CAD/CAM 23ME506

Topic: Unit- II

SURFACE MODELING

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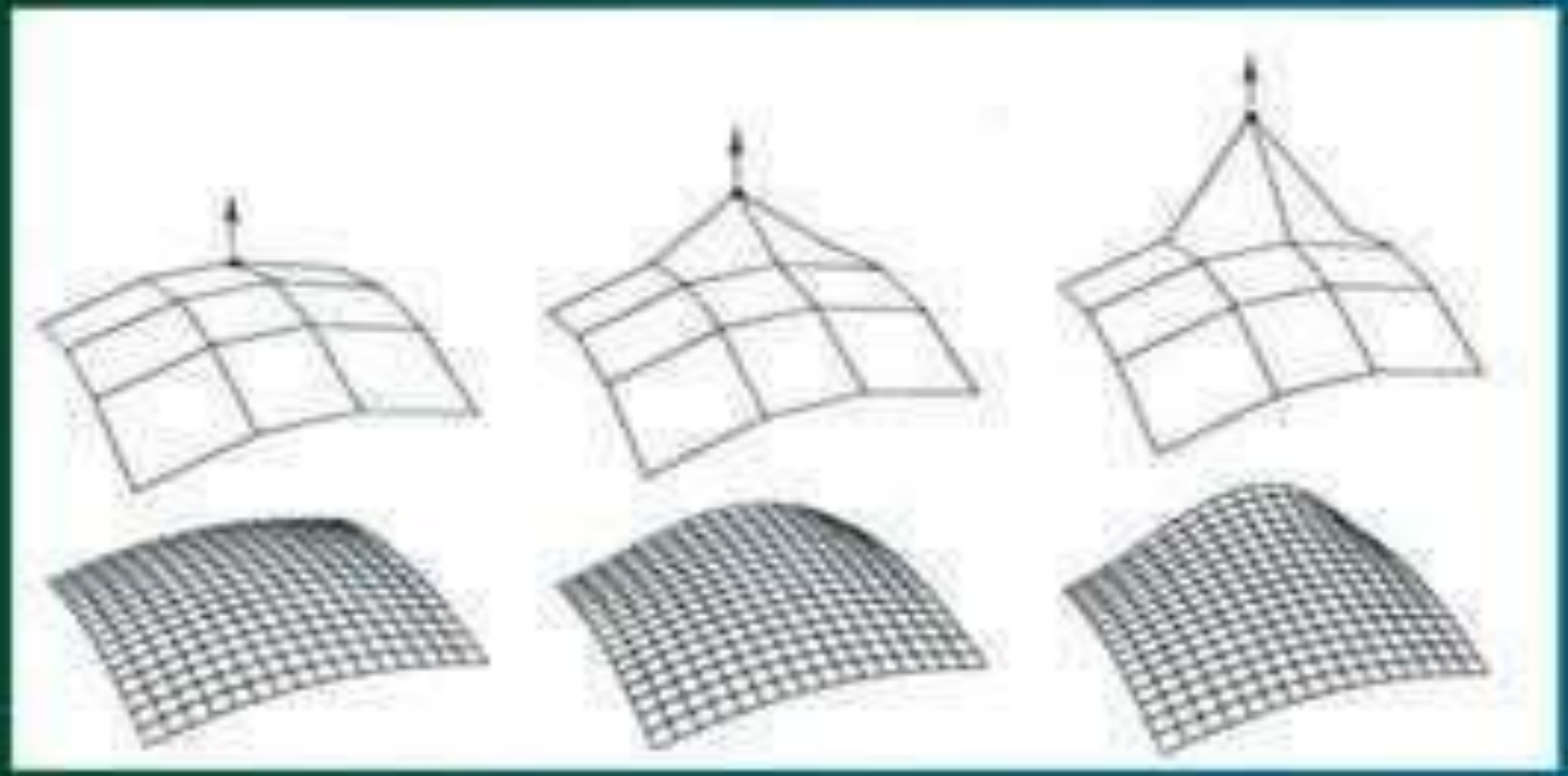
Unit- 2
SURFACE MODELING

A wire frame model consists only of edges of surfaces or lines of intersection of surfaces but does not contain information about the areas between the lines.

