VIVA QUESTIONS

SUBJECT: COMPUTER AIDED ENGINEERING GRAPHICS

SUBJECT CODE: 1FY3 - 28

TOPIC: BASICS OF ENGINEERING GRAPHICS

1. Define engineering drawing. Why drawing is called universal language of engineers?

A drawing drawn by an engineer having engineering knowledge for the drawing purposes is an engineering drawing. It is meant for communicating his ideas, thoughts and designs to others. Engineering drawing is a starting point of all engineering branches such as Mechanical, Production, Civil, Electrical, Electronics, Computer science, Chemical etc. It is spoken, read, and written in its own way. Engineering drawing has its own grammar in the theory of projections, its idioms in conventional practices, its punctuations in the types of lines, its abbreviations, symbols and its descriptions in the constructions

2. Name different types of drawing instruments.

Drawing board, T-square, Set Square, Scales, Pencil and sand paper block, Drawing pins or cello-tape, Duster or handkerchief, eraser etc.

3. Why pencil is rotated in finger while drawing a long line?

The pencil is rotated in finger while drawing a long line in order to get a line of uniform thickness throughout.

4. How will you test the set square and T-square?

Testing of T-square

– (i) Check all screw heads and tighten, if necessary(ii) In order to check the T-square, first of all draw a horizontal line. Now reverse the T-square and again draw horizontal line with working edge. If both the lines coincide with each other, then the working edge of T-square is alright. If there is a difference in two lines, then working edge is not correct and the line gives twice the error of the working edge. This error should be rectified by scraping the edge with a scraper or a sharp knife.

Testing of set-squares –

The straightness of edges of the set-square can be checked by drawing a vertical line. Then reverse the set-square and draw again vertical line. If there is any difference between the two vertical lines then working edge is not correct and the line gives twice the error. This error can be removed by straightening the edges by means of a scraper or sand paper.

5. What are the ways of sharpening a pencil for good and accurate work and which type of pencil is more suitable for drawing work?

There are two ways of sharpening a pencil (i) a small piece of sand paper of zero grade, pasted upon a piece of wood. (ii) Sharpeners. Usually hard pencils such as H, 2H etc are used for making the engineering drawing

6. What is layout of drawing sheet?

The selection of suitable scale and allotment of proper space for margin, title block, parts list, revision panel, folding marks etc. on the drawing sheet is known as layout of drawing sheet.

7. Why is the layout of sheet is necessary?

Layout of the drawing on the drawing sheet is necessary in order to make its reading easy and speedy. The title blocks, parts list etc will provide all the required information

8. List out the contents of title block and material list

The title block should contain at least the following information

(i)Name of the institution

(ii)Name of title of drawing

(iii)Name, Class and Roll no. of the student

(iv)Scale

(v)Drawing number

(vi)Symbols denoting the method of projection

9. What do you understand by thickness of lines?

There are three distinct thickness of lines used in engineering drawing. These lines are specified as thick, medium and thin lines. The line specified as thick is usually 3 times thicker and the line specified as medium is 2 times thicker than a thin line

10. Where and why a cutting plane is drawn in a drawing?

The section plane is generally perpendicular planes. The projection of a section plane, to which it is perpendicular, is a straight line. This line will be parallel, perpendicular or inclined to the x-y line. The cutting plane is drawn in a drawing to show the inner details of an object.

11. What is the importance of dimensioning?

1) Dimensioning expresses all the sizes and other information necessary to define the object.2) It must be done with due regard to manufacturing processes and inspection requirements.

