ME6501 - COMPUTER AIDED DESIGN

COMPUTER AIDED DESIGN – 2 MARKS Q&A

Unit I

1. What is CAD?
   Computer aided design (CAD) is the technology concerned with the use of computer systems to assist the creation, modification, analysis and optimization of a design.
2. Mention the various processes involved in CAD.
   Design engineering, computer graphics and geometric modelling
3. What are the various processes involved in product cycle?
   Design process and manufacturing process
4. What are the various steps involved in shigley model?
   Recognition of need, Definition of problem, synthesis, analysis and optimisation, evaluation and presentation.
5. What is meant by morphology design?
   It refers to the study of the chronological structure of design projects.
6. What are the advantages of sequential product development?
   It is simple, well defined and enforced-discipline approach.
7. What is concurrent engineering?
   It is a methodology of restructuring the product development activity in a manufacturing organization using a cross functional team approach.
8. What are the various classifications of geometric modelling?
   Wireframe modelling, surface modelling and solid modelling.
9. What are the various types of computer graphics?
   Passive and Interactive computer graphics.
10. What is modelling?
    It is the process of creating an object in the computer by using basic primitives such as points, lines, arc, circle etc.,
11. What is called viewing?
    It refers the looking of the model in various angles, zooming and views.
12. What is meant by window and viewpoint?
    Window is an imaginary rectangular frame through which the user looks onto the model.
    Viewpoint is the area on the screen in which the contents of the window are to be displayed as an image.
13. What is clipping?
    It is the process of determining the visible portion of a drawing lying within a window.
14. What is the process of zooming?
    It is a combination of scaling, translation and clipping transformation processes.
15. What is meant by scaling?
    It is the transformation applied to change the scale of an entity.
16. What is concatenation transformation?

It is a single transformation by combining many transformations linked one after the other to perform the final task.

17. What are the applications of clipping process?
    Identifying visible surfaces in three dimensional views, displaying multi window environment, antialiasing line segments, drawing and painting operations.
18. How is Bresenham's method differ from DDA algorithm?
    It completely eliminates the floating point arithmetic except for initial computations.
19. What is workstation transformation?
    The transformation which maps the normalized device coordinates to physical device coordinates is called workstation transformation.
20. What are the various advantages of computer graphics?
    Accurate drawings can be made, sectional drawings can be easily created, various views of the object can be easily created etc.,

UNIT II

1. What is a curve?
   It is a continuous map from one dimensional space to n-dimensional space.
2. What is a free form curve?
   A general curve which does not have a named shape is called a free form curve.
3. What are the types of curve continuities?
   Geometric and parametric.
4. What is meant by zero order continuity?
   It means simply that the curves meet each other.
5. What is meant by first order continuity?
   It means that the first parametric derivatives of the coordinate functions for two successive curve sections are equal at their joining points.
6. What are the two approaches to model synthetic curves?
   Interpolation and approximation.
7. What are called control points?
   The Bezier curve is defined in terms of locations with n+1 points which are called control points.
8. What are the B-spline functions properties?
   Partition of unity, positivity, local support and continuity.
9. What is called uniform B-spline?
   When the spacing between knot values is constant, the resulting curve is called uniform B-spline.
10. What is meant by a rational curve?
    It is defined as the ratio of two polynomials.
11. What are the various types of surfaces?
    Flat, Sculptured, Analytical and combination of these surfaces.
12. What are the common surface entities used in surface modelling?
    Plane surface, Ruled surface, surface of revolution, tabulated surface, Bezier surface etc.,
13. What is called a coons patch?
    A coons patch is generated by the interpolation of four edge curves.

14. What is a fillet surface?
    It is defined as a surface connecting two other surfaces in a smooth transition.
15. What is a patch?
    It is the basic mathematical element to model a composite surface.
16. What are the types of parametric Bi cubic surfaces used in CAD?
    Hermite, Benzier and B spline surfaces.
17. What are the various types of solid modelling?
    Primitive based modelling and feature based modelling.
18. What are the various classifications of solid models?
    Polyhedral solids and curved solids.
19. What is meant by topological data?
    It refers the connectivity and associativity of the object entities.
20. What are the various forms of solid model representation?
    Wireframe models, surface models and solid models.

UNIT III

1. What is meant by visualization?
   It is a technique for creating images, diagrams or animations to communicate ideas.
2. What are the approaches to achieve the visual realism?
   Shading, lighting, transparency and coloring.
3. What are the types of hidden line removal methods?
   Object space and image space method.
4. What are the visibility tests used in hidden line elimination?
   Minimax test, containment test, surface test, homogeneity test etc.,
5. What is meant by silhouette?
   It is the intersection of one visible face and one invisible face.
6. What are the various hidden line removal algorithms?
   Edge oriented approach, silhouette approach and area oriented approach.
7. What are the various types of image space algorithms?
   Depth buffer, area coherence, scan line and depth algorithms.
8. What are the buffers used in depth buffer algorithm?
   Depth buffer and refresh buffer.
9. What is meant by area subdivision?
   It is the process involving in the division of viewing window into four equal sub windows.
10. What is hidden solid removal?
    It is the process of displaying the solid models with hidden lines or surfaces removed.
11. What is meant by ray tracing?
    It is the process of tracking and plotting the path taken by the rays of light starting at a light source to the centre of projection.
12. What is meant by shading?
    It is defined as the process of variation in observed chromatic or achromatic colour across the object face.
13. What are the various light sources used in shading?
    Light emitting sources and light reflecting sources.

