Mechanical Engineering
CADM - III - Unit.

Q1 Explain Graphical kernel system. Dec-17.

In earlier days, there were different graphical systems. If a program is made for specific system. it was difficult to ron the same in other graphical systems. In order to ron the program in other graphical systems. entire program is recorded which led to the re writing of code 'n' number of times for 'n' number of graphical systems.

Prime objectives of Gks.

1. To give complete graphical facilities along with interactive capabilities in 2D.
2. To be compatible with all types of graphic and display devices.
3. To be small in size and must be capable to ron variety of programs.

The working environment of a user in Gks. is named as Workstation. It might be a printer, plotter, VDU. etc. and all the workstation are identical to a Programmer.

Three type of coordinate system.

1. WC (World coordinates) - User defined coordinates
2. NDC (Normalised Device coordinates) - coordinates are same for all workstations
3. DC - Device Coordinates - coordinates are specific for a workstation, which differ from one workstation to other.

Input methods.

Locator - used for giving the location (an x,y value) in WC.

Valuator - This gives the input in the form of distance

choice - This selects from set of integer options (Ex:- 0,1,2,3 etc)

Pick - This is used to identify (or) select an object or segment from existing drawing.

STROKE - This inputs a sequence of location i.e (x,y) values in WC.

Graphic output primitives.

1. Polyline :- This draws a sequence of line segments after defining line attributes (line type, thickness and colour).
2. polymarker :- This is used for specific marker types by specifying the type, colour and sizer.
3. Generalised Drawing Primitives (GDP). This is used for drawing particular graphic primitives like arc, circle, ellipse, spline, etc.
4. Text :- This is used for specifying text attributes like font type, colour, height of the text box, spacing and the path (left, right, up or down)
5. FILLAREA, This is used for filling and hatching the areas.

Q2 State the need and requirements of the product data exchange b/w dissimilar CAD/CAM systems. Describe the STEP methodology. - Dec - 17.

1. Need and requirements of Product data Exchange b/w Dissimilar CAD/CAM Sys.

In every phase of Product design and mfg the paper blueprints used for defining the Product geometry and non-geometry are replaced by Computer database.

Exchanging of modelling data among dissimilar CAD/CAM systems, is becoming very complicated due to fundamental incompatibilities among entity representations. Exp:- In some systems, simple geometrics entities like circular arcs are also represented by incompatible forms. This problem arises due to Complexity of CAD/CAM System. Using dissimilar CAD/CAM systems based on the organisational requirements.

Every CAD/CAM Sys uses its own specific data structure to store the Product data in its own ways.

This Problem can be solved in following two ways.

1. Translating the Product data stored in one CAD/CAM sys formate to other compatible
2. Using a Common (or) neutral data base structure in all exsting and future CAD/Cam sys.

93) Explain IGES structure and methodology with suitable examples.

Initial graphics Exchange specification is a data exchange standard, by US National Bureau. and is used to transfer the complete data defining the entire product diff. CAD softwares. This exchange standard is widely accepted.

IGES - records are provided with 80 columns

columns 1-72 Provide data. and columns.

7-80 Provid a sequence number which is standard data format for Punched card data. Semicolons are used to terminate the column and commas are used to sub-divide the columns into field.

IGES file contains following 6 Sub. Sections

1) Flag Section

This is an optional section, which Provides format for the data to be specified. Earlier versions used ASCII format to specify data with detailed structure which resulted in large file sizes.

In later versions 3.0 the standard is formatted in the following three modes.

i) ASCII Mode (Default mode.

ii) Binary form.

iii) Compressed ASCII Form.

2) start Section :- This Section Consists of data which is useful for the user, for Post Processing the information in IGES file for further applications.

3) Global Section :- This Section is ~~created~~ contains Parameters in 24 fields that are required to translate the file. The Parameters. (field numbers are included in brackets).

(1&2) - Delimiter character.

3 - Sender's identifier.

4) - file name.

5 - Software Id.