For a 3D surface model, you must define the surfaces mathematically.
Several other surfaces, such as cylinders and spheres, have mathematical expressions that can be written to describe them.

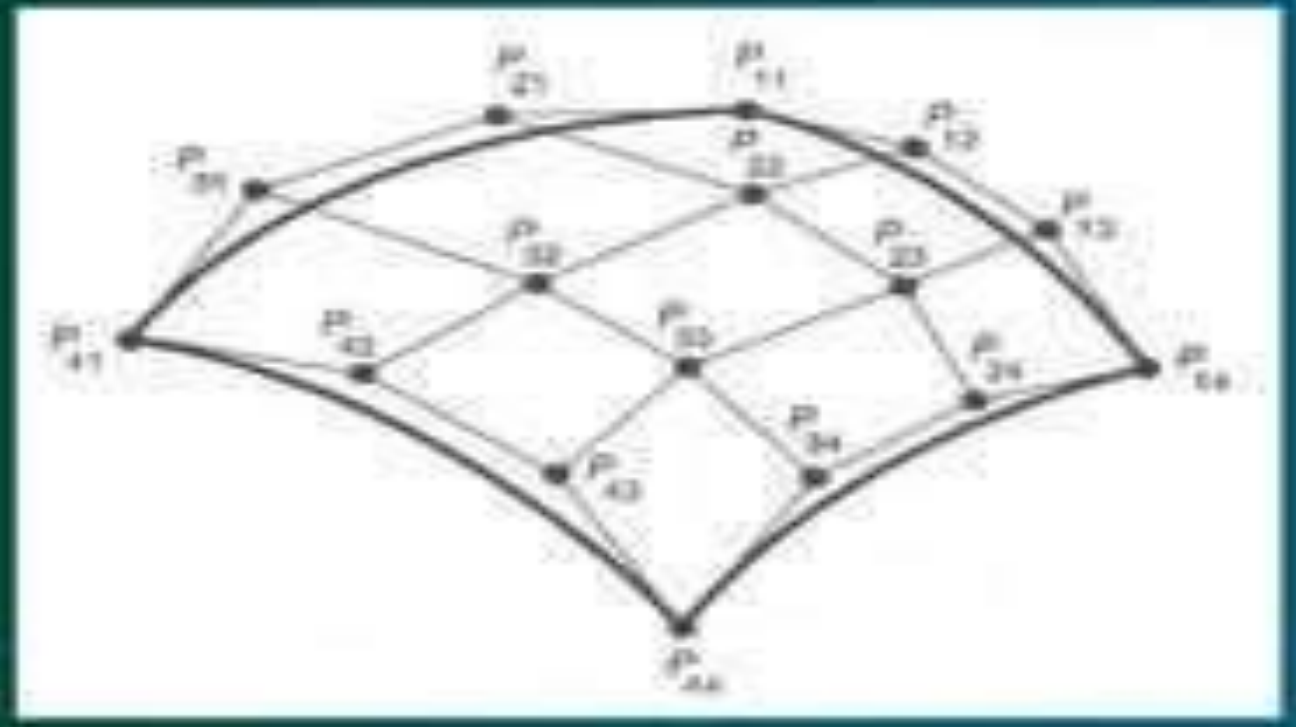
Surface Patch

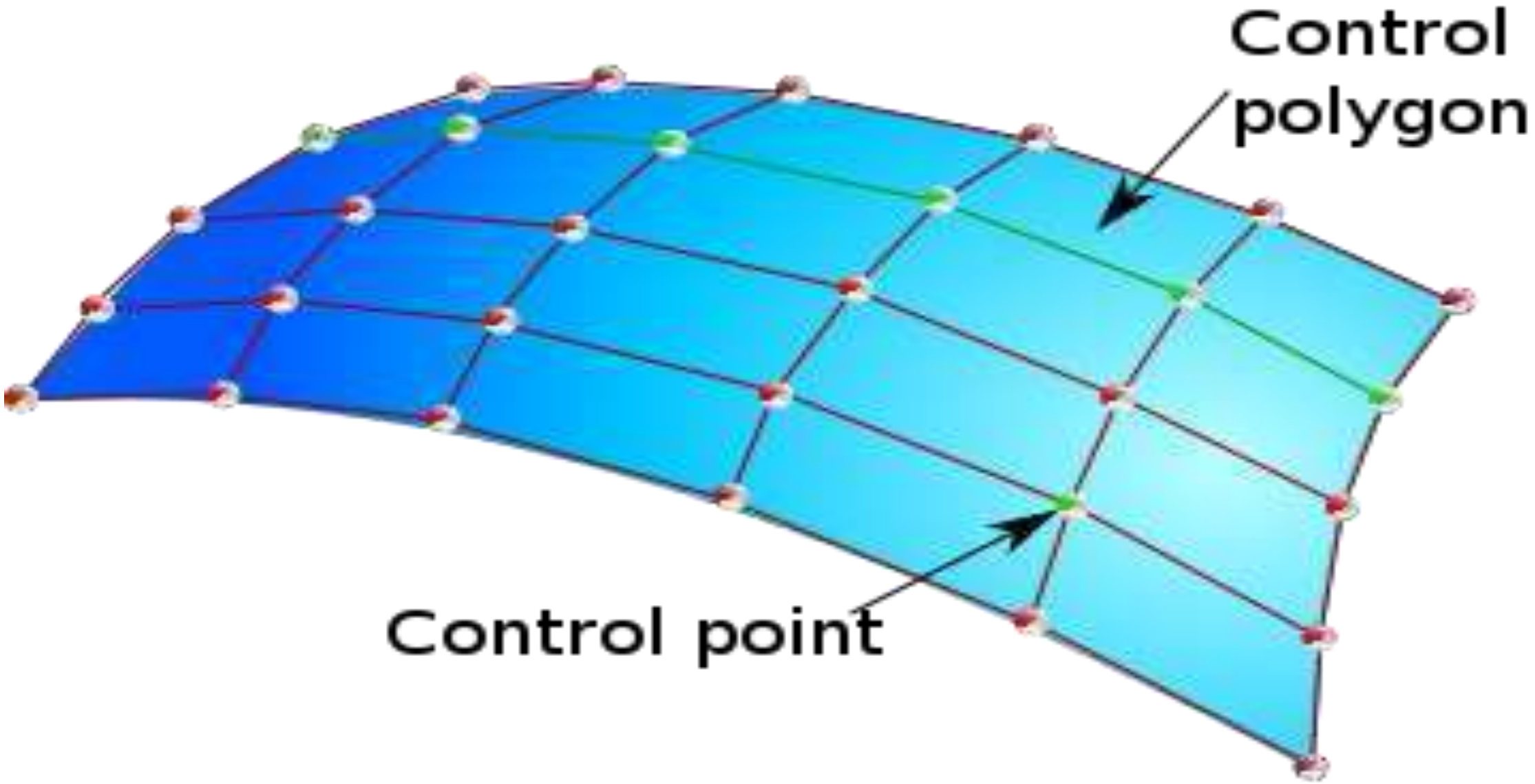
- The effect of "lifting" one of he control points of a patch.



Parametric Surface Patch

- Each patch is defined by control points net (Control Polyhedron).




Control
polygon
Control point

Advantages:

- Eliminates much ambiguity and non-uniqueness present in wireframe models by hiding lines not seen
- Renders the model for better visualization and presentation, objects appear more realistic
- This can be used to design and analysis complex free-formed surfaces of ship hulls, aeroplane fuselages and bodies
- Surface properties such as roughness, color and reflectivity can be assigned and demonstrated

Disadvantages:

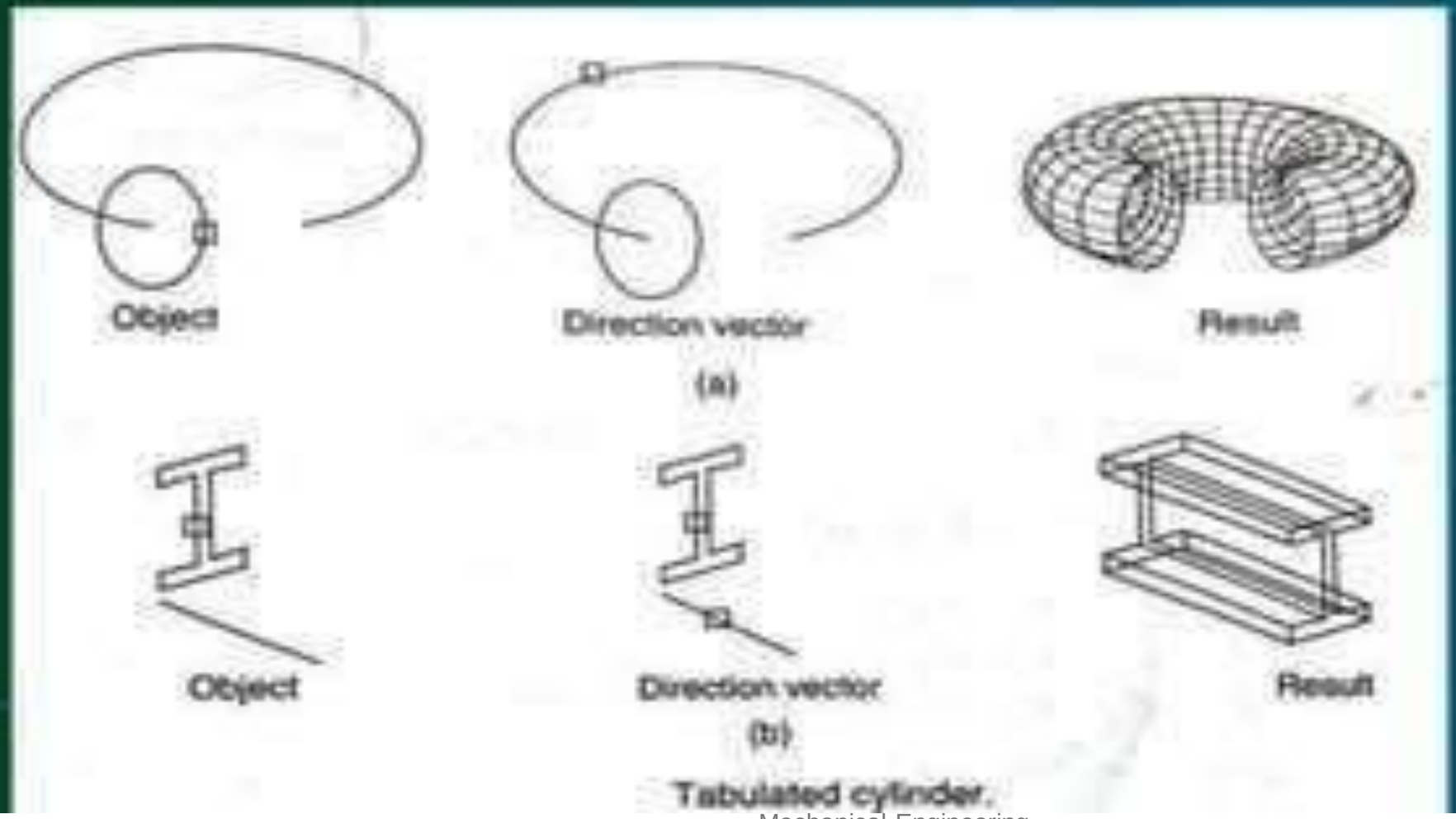
- Provides no information about the inside of an object
- Curved surfaces need a fine mesh to be accurate
- Provides wrong results if mesh is too coarse

Complicated computation, depending on the number of surfaces

4.Tabulated cylinder:

1.This is surface by translating a plane curve at a given distance along a specified direction.