12. What is a leader or pointer line? How a leader should be drawn?

A leader is a thin continuous line drawn from note of the figure to show where it applies. It is terminated by an arrow head or a dot. The arrow head touches the outline, whereas the dot is placed within the outline of the object. The leader is generally drawn at any convenient angle, usually 30º, 45º, and 60º but not less than 30º

13. What are the different methods of dimensioning?

<u>Aligned Method</u>

: - In aligned system, the dimensions shall be placed parallel to and above the dimension lines, preferably in the middle and not by interrupting the dimension lines. Here the dimensions can be read from the bottom or from the right side of the drawing.Figure.2)

Unidirectional Method

: - In this system dimensions shall be horizontally placed so that they can be read from the bottom of the drawing sheet. Here the dimension lines may be interrupted preferably near the middle for the insertion of dimensions

14. What are the general rules of dimensioning?

1) Every dimension must be given, but no single dimension should be repeated.2) Dimensions should be placed outside the views.3) Avoid dimensioning to hidden lines wherever possible.4) Dimension lines should not cross any other line of the drawing.5) Aligned system of dimensioning is recommended.

15.What is a scale?

A scale is defined as the proportion by which we either reduce or increases the actual size of the object on a drawing.

1) Full size scale

:-The scale in which the actual measurements of the object are drawn to same size on the drawing is known as full size scale.

2) Reducing scale

: - The scale in which the actual measurements of the object are reduced to some proportion is known as reducing scale.

3) Enlarging scale

: - The scale in which the actual measurements of the object are increased to some proportion is known as enlarging scale

16. What are the main uses of scale?

The following are the main uses of scale in engineering practice.

(i) The scales are used to prepare reduced or enlarged size drawings.
(ii) The scales are used to set off dimensions
(iii) The scales are used to measure distances directly

17. What is the principle of projection?

If straight lines are drawn from various points on the contours of an object to meet a plane, the object is said to be projected on that plane. The figure formed by joining in correct sequence the points at which these lines meet the planes is called the projection of the object

TOPIC: SCALE AND CONIC SECTION

Q 1. What do you Mean by R.F.? What is The Unit of R.F.?

Ans: - The Ratio of length of the drawing to the actual length of the object is called The Representative Fraction (R.F).

R.F. = Drawing Length / Actual Length R.F is unitless.

Q 2. Distinguish Among Full Size, Reduced Size & Enlarged Sized Drawing

Ans: - 1-When DL= AL Full Size Scale

R.F =1: 2- DLAL Enlarged Size Scale R.F >1

Q 3. Which scale is used for two system of Units Measurement

Ans: - Plane Scale

Q 4. What is the inclination of cutting plane in order to obtain 1- Parabola 2-Ellipse 3-Hyperbola 4-Circle 5- Triangle.

Ans- Parabola - The Cutting Should be parallel to Any Generator of The Cone. Ellipse- The Cutting Plane Should Be Inclined At An Angle To Axis Cutting All The Generator Lines of Cone. Hyperbola- The Cutting Plane Should Not Be Parallel To Any Generator of Cone & Should Not Pass through Axis Circle- The Cutting Plane Should Be Parallel To The Base of The Cone & Must Cut All The Generators. Triangle- The Cutting Plane Should Cut The Cone in Two Equal Halves Starting From The Vertex.

Q 5. Gives Two Practical Applications Of Conic Curves Like Parabola, Ellipse And Hyperbola.

Ans- Parabola - Parabolic Curves Are Used in Arches, Bridges, Sound Reflectors, Light Reflector, etc. Ellipse- Use of Elliptical Curves is made in Arches, Bridges, Dam, Mountains, Man HolesGlands, Cookers (Pressure) Etc. Hyperbola- Use of Hyperbolic Curves is made in Cooling Towers, Water Channels Etc.

Q 6- What is meant by an Eccentricity? Define Parabola, Ellipse And Hyperbola.

Ans- The Eccentricity is the ratio of distance of any point on The Conic From Focus to the distance of the same point from the Directrix. Eccentricity = Distance of Any Point on the Conic from Focus Distance of the Same Point from the Directrix For Ellipse it is Always Less Than 1 For Parabola it is Always Equal to 1 For Hyperbola it is More Than 1

Q 7. Defines Rectangular Hyperbola?

Ans- It is Curves Traced out by a point moving in such a way that the product of its distances from two fixed lines at right angles to each other is constant. The fixed lines are called asymptotes.

Q 8.What Will the Path Traversed by the Bullet, when it is shot in the Air?

