

CLASS-XII (2014-15)
(Theory)

One Paper: 3 Hours

70 Marks

Unit	Periods	Marks	
I.	Isometric Projections of Solids	50	25
II.	Machine Drawing	118	45
	A. Drawing of Machine parts		
	B. Assembly Drawing and Dis-assembly drawings		
	1. Bearings		
	2. Rod joints		
	3. Tie-rod and pipe joints		
	4. Couplings		
	5. Pulleys		
	Practical	72	30
	Total Marks	240	100

Unit I: Isometric Projection of Solids

50 Periods

- (i) Construction of isometric scale showing main divisions of 10mm and smaller divisions of 1mm, also showing the leading angles. Drawing helping view/s such as triangles, pentagon, hexagon, etc., using isometric scale.
- (ii) Isometric projections (drawn to isometric scale) of solids such as cube, regular prism and pyramids (triangular, square, pentagonal and hexagonal), cone, cylinder, sphere, hemi-sphere, 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)
- (iii) 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:**
- (1) Question on frustum will be asked in vertical position only.
 - (2) Hidden lines are not required in isometric projection.

Unit II: Machine Drawing (as per SP46: 2003)

118 Periods

A. Drawing of machine parts

36 Periods

- (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, 90° flat counter sunk-head, hexagonal sockethead and grub-screw). Types of rivets:- snap head, pan head-without tapered neck, flat head and 60° countersunk flat head. Types of sunk-keys (rectangular taper, woodruff and double-head feather key with gib head on both ends).

- B. Assembly drawings and Dis-Assembly drawings (Internal choice will be given between an Assembly drawing and a Dis-Assembly drawing). **82 Periods**

- 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 (asterix * marked only), only two orthographic views (one of the two views may be half in section or full in section) of any two parts.
 - (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
 - (iii) Footstep-Bearing (only sectional front-view will be asked)
 - (iv) Simple Plummer-Block (only sectional front view will be asked with only round brasses).
 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)
 - (iv) Knuckle-joints (only sectional front view will be asked)
 3. Tie-rod and Pipe-joint
 - * (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 (upto 200 mm diameter) having solid web
 - * (ii) Single groove V-belt pulley (upto 200 mm diameter)

PRACTICALS

One paper (Practical): 3 Hours

30 Marks 72 Periods

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

Block (One).

Value-Points

- | | |
|---|---|
| 1. Copy the given views | 1 |
| 2. Drawing the missing view without hidden lines | 2 |
| 3. Sketching the Isometric view without hidden edges | 5 |
| 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, orchis (available with flowerists), etc. | 7 |

(II) Computer Aided Design(CAD) - Project

10

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. | 3 |
| (ii) Viva-voce based on part-I and part-II | 2 |
| Total Marks | 30 |