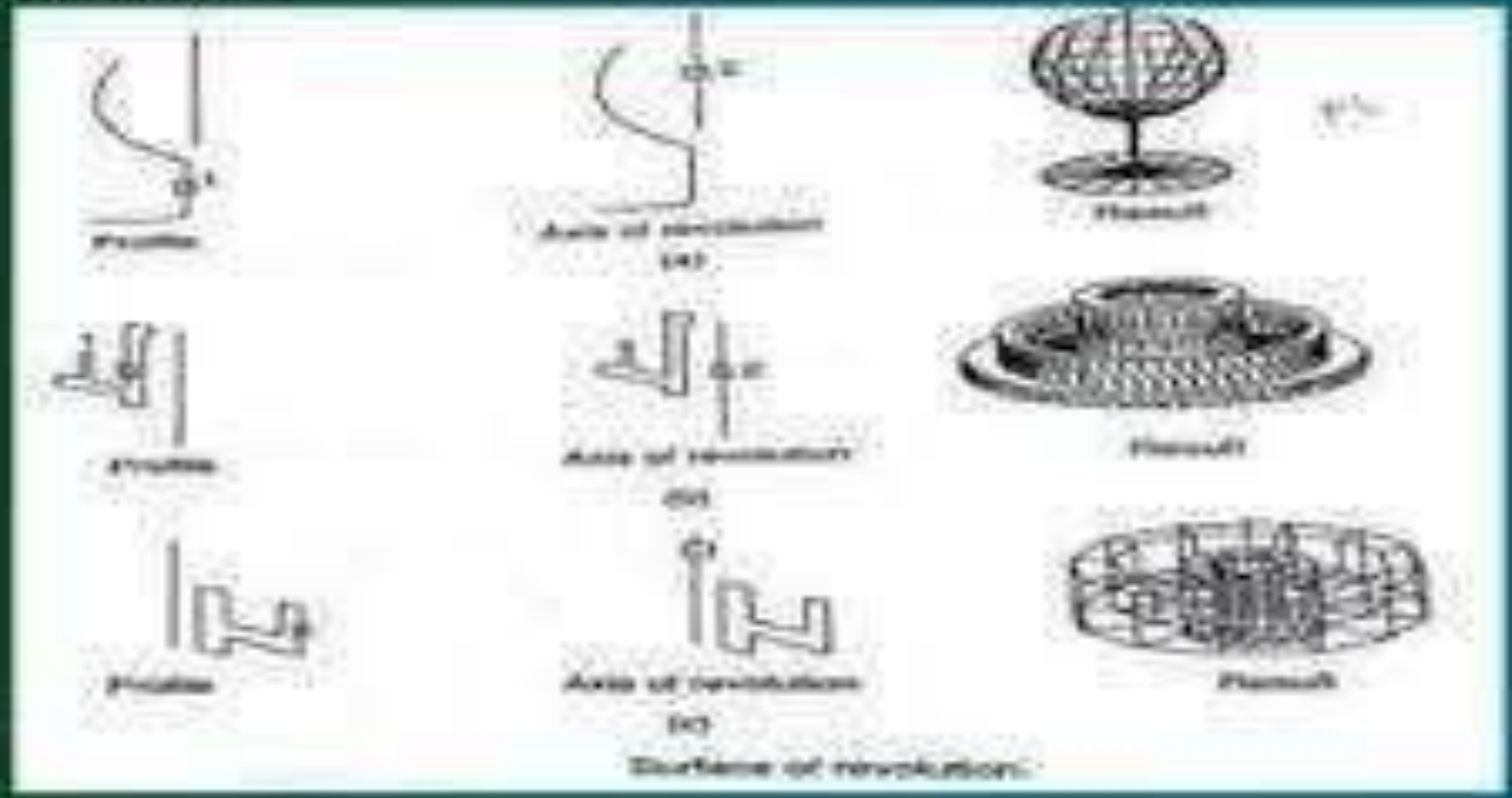
2.Plane of the curve is perpendicular to the axis of generated cylinder