Ans. Parabola. Q 9. Name The Curve Having Zero Eccentricity? Ans. Circle.

Q 10. Name The Curve Having Eccentricity More Than 1?

Ans. Hyperbola.

Q 11. Differentiate B/W Epicycloid And Hypocycloid?

Ans. Epicycloid - The Curve Generated By a Point on the Circumference of A Circle, Which Rolls Without Slipping Along another Circle Outside. It is called an Epicycloid Hypocycloid- When the Circle Rolls along another Circle inside it, The Curves is Called Hypocycloid

TOPIC: PROJECTION OF POINTS AND LINES

Multiple Choice

1.Orthographic projection represents three dimensional objects in

a. One dimension
b. Two dimension

c. Three dimension
d. All of the above
(Ans:b)

2. Orthographic projection, the projection lines are _____ to the projection plane.
a. Parallel
b. Orthogonal
c. Inclined
d. Any of the above
(Ans:b)

3.The term ortho-graphic, 'orthos' means
a. Drawing
b. Straight
c. Projection
d. View
(Ans: b)

4.The point, from which the observer is assumed to view the object, is called
a. Center of projection
b. Point of projection
c. Point of observer
d. View point
(Ans: a)

5.In orthographic projection, the object is placed with one of its faces _____ to the picture plane.
a. Inclined
b. Perpendicular
c. Parallel
d. Any of the above
(Ans: c)

6.Orthographic projection is also known as
a. Single view projection
b. Two view projection
c. Multi view projection
d. All of the above
(Ans: c)

7.The two ways of drawing orthographic projection are
a. First angle, second angle
b. First angle, third angle
c. Second angle, third angle
d. Second angle, fourth angle
(Ans: b)

1. Differentiate first and third angle projection.

Ans

i.) Object is placed in first and third quadrant in first and third angle projection respectively.
ii.) Object is in between POP and observer in first angle projection, whereas in third angle projection POP is in between object and observer.
iii.) In first angle projection, Plan (Top View) is below the Elevation (Front View).Right side view is on the left of elevation and Left side view is on the right of the elevation.
iv.) In third angle projection , Plan (Top View) is above the Elevation (Front View).Right side view is on the right of front view (elevation) and Left side view is on the left of the elevation.

2. What is difference between orthographic and pictorial views?

Ans. Orthographic projection is commonly used because it gives 100% details of an object by drawing different views e.g. Elevation, Plan, side views, section views auxiliary views etc. It is 2-D, whereas Pictorial views are 3-D and don't give full details. Yes pictorial projection can be understood by a layman easily, but orthographic projection can be understood by an engineer or concerned person only.

3. Define point, line, plane & solid.

Ans. Point- it is a geometrical entity which is dimensionless. We cannot give dimension to a point. It is known as 0-D (zero dimension) entity. Line- a line is shortest distance between two points. It is a geometrical entity which is 1-D (length only). Plane- it is a geometrical entity which is 2-D (length x breadth) or have a area only. It has two types

1. Principle plane- HP, VP & PP (profile plane). orthographic views are drawn on it

2. Secondary plane(plane lamina) Solid- it is a geometrical entity which is 3-D (length x breadth x height) or have a definite volume

Q4 What do you mean by A.I.P.?

Ans. Auxiliary Inclined Planes

Q5 What do you mean by A.V.P?

Ans. Auxiliary Vertical Planes

Q6 What do you mean by P.P?

Ans. Profile Planes

Q7. What is projection, projector and plane of projection?

Ans. Projection is an image or a view. Projectors are the lines drawn from each and every point of the object. These lines are perpendicular to the plane of projection & parallel to each other. Plane of projection (POP) is the plane on which image is drawn.

Q8. Explain auxiliary plane.

Ans. The plane which is not at right angle to the reference planes (HP&VP) and true image in shape and size of the details is drawn on it.

Q9. What are reference, coordinate and section cutting planes?

