

ENGINEERING DRAWING

**CLASS-XI**

**THEORY**

*One Paper*

*3 Hours*

*70 Marks*

Unit	Marks
<b>PLANE GEOMETRY</b>	
1. Construction of lines, angles and rectilinear figures	4
2. Construction of circles, semi-circles and tangents	6
3. Construction of ellipse, parabola, involute, cycloid, helix and sine-curve	6
<b>SOLID-GEOMETRY</b>	
4. Orthographic-projections of points, lines laminae, (plane) and solids	12
5. Section of solid-figures	15
<b>MACHINE DRAWING</b>	
6. Orthographic projections of simple machine-blocks	12
7. Isometric-projection of laminae (plane) figures	10
8. Development of surfaces	5
<b>Total Marks</b>	<b>70</b>

**PLANE GEOMETRY**

**Unit 1 :** Construction of lines, angles and their divisions. Simple questions based on triangles, squares, rhombuses, trapeziums, regular polygons-pentagon, hexagon and octagon. **08 Pds.**

**Unit 2 :** Construction of circles, external and internal tangents of circles, inscribing of circles in equilateral triangle, square, rhombus, regular polygons-pentagon, hexagon and octagon. **10 Pds.**

**Unit 3 :** (a) Construction of ellipses by the following methods :  
 (i) Concentric circles  
 (ii) Intersecting arcs  
 (iii) Intersecting lines  
 (b) Construction of Parabola by the following methods :  
 (i) Intersecting lines  
 (ii) Intersecting arcs  
 (c) Construction of involute of a circle,  
 (d) Construction of cycloid, helix and sine curve **20 Pds.**



ENGINEERING DRAWING  
CLASS - XI  
THEORY  
DESIGN OF THE QUESTION PAPER

The weightage of the distribution of marks over different contents of the question paper shall be as follows :-

**One Paper** **3 Hours** **70 Marks**

**A. Weightage to Contents/Subject Units**

UNIT-1 PLANE GEOMETRY	Marks
i. Construction of lines, angles, rectilinear figure.	4
ii. Construction of circles, semi circles and tangents.	6
iii. Construction of ellipse, parabola, involute, cycloid, helix and sine curve.	6

**UNIT-2 SOLID-GEOMETRY**

i. Orthographic - projections of points, lines laminae (plane) and solids.	12
ii. Section of solid figure.	15

**UNIT-3 MACHINE DRAWING**

i. Orthographic projections of simple machine blocks.	12
ii. Isometric - projection of laminae (plane) figure.	10
iii. Development of surfaces.	5
<b>Total Marks</b>	<b>70</b>

**B. SCHEME OF OPTION**

- (I) There will be no overall options.
- (II) Internal choice has been given in question of Machine Drawing.

**C. WEIGHTAGE TO DIFFERENT LEVELS OF QUESTIONS**

Sl. No.	Estimated Level of Difficulty	Percentage
I	Easy	35
II	Average	50
III	Difficult	15

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ENGINEERING DRAWING  
(THEORY)  
CLASS - XI  
BLUE PRINT

**Time : 3 Hours**

**Full Marks : 70**

**UNIT-I PLANE GEOMETRY** **16**

Sl. No.	Contents	Weightage/Marks
i.	Construction of lines, angles, rectilinear figures.	4
ii.	Construction of circles, semi circles and tangents.	6
iii.	Construction of ellipse, parabola, involute, cycloid, helix and sine curve.	6

**UNIT-II SOLID-GEOMETRY** **27**

Sl. No.	Contents	Weightage/Marks
i.	Orthographic - projections of points, lines laminae (plane) and solids.	12
ii.	Section of solid figures.	15

**UNIT-III MACHINE DRAWING** **27**

Sl. No.	Contents	Weightage/Marks
i.	Orthographic projections of simple machine blocks.	12
ii.	Isometric - projection of laminae (plane) figures.	10
iii.	Development of surfaces.	5