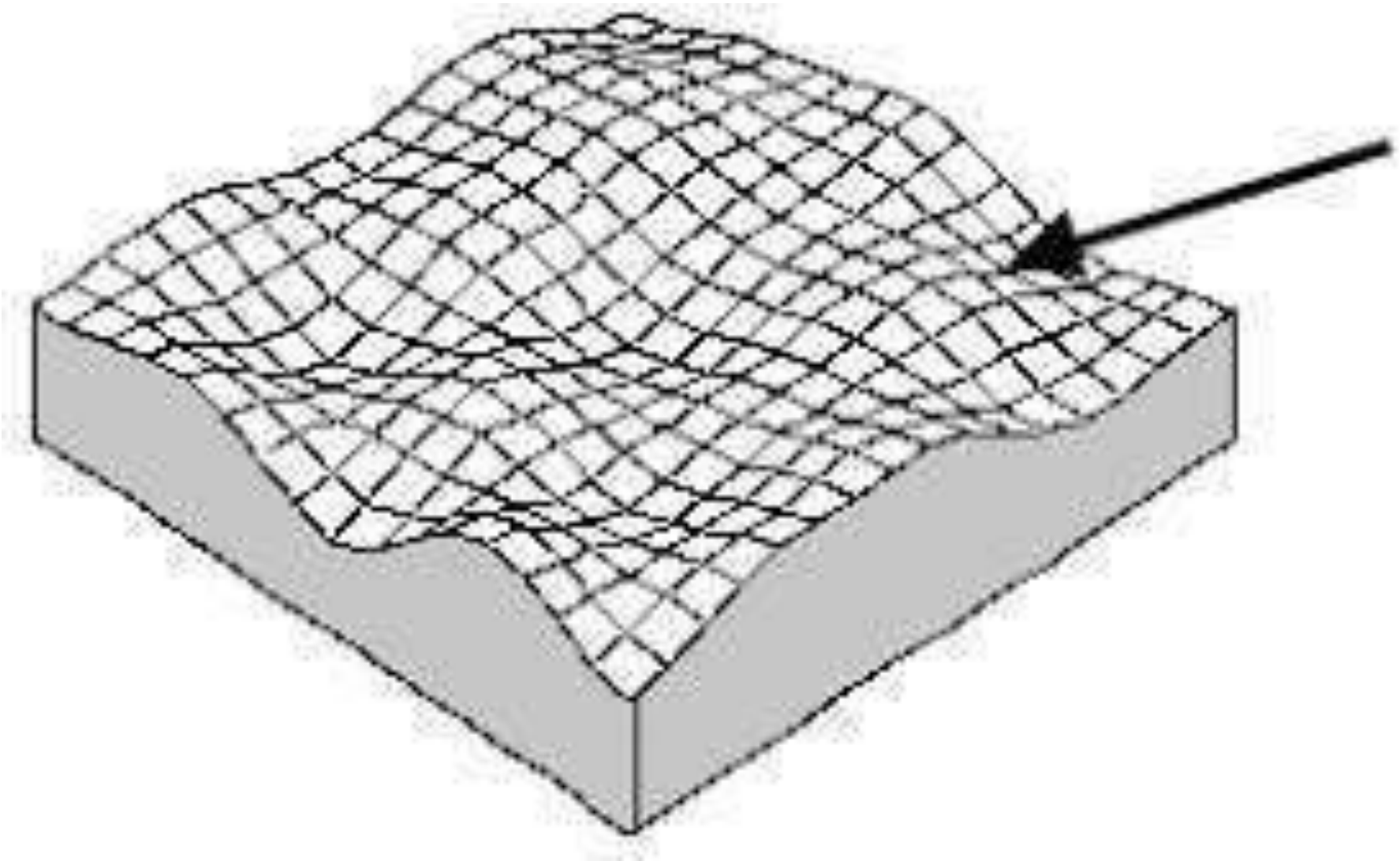


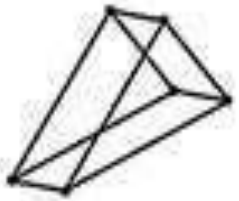
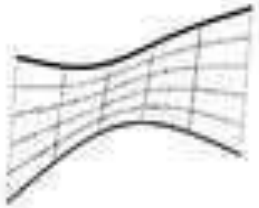
Tabulated cylinder.