6 - IGES Processor version.
7-11 - Precision integer, floating - Point and double precision nombers.
12 - Receiver's identifier.
13 - Space Scale of model.
14 - Units.
15 - Name of the units.
16 - max Number of line thicknesses.
17 - max line thickness.
18 - Time file generated.
19 - Smallest distance.
20 - Largest coordinate value.
21, 22 - Person and organisation creating the file.
23 - Version of IGES.
24 - Drafting Standard.

4. Directory Entry Section:-

This section is created by the IGES Pre-Processor and it consists entries for all entities in the file in which code is entered. This code represents entity type, subtype and Pointers to the entity data in forther Section.

This Section is provided with two lines containing 20 fields having 8 characters

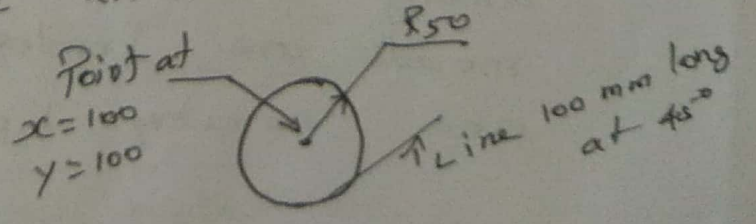
5. Parameter Data Section.

This section consists data regarding specific entities like coordinate values, annotation text, number of spline data points etc. The entity type is identified by first parameter in every entry, which is the basis for defining the meaning of remaining parameters. In columns 66-72, each entry is provided with pointer mapping to the directory entry for the entity.

6. Termination Section :- This indicates the end of the data file which consist of record's subtotals for verifying data transmission. In column 73-80, every record line consists an identifier, which indicates file section with its first character and remaining part is an integer which begins with one in every section.

These integer numbers are used as pointers by IGES for cross referencing b/w sections

Ex :- of IGES representation of a line, a Point and an arc is shown in below



Q4, what is STEP? Explain STEP Methodology.

April/May-18,

STEP - Standard for the Exchange of Product model Data) is an international standard (Iso 10303) for exchanging Product model information among various CAD authoring sys or among various CAD systems.

