



CBSE Syllabus

Class XII

ENGINEERING GRAPHICS



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ENGINEERING GRAPHICS

Course Structure

Parts/Units	Topics	Marks
Unit - I	Isometric Projection of Solids	25
Unit - II	Machine Drawing	45
	Part A. Drawing of Machine Parts	
	Part B. Assembly Drawing and Dis-assembly drawings: 1. Bearings 2. Rod Joints 3. Tied-rod and Pipe Joints 4. Couplings 5. Pulleys	
Practical		30
Total		100

Course Syllabus

Unit I: Isometric Projection of Solids

- Construction of isometric scale showing main divisions of 10 mm and smaller divisions of 1 mm, also showing the leading angles.
- Drawing helping view/s such as triangles, pentagon, hexagon, etc., using isometric scale
- Isometric projections (drawn to isometric scale) of solids such as cube, regular prism and pyramids (triangular, square, pentagonal and hexagonal), cone, cylinder, sphere, hemisphere, frustum of right regular pyramids (triangular, square, pentagonal, hexagonal) and cone, when they are cut by a plane parallel to the base. The axis and the base side of the solid should be either

perpendicular to HP / VP or parallel to HP and VP. (Indicate the direction of viewing)

- Combination of two solids (except "frustum" of Pyramids and Cone) Keeping the base side parallel or perpendicular to HP/VP and placed centrally together, axis of both the solids should not be given parallel to HP

Note:

- Question on frustum will be asked in vertical position only
- Hidden lines are not required in isometric projection

Unit II: Machine Drawing

Part A. Drawing of machine parts

(i) Drawing to full size scale with instruments

(Internal choice will be given between any two of the following).

Introduction of threads: Standard profiles of screw threads square, knuckle, B.S.W., Metric (external and internal). Bolts (Square, Hexagonal, Tee and Hook); Nuts: (Square and Hexagonal), Plain washer, combination of nut and bolt with or without washer for assembling two parts together, Single riveted lap joint with standard dimensions.

(ii) Free-hand sketches

(Internal choice will be given between any two of the following).

Conventional representation of external and internal threads; studs (plain, square-neck and collar), screws (round-head, cheese-head, 900 flat counter sunk-head, hexagonal socket head and grub-screw). Types of rivets: - snap head, pan head-without tapered neck, flat head and 600 countersunk flat head. Types of sunk-keys (rectangular taper, woodruff and double-head feather key with gib head on both ends).

Part B. Assembly drawings and Dis-Assembly drawings

(Internal choice will be given between an Assembly drawing and a Dis-Assembly drawing).

Note:

1. In all Assembly drawings, half sectional front view will be asked. Side/End view or Top View/Plan will be drawn without section
2. In all the Dis-assembly drawings, only two orthographic views (one of the two views may be half in section or full in section) of any two parts
3.
 - a) In all sectional views, hidden lines / edges are not to be shown
 - b) In all full views, hidden /edges are to be shown

1. Bearings:

- i. Open-Bearing
- ii. Bushed-Bearing

2. Rod-Joints:

- i. Cotter-joints for circular-rods (socket and spigot joint)
- ii. Cotter-joints for round-rods (sleeve and cotter joint)
- iii. Cotter-joints for square rods (Gib and cotter-joint)

3. Tie-rod and Pipe-joints:

- i. Turnbuckle
- ii. Flange pipe joint

4. Couplings:

- i. Unprotected Flange Coupling (having socket and spigot arrangement)
- ii. Protected Flange Coupling

5. Pulleys:

- i. Solid cast iron pulley – (up to 200 mm diameters) having solid web

Practical Work

To perform the following tasks from the given views of the prescribed Machine Block
(One)

I. Value-Points

- Copy the given views
- Drawing the missing view without hidden lines
- Sketching the isometric view without hidden edges
- To make the machine block of the above in three dimensions

(Not to scale but approximately proportionately) drawn with any medium, i.e. thermocol, soap-cake, plasticine, clay, wax, orchsis (available with florists), etc.

II. Computer Aided Design (CAD) – Project

- Project file to be submitted on the simple solids (Prism, Pyramids and Frustums of equilateral triangle, square, pentagon and hexagon) or machine blocks as prescribed in part – I by using the CAD software

III.

- i. Sessional work relating to machine blocks as prescribed
- ii. Viva-voce based on part – I and Part - II