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ENGINEERING DRAWING  
(PRACTICAL INSTRUCTION)  
CLASS - XI

One Paper

3 Hours

Full Marks : 30

Pass Marks : 12

**INSTRUCTION TO EXAMINERS**

Collect Record book/Drawing sheets from the students before they start practical work.  
Only Drawing Instruments are allowed in the practical hall :

**DISTRIBUTION OF MARKS/VALUE POINTS MAY BE AS FOLLOWS :**

1.	(i) Drawing		4
	(ii) Folding of edges		2
	(iii) Finishing of objects		1
2.	(i) Preparing to the scale		5
	(ii) Cutting accurately to the given measurement		5
	OR		
	(i) Number of geometrical shape used		2
	(ii) Correct used of shape		3
	(iii) Proper Assembling to get desired design		3
3.	A. (i) Proper labeling		1
	(ii) Drawing		4
	Or		
	B. (i) Accurate Measurement		1
	(ii) Correct procedure		2
	(iii) Proper shape		2
4.	* Viva Voce – (at least 5 questions relating to the practical activities mentioned above are to be asked.)		5
5.	* Sessional work [Regularity, neatness and no. of records/sessional work are to be observed]		5

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ENGINEERING DRAWING  
CLASS-XII  
THEORY

One Paper

3 Hours

70 Marks

Unit		Marks
I.	Isometric projections of solids	25
II.	Machine Drawing	
	A. Drawing of Machine parts	15
	B. Sectional view of assembly of machine parts :	30
	1. Bearings	
	2. Rod joints	
	3. Tie-rod and pipe joints	
	4. Couplings	
	5. Pulleys	
<b>Total Marks</b>		<b>70</b>

**Unit 1 : Isometric projection of solids**

**50 Pds.**

Construction of isometric scale showing main divisions of 10mm and smaller divisions of 1mm, also showing the leading angles. Helping view/s such as triangles, pentagon, hexagon etc. can be drawn using scale 1:1 or isometric scale. *Hidden lines are not required in isometric projection.*

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 of the solid should be either perpendicular to H.P. or perpendicular to the VP or parallel to HP and VP both. (Indicate the direction of viewing)

Combination of two solids (except “frustum” of Pyramids and Cone) Keeping the base side parallel or perpendicular to H.P./V.P. and placed centrally together, but in no case the common axis of both the solids should be given parallel to H.P.

**Note :** Question on single solid will be asked in vertical position only.

**Unit II : Machine Drawing**

**A. Drawing of machine parts**

**36 Pds.**

(i) Drawing to full size scale with instruments.

**9 marks**

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

Standard profiles of screw threads (square, knuckle, B.S.W. Metric (external and internal) and nomenclature of threads : 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

6 marks

(Internal choice will be given between any two of the following) conventional representation of external and internal threads; studs (plain, plain with square-neck and collar); screws (round-head, cheese-head, 90 flat countersunk-head, hexagonal socket-head 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. Assembled views of the following Machine parts :**

82 Pds.

(Internal choice will be given in the examination between *any two* of the following assembly drawings, given in the “orthographic views” of the components drawn separately).

**Note :**

1. In all the following assembly drawings only half sectional front view will be asked and the other half without section.

2. Side/End view or Top View/Plan will be drawn without section, wherever applicable.

3. In no view hidden edges/lines are required.

**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 brases).

**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) Tumbuckle
- (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 200mm diameter) having solid web
- (ii) Single groove V-ball pulley (upto 200 mm diameter)

ENGINEERING DRAWING

CLASS-XII

PRACTICAL

One Paper (Practical)

3 Hours

30 Marks, 72 Pds.

To perform the following jobs from the given views of the prescribed Machine Block (two).