Methodology :-

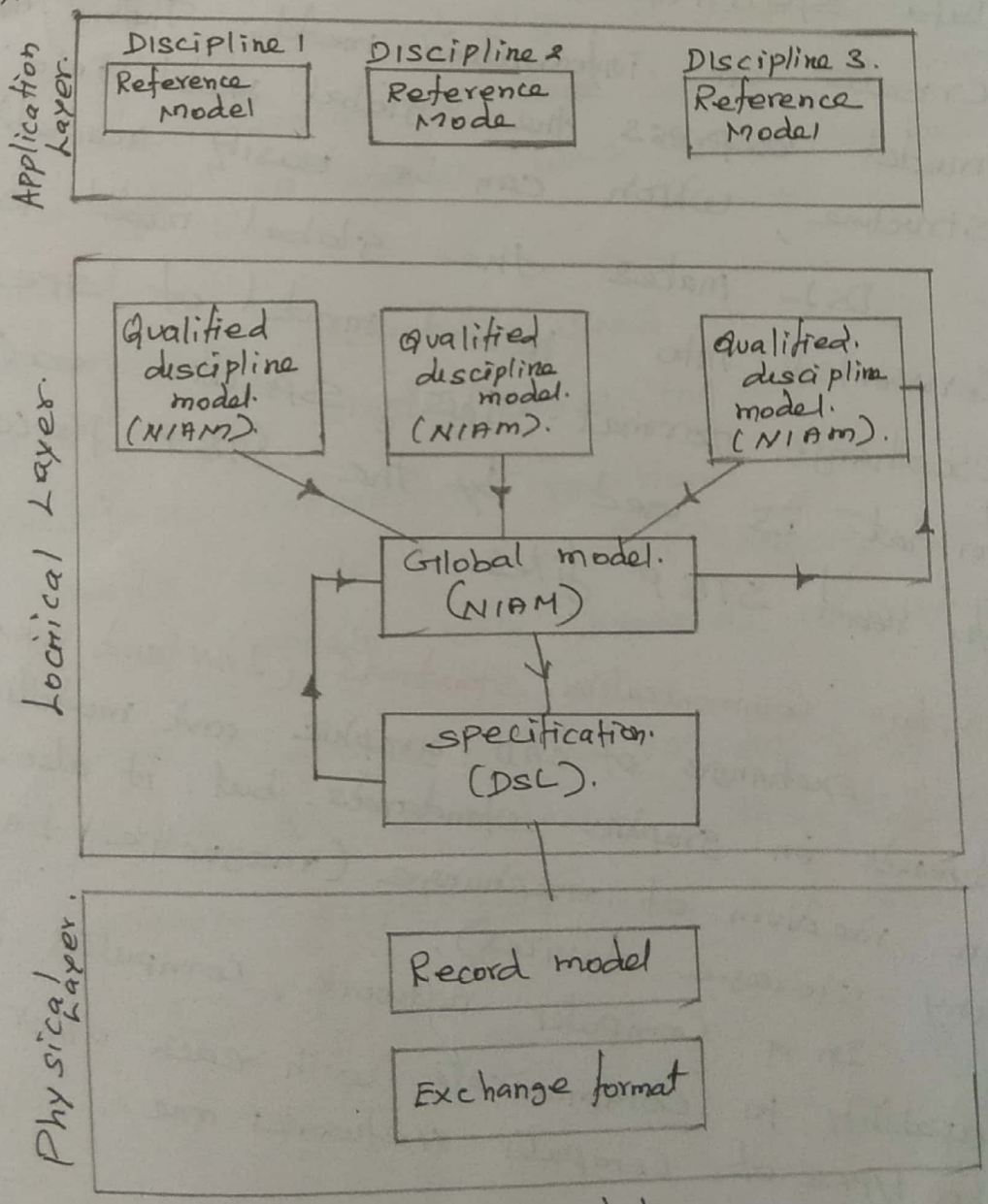
1. The input to the STEP methodology consists of discipline models. there are also called as reference models
2. Discipline models may be mechanical. Product, electrical products, AEC Products etc, and are generated by the user or an expert.
3. STEP methodology consists of three layers as shown in figure.

4) i) Application Layer :- is the interface b/w the user and STEP. It contains the discipline or reference models, that are used to develop logical layer model in the logical layer itself.

ii) Logical layer model is a generic binary model, which is the combination of the resource models and any cross-relationship among resource models. The resource models are topology, geometry, Presentation and geometry topology associativities.

Resource models consists of genuine entities and structures, which are common to application areas.

Logical layer model and discapline model can be related by maintaining a set of mapping from the discipline-Specific entities to the generic entities.



step methodology.

For this purpose, global model is introduced, which consists of both discipline-specific entities and generic entities. Global model compares, the correctness b/w discipline model and the logical layer model.

After developing the global model, Data specification language (DSL) is used to create an information model. This information model express the global model into text structure, which can be easily readable.

DSL makes the global model to get converted into record model of specific exchange format. This specific exchange format is used by the STEP Processor to read STEP files.

Q5 Explain Communication standards. (LAN and WAN)

Exchange of CAD graphic and modelling data depends on graphic standards. but. it also. depends on medium of exchange (magnetic tapes, or any storage devices).

In a computer network, computers have capability to communicate with each other. the types of computer networks are.

Local Area Network (LAN).

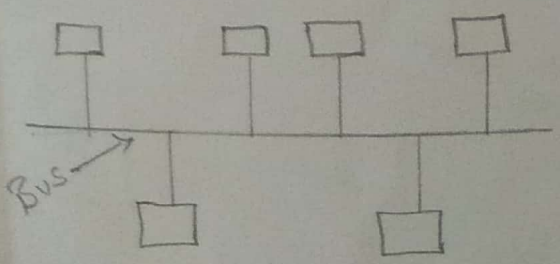
It is a privately owned network having its links in a single office, building or campus, LANs are designed to allow personal computers or workstations in an organization to share resources and exchange information.