14. What are perfect or ideal reflectors?
    If the diffuse reflections from the surface are scattered with equal intensity in all directions, it is a perfect reflector.
15. State Lambert cosine law.
    It states that the intensity of light reflected from a perfect diffuser is proportional to the cosine of the angle between the light direction and the normal to the surface.
16. What are the various color models available?
    RGB, CMY, YIQ, HSV and HSL.
17. What is meant by texture mapping?
    The method of adding surface detail to map the texture patterns onto the surfaces of objects is called texture mapping.
18. What is meant by animation?
    It is the process of illusion of continuous movement of objects created by a series of still images with elements that appear to have motion.
19. What are the various types of animation?
    Frame buffer animation, frame by frame animation, real time playback and real time animation.
20. What is meant by key frame?
    It is defined by its particular moment in the animation timeline as well as by all parameters or attributes associated with it.

UNIT IV

1. What is meant by assembly modelling?
   It is a technology and method used by CAD systems to handle multiple files which represent the components within a product.
2. What are the various assembly modelling approaches?
   Bottom up, Top down and combination of these.
3. What is meant by constraints?
   They refer to the geometric or mathematical rules which are applied to restrict the location of parts in the assembly model.
4. What are the various mating conditions used in assembly modelling?
   Parallel, perpendicular, symmetric etc.,
5. What are the techniques used in the evaluation of assembly sequence?
   Precedence diagram, liaison sequence analysis and precedence graph.
6. What is meant by tolerance?
   It is the amount of variation permitted to the basic size.
7. What is meant by deviation?
   It is the difference between the actual size and the basic size.
8. What is meant by fundamental deviation?
   It is either the upper or lower deviation nearer to the zero line and chosen to refer the position of tolerance zone.
9. What is a basic hole?
   It is a hole for which the lower deviation is zero.
10. What is meant by hole basis system?

In this, the hole size is kept constant and the shaft size is varied to get the required fit.

11. What is unilateral tolerance?
    It is a tolerance in which variation is permitted only in one direction from the specified direction.
12. What is meant by fit?
    It refers to the relative tightness or looseness between the two mating parts.
13. What are the various types of fits?
    Clearance fit, interference fit and transition fit.
14. What is meant by preferred numbers?
    They are the numbers which are got by geometric progression with specific step ratios.
15. What is meant by tolerance analysis?
    The process of checking the tolerances to verify whether all the design constraints are met is called as tolerance analysis.
16. What are the methods of tolerance analysis?
    Worst case arithmetic, worst case statistical and monte carlo simulation method.
17. What is meant by dynamic analysis?
    It is the study of motion in response to externally applied loads.
18. What is meant by first moment of inertia?
    It is defined as the moment of area, volume or mass with respect to a given plane.
19. What is kinematics?
    It is the study of motion without regard for forces which cause the motion.
20. What is meant by interference checking?
    It is the process of checking if any parts of an assembly pierce each other or not.

UNIT V

1. What are the various elements of cad/cam structure?
   Application data, application program, graphics system and application data input/output device.
2. What is meant by database?
   It is a collection of data at a single location to be used by various people for different applications.
3. What the various objectives of database?
   It reduces redundant data, It integrates the existing data, It provides security and It shares the data among the users.
4. What is the need of graphic standards?
   It is mainly used to exchange graphic data between different computer systems.
5. What are the various interface standards available?
   GKS, PHIGS, STEP, IGES,DXF etc.,
6. What is meant by topological information?
   It is the information about the product through solid modelling.
7. What are the classifications of CAD standards?
   Graphics and computing standards, data exchange standards and communication standard.
8. What is meant by GKS?

It is basically a set of procedures which can be called by user programs to carry out certain generalized functions such as arc, circle etc.,

9. What are the different coordinates used in GKS?
   World coordinates, Normalized device coordinates and device coordinates.
10. What is a Core system?
    The standardization of graphic system is called a core system.
11. What are the basic items of an object in GKS?
    Primitives and attributes.
12. Define – Primitives
    In GKS, pictures are considered to be constructed from a number of basic building blocks called as primitives.
13. What are the output primitives in GKS?
    Polyline, polymakers, text and fill area.
14. What are the various input methods in GKS?
    String, choice, valuator and locator.
15. What are the approaches used in data exchange format?
    Shape based format and product data based format.
16. What are the various file sections in IGES?
    Flag, Start section, Global section, Directory section, Parameter data section and Termination section.
17. What are the various methods of data exchange.
    Direct CAD system export/import, Direct translation software and neutral data exchange format.
18. What are the reasons of exchanging data?
    For using the same CAD package across different systems and to use a neutral format for data exchange.
19. What are the logical concepts involved in GKS?
    Logical input modes, logical workstation, GKS metafiles and GKS – 3D.
20. What are the logical concepts involved in PHIGS?
    Structure networks and manipulation, logical input device, search and enquiry, structure transversal and display and graphic output.