Ans. Horizontal Plane (HP) and Vertical Plane (VP) are reference planes. Profile Plane (PP) is a coordinate plane. Cutting plane is an imaginary plane used for viewing and showing the sectioned details (cut portion) of an object.

10. Why the projections of an object are not drawn in second and fourth quadrants?

The projections of an object are not drawn in second and fourth quadrants because the overlapping will take place. It will become very difficult to understand the views

11. When the auxiliary planes are used?

The auxiliary planes are used in order to view the true shape of an inclined surface. The projection drawn on the auxiliary plane is known as the auxiliary view and gives the true shape of the inclined surface.

12. What are the types of auxiliary planes?

The plane placed at any angles to the principle planes is called auxiliary plane.

Auxiliary vertical plane (A.V.P.)

:-It is perpendicular to the HP and inclined to the VP. Projection on anAVP is called auxiliary front view.2)

Auxiliary inclined plane (A.I.P.)

:-It is perpendicular to the VP and inclined to the HP. Projection on AIP is called auxiliary top view.

13. What is the trace of a straight line?

When a straight line is inclined to a plane, it will meet that plane, produced if necessary. The point in which the line or line produced meets the plane is called its trace.

1) Horizontal trace

:-The point of intersection of the line with the HP is called the horizontal trace.

2) Vertical trace

:-The point of intersection of the line with the VP is called the vertical trace

14. Define a plane.

A flat surface generated by moving a straight line in space is called a plane. A plane fig. has only two dimensions i.e. length and breadth.

15. What is the difference between a plane and a lamina?

A plane has no boundary and it extends to infinity in all directions.

Lamina:-

The plane which has limited extent is also known as lamina

16. What are the types of planes?

There are two types of planes.

1) Perpendicular planes

:-The planes which are perpendicular to one or both the reference i.e. VP and HP are called perpendicular planes.

2) Oblique planes

:-The planes which are inclined to both the reference planes i.e. VP and HP are called oblique planes.

17. What is the trace of a plane?

The lines in which the planes meet the reference planes i.e. HP and VP are called the traces of the planes. There are two types of traces of planes.

1) Horizontal trace

:-The intersection of a plane with the horizontal plane is called the horizontal trace.

2) Vertical trace

:-The intersection of a plane with the vertical plane is called the vertical trace

TOPIC: PROJECTION OF SOLIDS AND SECTION OF SOLIDS

Q 1 What do you mean by section of solids?
Ans: Many solids are different externally and internally. In engineering drawing n the normal practice, only external views are drawn. To know the solid internal constructional details, it has to be cut and then views will be drawn. This cutting of the solid to know the internal details is called section of solids. Views drawn after sectioning are called sectional views. Cutting of the solids in these views is shown by section lines.
Q 2 What is a section plane or a cutting plane?
Ans: It is an imaginary plane which cuts the solid to know the internal constructional details by which the object is assumed to be cut is called the cutting plane or sectional plane. This cutting plane can be perpendicular or parallel to one of the principle planes and also perpendicular or inclined to the other principle plane. These section planes are represented by their traces i.e. Horizontal trace (H.T.) or Vertical trace (V.T.).

Q 3 What do you understand by H.T. and V.T. of a section plane?
Ans: Horizontal trace (H.T) – H.T. of a section plane is a line in which the section plane meets the H.P..
Vertical trace (V.T.) – V.T. of a section plane is a line in which the section plane meets the V.P..
Q 4 What are section lines or hatching lines?
Ans: The lines used to represent the material which has been really cut by the cutting plane are called section lines. They are also called hatching lines. These are equally spaced lines inclined at 45º to the horizontal as well to the vertical. If a solid is complicated and requires more than one section to know the complete details, then section lines are shown different equally spaced lines. In case the solid is made up of more than one materials and hence different materials are cut by the cutting plane, even then differently equally spaced lines are used to show different materials.

Q 5 What is a sectional view? Why sectional views are used in drawing?
Ans: The view obtained after cutting the object (to show the inner details which are otherwise not visible) is called the sectional view.

Q 6 What is apparent section?