Three distinguishing characteristics of LANs are.

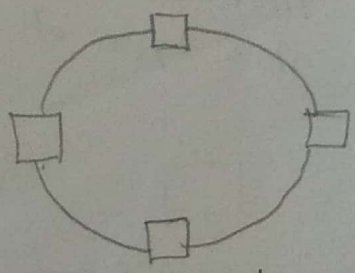
1. Size :- Limited in size of upto a few kilometers. The advantage of limited size is that in the worst case transmission time bounds are predicate It is simpler in design which simplifies network. management.

2. Transmission Technology - used in LANs often consists of a single cable to which all the machines are connected. Traditional LANs operated at speeds of 10 to 100Mbps. Newer LANs may run at speeds upto hundreds of megabits/sec

3. Network Topology :- The various LAN topologies are possible for broadcast LANs. The two most common topologies are bus and ring.



Bus Topology.



Ring Topology.

In bus (or linear) topology, all the computers are connected to a common bus. In this topology a node can send data over the bus at any time. when two or more machines want to send data simultaneously, an arbitration mechanism is needed to resolve this conflict.

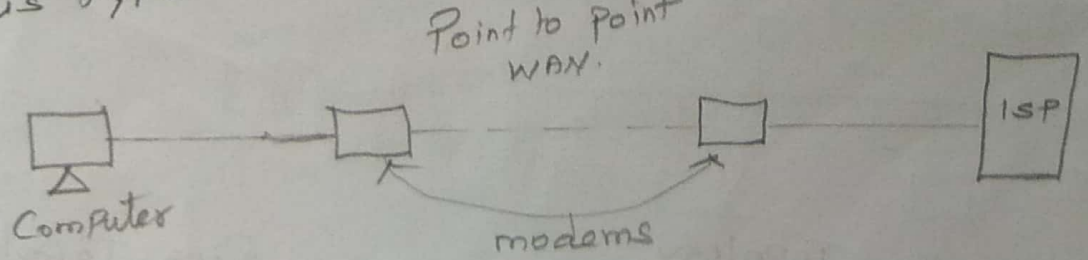
In Ring topology :- the computers are connected in the form of a ring i.e each node has exactly two neighbours. In this topology any computer can send data by a source node, and the data traverse through many intermediate nodes to reach to its ultimate destination. Data is transmitted only in one direction.

Wide Area Network (WAN).

It spans a very large area that comprises a county, a continent or even the whole world.

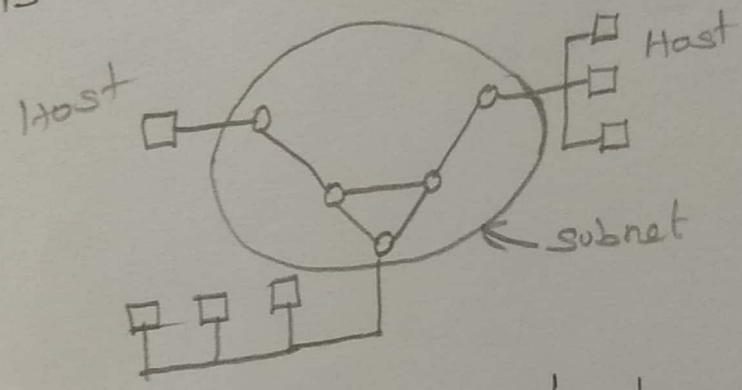
Two types of WAN. i) Point to Point WAN.
ii) Switched WAN.

i) Point to Point WAN. is the simplest WAN that connects a computer to a small LAN or to an Internet Service Provider (ISP) as shown in fig. This type of WAN provides internet access to a computer.



Switched WAN.

" is a complex WAN that connects the hosts (or end systems) to the subnet.



The subnet consists of transmission lines and switching elements. The router is a switching element that connects two or more transmission lines and also connects to another LAN or WAN. Unlike LAN, the transmission media is not shared in WAN so any computer can send data at any time. The transmission mechanism of WAN is based on the concept of packet store and forward.