1. Block-one, by the external examiner.
2. Block-two, by the internal examiner.

Value-Points

Part 'A'

- |   |        |
|---|--------|
| 1. Copy the given views   | 1x2=2  |
| 2. Drawing the missing view with hidden line  | 1½x2=3 |
| 3. Sketching the Isometric view without hidden edges  | 2½x2=5 |
| 4. To make the machine block of the above in three dimensions.<br>(not to scale but approximately proportionately) drawn with any medium<br>i.e. thermocol, soap-cake, plasticine, clay, wax etc. | 5x2=10 |

Part 'B'

- |  |   |
|--|---|
| Viva-voce-questions based on the practicals<br>Performed in Part 'A' | 5 |
|--|---|

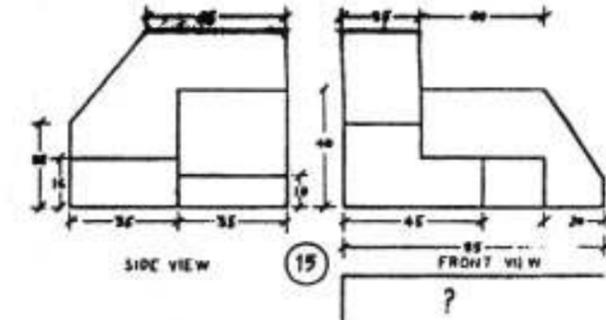
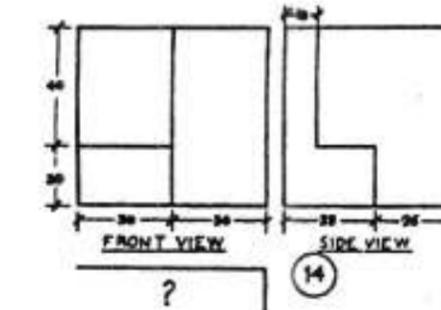
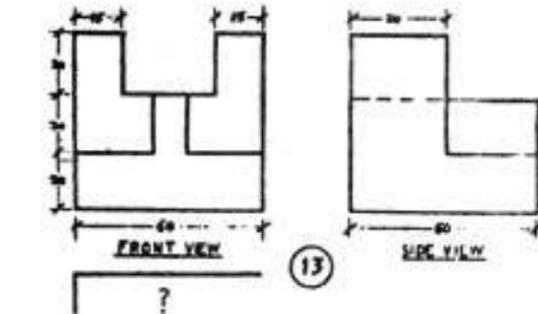
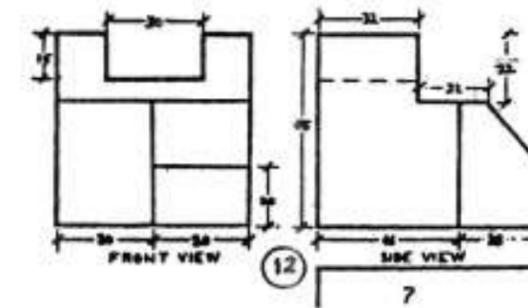
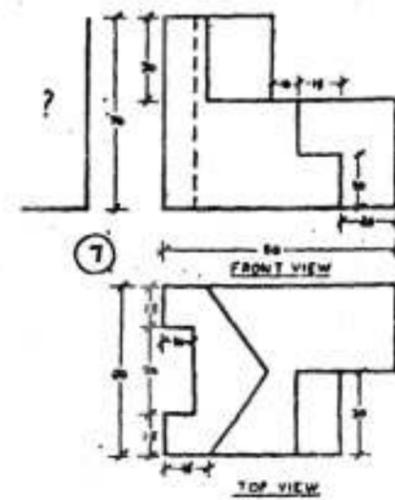
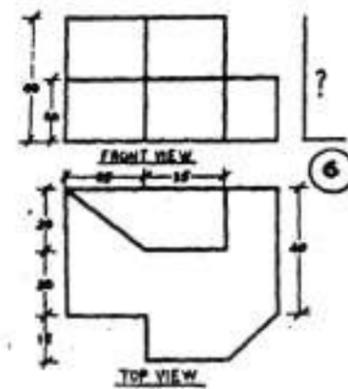
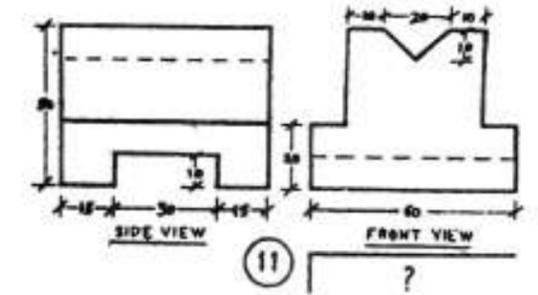
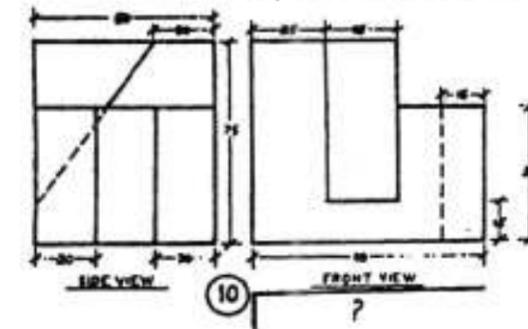
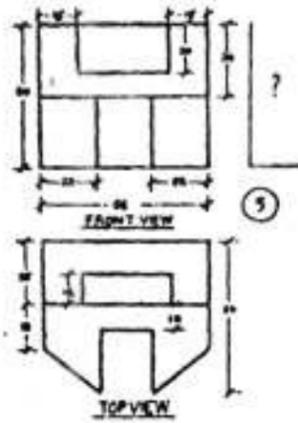
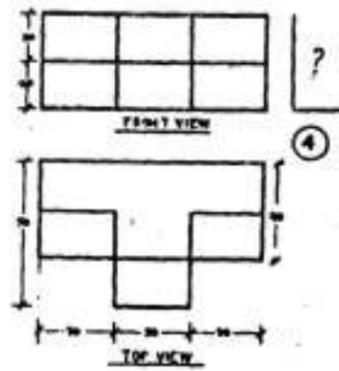
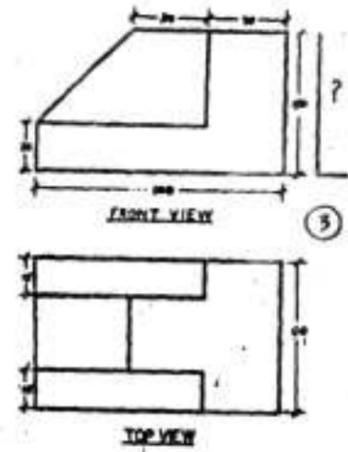
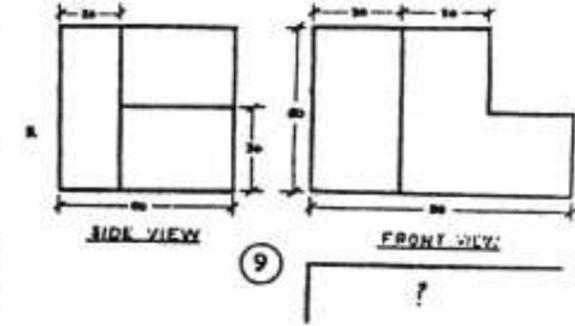
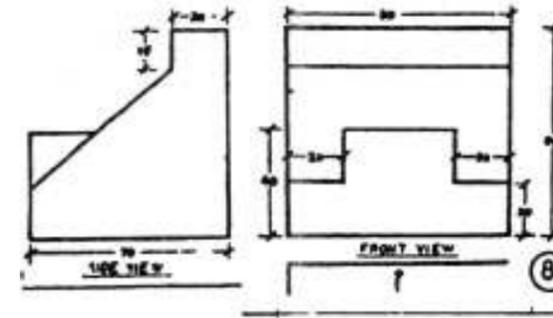
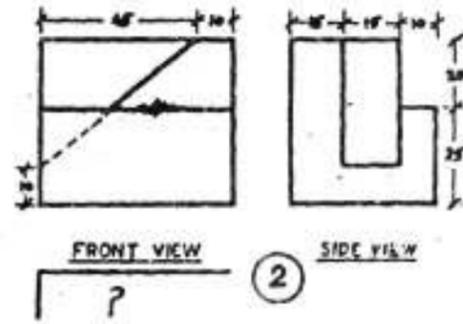
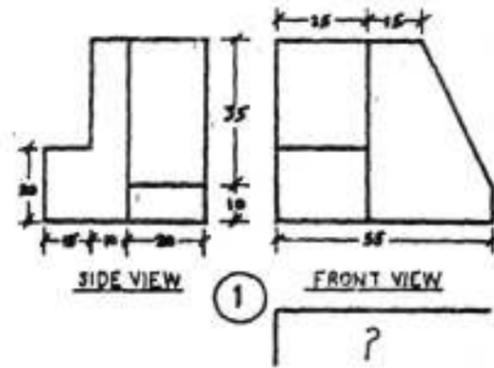
Sessional Work :