Ans: The projection of the cut portion on an inclined plane is called as apparent section. It will be of smaller size than the portion actually cut.

Q 7 What is true section?
Ans: The projection of the cut portion on a parallel plane is called as true section. It will be of same size as the portion actually cut.

Q 8 What are the different types of sections of solids?
Ans: Section plane can be one of the following types:
1) Section of solids by a horizontal plane parallel to HP.

2) Section of solids by a vertical plane parallel to VP.

3) Section of solids by an auxiliary inclined plane (AIP).

4) Section of solids by an auxiliary vertical planes (VIP).

5) Section of solids by a profile plane.

Q 9 What do you mean by Frustum?
Ans: When the cutting plane is parallel to the base plane of a prism, pyramid or cone, The cut portion is called the frustum of the solid. The portion between the observer and the cutting plane is assumed to be removed and the portion which is left is called the Frustum of a solid.

Q 10 What do you mean by truncated?
Ans: When the section plane is inclined to the base of a solid, the cut portion is called truncated. The portion between the observer and the cutting plane is assumed to be removed and the portion which is left is called the truncated solid.

Q 11When sphere is cut by section plane the true shape of the section plane is?

Ans. Circle

Q12 What is the difference between triangular prism and triangular pyramid pyramid?

Ans. A triangular pyramid is a geometric solid with a base that is a triangle and all other faces are triangles with a common vertex. A triangular prism is a geometric solid with two bases that are congruent (identical), parallel triangles and all other faces are parallelograms.

TOPIC: AUTO CAD

1) What is AutoCAD?

AutoCAD is a software program built to design and shape the 2-D and 3-D images. It provides the tools by which a detail design of the product can be done. It also has the option to create detailed design layout, which can be automatically drawn by using source model.

2) What are the uses of AutoCAD?

AutoCAD can be used by the professionals to visualize the imaginary view of the product on a computer system. In AutoCAD, it is possible by the drafter to make the changes in the product before it gets finalized for design. It also gives the freedom for the designer to implement their various ideas and represent them to the suppliers or their clients.

3) What are the fields where you see maximum use of AutoCAD?

AutoCAD is more popular among the architects, engineers and builders for developing their building layouts.

4) What is the file formats used in design?

In AutoCAD, .dwg file format is used for design, it can be an interchangeable format. The file format which is interchangeable has the extension as DXF and operates data operability. It provides different languages which can be used as per the requirement.

5) How you can create a user interface in AutoCAD?

User interface can be created by using the command prompts to draw the plots and dialog boxes. The dialog boxes can be displayed by the use of PLOT command and the external database commands (ASE). Setting of CMDDIA to 1, allows the dialog boxes to run the command. The user interface creation also needs the command line to display the entire file so that it can be edited or customized easily.

6) What is the function of vertical integration?

To enhance the architectural designing of 3D object AutoCAD uses the vertical integration program. The 3D objects can include walls and other things that are associated with the data having information and simple objects like lines and circles. The data is programmed in such a way that it represents only the architectural products and the extracted files, and can be modified according to the requirement.

7) What is the use of variant in AutoCAD?

In AutoCAD variants are used to help in creation, visualizing and rendering the 3D models that include 3D printing as well. Variants allow you to use the functionality of different application according to the requirement.

8) What are the benefits of using AutoCAD?

AutoCAD has replaced the traditional method of drafting and designing which was made by pencil, drafting boards, triangles and compass with just a set of a computer program. The benefits are immense like:

- Saves time and helps to increase the productivity
- It helps to streamline your design and documentation workflow
- Physical '3D' prototype of the design can be quickly created by using AutoCAD
- 3D models can be directly imported into AutoCAD by using application like Solid Works
- Tedious work of drafting can be done easily and you can design and re-design the product in short span of time.

9) What is the process to draw a line more than one time and save it automatically?

When a need arises to draw a new line the process opens up a new file in a new session to write the file. AutoCAD allows saving multiple drawing for each session. The files are saved by using the file extension .dwg and it can be modified by using the browser.

10) What are the steps that enable the drag and drop feature in Autocad?

