n
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

$A_n B_n$	00	01	11	10
C_{n-1}				
0		1		1
1	1		1	

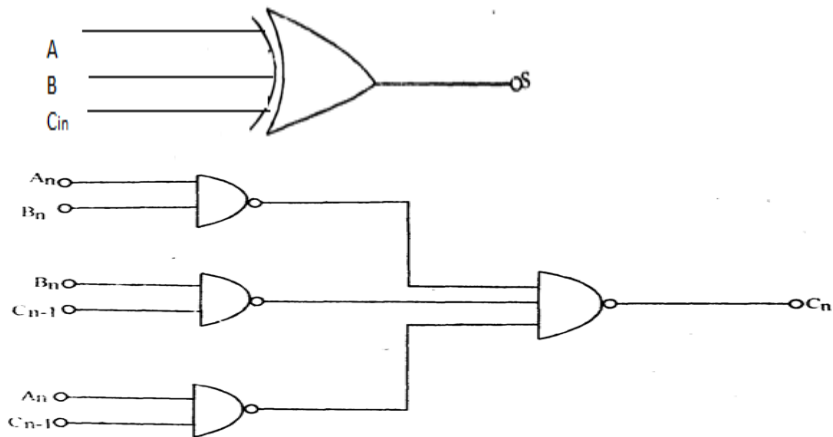
(a) S_n

$A_n B_n$	00	01	11	10
C_{n-1}				
0			1	
1	1	1	1	1

(b) C_n

$$S_n = \bar{A}_n \bar{B}_n \bar{C}_{n-1} + \bar{A}_n \bar{B}_n C_{n-1} + A_n \bar{B}_n \bar{C}_{n-1} + A_n \bar{B}_n C_{n-1}$$

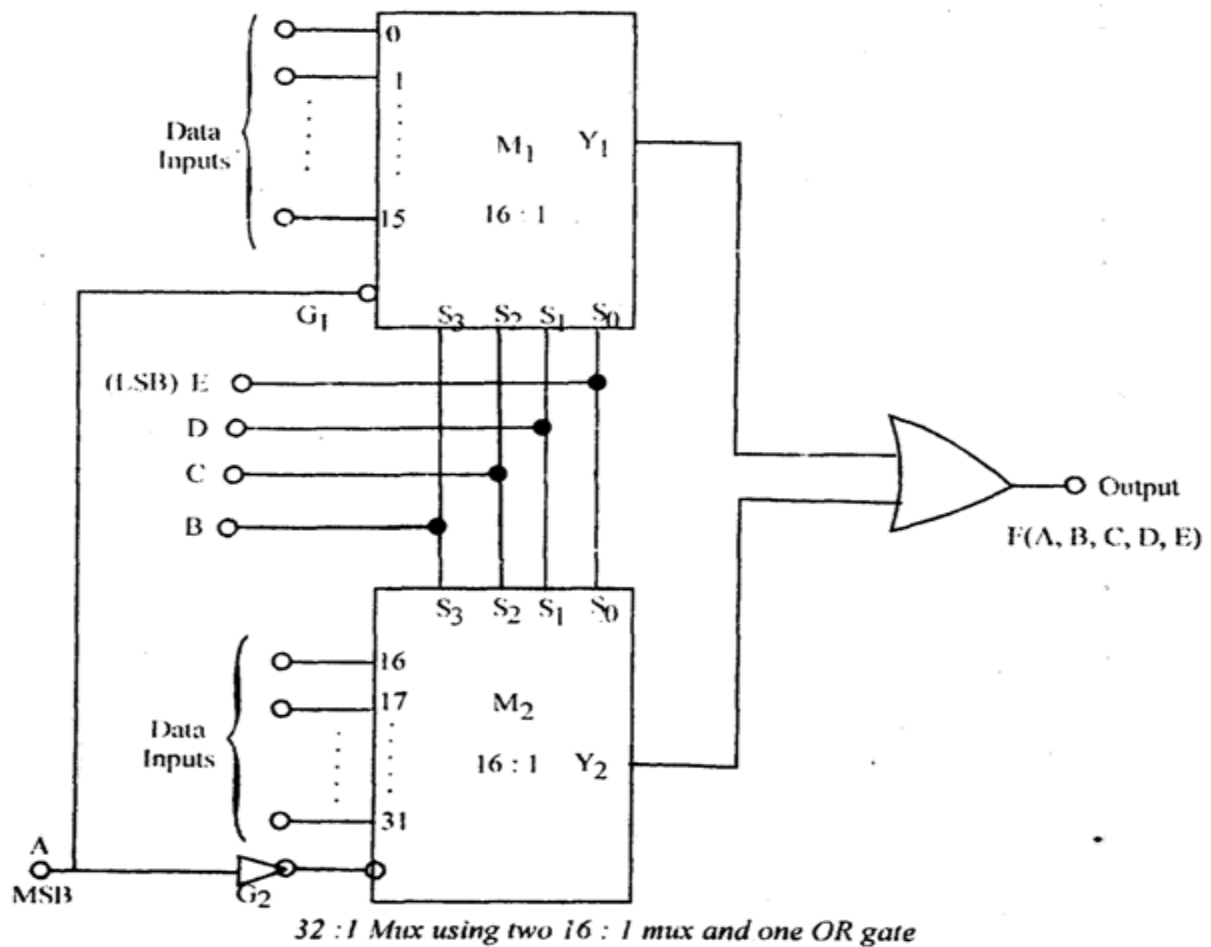
$$C_n = A_n B_n + B_n C_{n-1} + A_n C_{n-1}$$



Q2. Design a 32:1 Multiplexer using 16:1 Multiplexer .