- |  |   |
|--|---|
| Solution of the fifteen Prescribed Machine Blocks. | 5 |
|--|---|

**TOTAL 30 Marks**

Prescribed Textbook :

1. Basic Engineering Drawing Part II  
By : V.P. Kumar and Jasbir Singh  
Published by : Kumarsons Publishers, New Delhi.



**Important :**

- (i) All dimensions are in mm.
- (ii) The above diagrams are not to scale.
- (iii) Assume suitably, missing or mismatching dimensions, if any.
- (iv) Follow I angle method of projection only in all drawing or sketches.

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ENGINEERING DRAWING  
CLASS - XII  
THEORY  
DESIGN OF THE QUESTION PAPER

The weightage of the distribution of marks over different contents of the question paper shall be as follows :-

**One Paper** **3 Hours** **70 Marks**

**A. WEIGHTAGE TO CONTENTS/SUBJECT UNITS**

Unit	Contents	Percentage
I	Isometric Projection of Solids	25
II	Machine Drawing	
	A. Machine Parts	15
	B. Sectional view of assembly of machine parts :	30
	1. Bearings	
	2. Rodjoints	
	3. Tie-rod and pipe joints	
	4. Couplings	
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<b>Total Marks</b>		<b>70</b>

**B. SCHEME OF OPTION**

- (I) There will be no overall options.
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ENGINEERING DRAWING  
(THEORY)  
CLASS - XII  
BLUE PRINT

**Time : 3 Hours**

**Full Marks : 70**

**UNIT-I ISOMETRIC PROJECTION OF SOLIDS** **25**

Sl. No.	Contents	Weightage
i.	Construction of Isometric Scale	4
ii.	Isometric projection of solid	7
iii.	Isometric Projection of combination of two solids	14

**UNIT-II (A) DRAWING OF MACHINE PARTS** **15**

Sl. No.	Contents	Weightage
i.	Drawing of machine parts to a scale 1:1 (using instruments)	9
ii.	Drawing of Machine parts by free hand sketching	6

**UNIT-II (B) ASSEMBLY/DISASSEMBLY** **30**

Sl. No.	Contents	Weightage/Marks
i.	Sectional view assembly of machine parts.	30

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ENGINEERING DRAWING  
(PRACTICAL INSTRUCTION)  
CLASS - XII

One Paper

3 Hours

Full Marks : 30

Pass Marks : 12

**INSTRUCTION TO EXAMINERS**

Collect the drawing sheets/models/sessional activities from the students before starting practical works for assessment.

**DISTRIBUTION OF MARKS FOR EACH OF THE VIEWS MAY BE AS FOLLOWS :**

- |    |   |        |
|----|---|--------|
| 1. | (i) Copy the given views  | 1x2=2  |
|    | (ii) Drawing the missing view with hidden line  | 1½x2=3 |
|    | (iii) Sketch the isometric view without hidden edge.  |        |
|    | (a) Isometric sketch  | 2x2=4  |
|    | (b) Dimension   | ½x2=1  |
|    | (iv) Make the machine block of the above in 3 dimension<br>(not to scale but approximately proportionally drawn<br>with any medium i.e. thermocal, socket, plasticine, clay,<br>waxes etc.) |        |
|    | (a) Model   | 4x2=8  |
|    | (b) Neat & Tidy   | 1x2=2  |
| 2. | * Viva Voce – (at least 5 questions based on the above<br>activities.   | 5      |
| 3. | * Sessional work  | 5      |

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