Autocad provides a way to drag and drop the elements by the use of “NOUN” and “VERB” in a dialog box. It allows the object to move from one place to another. Likewise, the remove or editing function can be done by using “MOVE and ERASE”.

11) What are the features corrected by AutoCAD?

AutoCAD detects the problem and correct it by removing the corruption with the drawing parts. With the available option of adding additional vertices, it also adds vertices to the poly-lines. The error can be corrected or neglected by finding out the exact location of the poly-line that has zero vertices. The object can be deleted or removed after there is no use of it in the system.

12) How to set up a default drawing directory?

Default drawing directory has sub directories having the information using the windows commands. The applications, which are going to be used, are highlighted, and by using drag and drop features those application will be placed in the default directory. The properties for the application are selected from the menu and dialog boxes displayed on the front.

13) How you can copy a closed drawing?

The copying of the closed drawing can be done by the designer center in the toolbar of the Autocad. By using the tree view option the copy of closed drawing can be done easily. The modification of the drawing can be done by using graphical interface.

14) How you can hide the specific layers when plotting in AutoCAD?

To hide the specific layers while plotting, you can use various options like turning off the layers for plotting , freezing the layers and turning off. Turning off for plotting will show the layers on the screen but won’t output on printing. The layers that are turned off will hide the layers and also it will not appear on the screen.

15) What is the process of copying the dimension styles from one drawing to another in AutoCAD?

Copying of dimension styles require setting up the particular dimension style. To copy a dimension style, a new document has to be created. Once it is created, this document will be saved as a drawing template. A new reference will be created by new drawing template document and it will show all the options like layer style, units and blocks. Drawing can be done by seeing the current drawing and dimension style would be same as the original picture. By using the design center, Autocad tools can be used to copy the dimension styles from one drawing to another.

16) How can you remove the empty layers from drawing?

The layers can be removed only when the object resides in the layers will be removed; once it is removed it is an empty layer. The empty layers cannot be deleted by purge. It might be because the layer is frozen on a viewport or referenced by an object in a block definition. By using EXPORT command it is possible to remove the layer from drawing, which results in creating a DXF file of the drawing. You can edit the dxf file in a text editor and rename all the instances of layers in the file, except the layer definition.

17) Why AutoCAD WS is more popular among mobile users?

AutoCAD WS provides many option for mobile application developer like edit, view and share. They can easily share the application wherever they go and can develop an application in a matter of time. The

application can be downloaded and installed from anywhere in the world, ignoring the licensing problem. The users can save file in any format and can run the application on any platform with ease.

18) How can you make a spring, spiral or screw thread?

To make a spiral or screw thread use an AutoLISP routine such as spiral.1sp, it will create a spiral path according to your need. Then you can use EXTRUDE command with a reference object, using the spiral as the path. Also, there is another way you can do this, by using Mechanical Desktop (MDT) or Autosurf by using augmented lines as path.

19) Tell me how you assign the keyboard characters or function keys to AutoCAD commands?

By editing the ACCELERATORS section of the AutoCAD menu file we can assign keyboard characters to AutoCAD commands.

20) How you can open a drawing file that was created with the automatic save features?

AutoCAD files have an extension of ".dwg" and will only open those files having this extension. To open the drawing files you have to rename it, by using Explorer or DOS prompt you can do that. If you are using EXPLORER you have to make sure that the option of "Hide file extensions for known file types" is not enabled. After the file is copied you can rename and use the OPEN command in Autocad to open the drawing.

21) What will you do when command prompts appear on the command line instead of ASE dialog box and plot dialog box?

In Autocad, CMDDIA variable controls the display of dialog boxes. To enable these dialog boxes you have to set CMDDIA to 1.

22) In Autocad, what is the command that is used to rotate the grid at 45 degress?

To rotate the grid at 45 degrees, command UCS is used.

23) In what situation command prompt appears instead of a dialog boxes?

If a file command is imported from a script or AutoLISP/ ObjectARX/ ADSRX a command prompt appears instead of a dialog box.