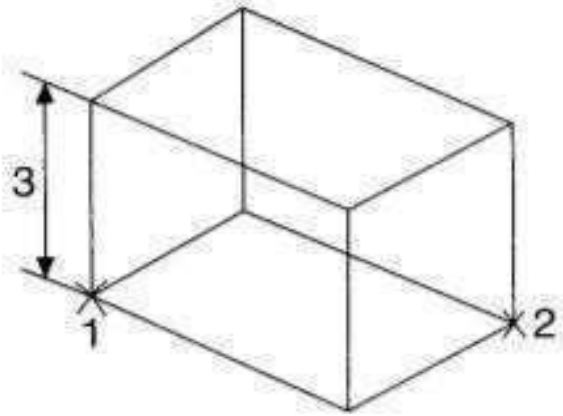
3. Surface of Revolution

This is an axisymmetric surface that can be model axisymmetric objects. It is generated by a planar wire frame entity in space about the axis of symmetry of a given angle.

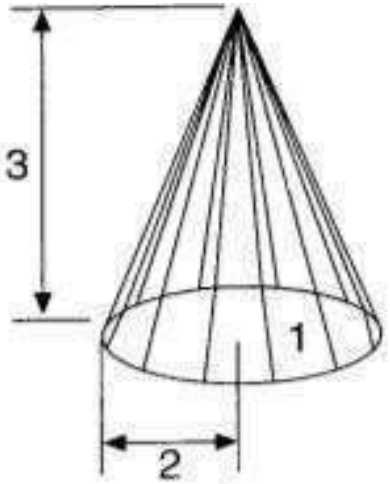




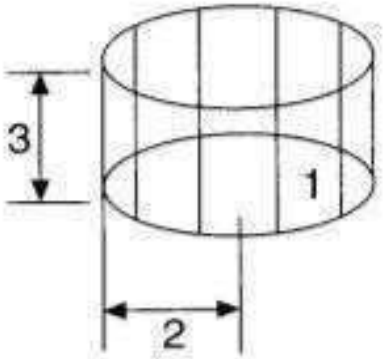
	Wireframe model	Surface model	Solid model
			
1960	Development of wire and surface models		
1970	First use of wire and surface models		Development of solid models modelling
1980	Specific use of wire and surface models		First use of solid models
1990	General use of wire and surface models		Specific use of solid models
2000	General use of wire, surface and solid models		
2010	Introducing special techniques of wire, surface and solid models for product modelling		



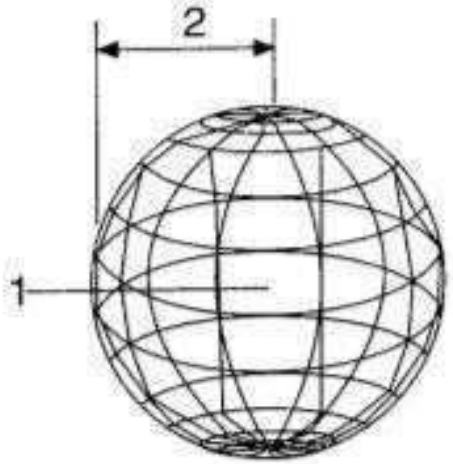
(a) Box



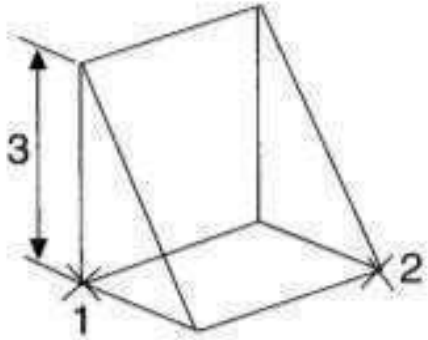
(b) Cone



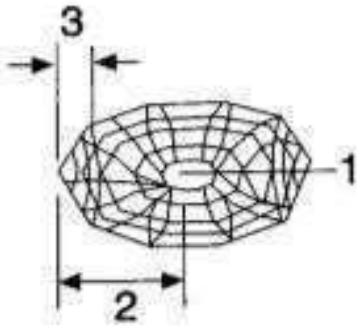
(c) Cylinder



(d) Sphere



(e) Wedge



(f) Torus

Solid primitives.