

**ENGINEERING GRAPHICS
COURSE STRUCTURE
CLASS XII (2021-22)**

TERM – 1

S.No.	Unit	Marks
I	ISOMETRIC PROJECTION OF SOLIDS 1. Isometric Projections of Solids 2. Isometric Projections of Combination of Solids	25
II	Machine Drawing (Machine Parts) 3. Machine Parts – Drawing with instruments	10
Practical		15
Total Marks		50

THEORY

I. ISOMETRIC PROJECTION OF SOLIDS

Unit 1: Construction of isometric scale showing main divisions of 10mm and smaller divisions of 1mm, also showing the leading angles.

Isometric projection (drawn to isometric scale) of solids such as cube; regular prisms and pyramids (triangular, square, pentagonal and hexagonal); cone; cylinder; sphere; hemisphere; keeping the base side of the solid parallel or perpendicular to HP/VP. The axis of the solid should be either perpendicular to HP / VP or parallel to HP and VP.

Unit 2: Combination of any two above mentioned solids 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: *Hidden lines are not required in isometric projection.*

II. Machine Drawing (Machine Parts) (as per SP 46: 2003)

Unit 3: Drawing to full size scale with instruments.

Introduction of threads: Standard profiles of screw threads - Square, Knuckle, B.S.W., Metric (external and internal); Bolts – Square head, Hexagonal head; Nuts – Square head, Hexagonal head; Plain washer; combination of nut and bolt with or without washer for assembling two parts together.

PRACTICALS

(i) To perform the following tasks (for One only) from the given views of the prescribed machine blocks from 1 to 5 from **ANNEXURE-I**.

Value-Points

1. Copy the given views 1
2. Drawing the missing view with hidden lines 1
3. Sketching the Isometric view without hidden edges 3
4. To make the machine block of the above in three dimensions. 3
(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 (5 sheets) 3
Project on the simple solids (Prism, Pyramids etc.) or machine blocks as prescribed in part-I by using the CAD software.
- (iii) (a) Sessional work relating to machine blocks as prescribed. 2
(b) Viva-voce 2

ACTIVITY

Industrial Visits (one) to any industry/ manufacturing plant to acquaint the students with the present - day methods & technology for better conceptual understanding can be done by virtual tour of the factory/plant in present situation.

TERM – 2

S.No.	Unit	Marks
III	Machine Drawing (Machine Parts) 4. Machine Parts – Free Hand Sketches	7
IV	Machine Drawing (Assembly and Dis-assembly) 5. Bearings 6. Rod joints 7. Tie-rod and Pipe joint	28
Practical		15
Total Marks		50

III. Machine Drawing (Machine Parts) (as per SP 46: 2003)

Unit 4: Free-hand sketches

Conventional representation of external and internal threads; Types of studs – Plain stud, Square-neck stud, Collar stud; Types of rivets – Snap head, Flat head, Pan head (without tapered neck), 60° Counter Sunk Flat head.

IV. Machine Drawing (Assembly and Dis-assembly) (as per SP 46: 2003)

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

Unit 5: Bearings

- (i) Open-Bearing

- (ii) Bush- Bearing

Unit 6: Rod-Joints

- (i) Cotter-joints for round-rods (Sleeve and cotter joint)
- (ii) Cotter-joints for square rods (Gib and cotter-joint)

Unit 7: Tie-rod and Pipe-joint

- (i) Turnbuckle
- (ii) Flange pipe joint

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 Dis-assembly drawings, only two orthographic views (one of the two views may be half in section or full in section) will be asked of any two parts only.*
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.*

PRACTICALS

- (i) To perform the following tasks (for One only) from the given views of the prescribed machine blocks from 6 to 10 from **ANNEXURE-I**.

	Value-Points
1. Copy the given views	1
2. Drawing the missing view with hidden lines	1
3. Sketching the Isometric view without hidden edges	3
4. 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.)	3
(ii) Computer Aided Design (CAD) – Project (5 sheets) Project on the simple solids (Prism, Pyramids etc.) or machine blocks as prescribed in part-I by using the CAD software.	3
(iii) (a) Sessional work relating to machine blocks as prescribed.	2
(b) Viva-voce	2

ACTIVITY

Industrial Visits (one) to any industry/ manufacturing plant to acquaint the students with the present - day methods & technology for better conceptual understanding can be done by virtual tour of the factory/plant in present situation.

ANNEXURE -- 1