5

Ans.



Q3. Solve $Y(A,B,C,D)=\sum m(4,7,10,11,14,15)$ using K-map.

5

AB \ CD		00	01	11	10
00	0		1	3	2
01	4	1	5	7	6
11	12		13	15	14
10	8		9	11	10

The simplified expression by using K-map is

$$Y = AC + ABD + \overline{A}\overline{B}\overline{C}D$$

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Class Test-II

MODEL TEST PAPER EL-310

SUBJECT: Circuit Analysis

CODE-EL-202

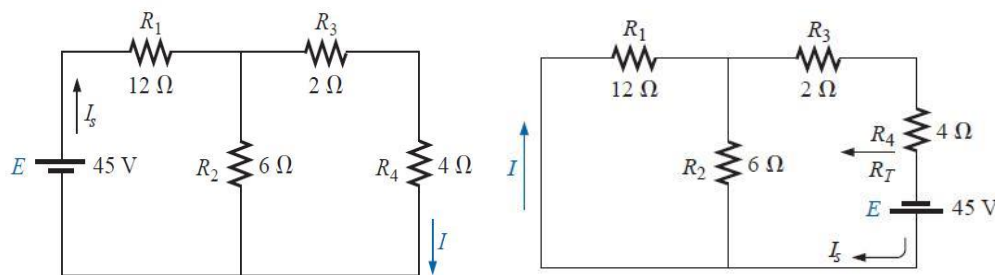
M.M.: 15

TIME :1 HR.

Q 1. Write statement of Reciprocity theorem and prove it.

4

Ans: In its simplest form, the reciprocity theorem states that if an **emf E** in one branch of a reciprocal network produces a **current I** in another, then if the **emf E** is moved from the first to the second branch, it will cause the same current in the first branch, where the emf has been replaced by a short circuit.



$$R_{TH} = [(2 + 4) \parallel 6] + 12 = 15\Omega$$

$$I_S = 45 / 15 = 3 \text{ A}$$

By using current division rule

$$I = 3 * 6 / 12 = 1.5 \text{ A}$$

$$I = 1.5 \text{ A}$$

Now we have to interchange E and I

Since I is pointed downwards in the given problem. so the positive terminal placed downwards when we interchange.

Since E positive terminal points upwards in the given problem, the current I also points upwards in above diagram when we interchange

$$R_T = (12 \parallel 6) + 2 + 4 = 10 \Omega$$

$$I_S = 45 / 10 = 4.5 \text{ A}$$

By using current division rule

$$I = 4.5 * 6 / (12 + 6) = 1.5 \text{ A}$$

$$I = 1.5 \text{ A}$$

Hence Proved

Q2. Write statements of following theorems

3*2=6

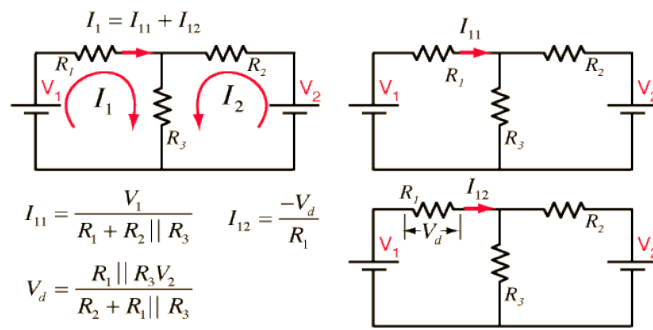
- (i) Thevenin's theorem

- (ii) Norton's Theorem
- (iii) Superposition Theorem

Ans(i) : **Thevenin's Theorem** states that ,Any linear circuit containing several voltages and resistances can be replaced by just one single voltage in series with a single resistance connected across the load. In other words, it is possible to simplify any electrical circuit, no matter how complex, to an equivalent two-terminal circuit with just a single constant voltage source in series with a resistance (or's impedance) connected to a load as shown below.

(ii) **Norton's Theorem** states that , Any linear circuit containing several energy sources and resistances can be replaced by a single Constant Current generator in parallel with a Single Resistor.

- (iii) **The total current in any part of a linear circuit equals the algebraic sum of the currents produced by each source separately.**

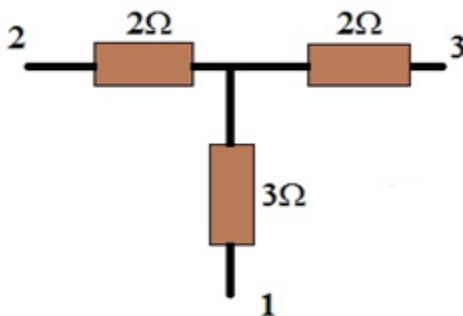


- (iv)

$R_1 \parallel R_3$ means the parallel resistance of R_1 and R_3 .

Q3. Convert following star network to Delta Network

5



$$R_{12} = R_1 + R_2 + (R_1 R_2 / R_3)$$

$$R_{12} = 3 + 2 + (3 \cdot 2) / 2$$

$$\underline{R_{12} = 8\Omega}$$

$$R_{23} = R_2 + R_3 + (R_2 R_3 / R_1)$$

$$R_{23} = 2 + 2 + (2 \cdot 2) / 3$$

$$\underline{R_{23} = 16/3\Omega}$$

$$R_{31} = R_3 + R_1 + (R_3 R_1 / R_2)$$

$$R_{13} = 3 + 2 + (3 \cdot 2) / 2$$

$$\underline{R_{13} = 8\Omega}$$

