ENGINEERING DRAWING

CLASS-XI THEORY

One Paper 3 Hours 70 Marks

Unit		Marks
PLA	ANE GEOMETRY	
1.	Construction of lines, angles and rectilner figures	4
2.	Construction of circles, semi-circles and tangents	6
3.	Construction of ellipse, parabola, involute, cycloid, helix and sine-curve	6
SOI	LID-GEOMETRY	
4.	Orthographic-projections of points, lines laminae, (plane) and solids	12
5.	Section of solid-figures	15
MA	CHINE DRAWING	
6.	Orthographic projections of simple machine-blocks	12
7.	Isometric-projection of laminae (plane) figures	10
8.	Development of surfaces	5
	Total Marks	70

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 equilaterial traingle, 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.

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SOLID GEOMETRY

Unit 4: Methods of orthographic projections and dimensioning strictly as per SP: 46-1988 revised conventions. Projection of points, lines, regular plane figure and right regular solids such as cubes, prisms and pyramids (square, traingular, pentagonal and hexagonal), tetrahedrons, cones, cylinders, spheres, hemi-spheres and frustum of solids when they are kept with their axis perpendicular, to HP/VP or parallel to one plane and inclined to the other or parallel to HP and VP both.

40 Pds.

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Unit 5: Section of solids under the same conditions mentioned above made by the horizontal, vertical and inclined planes, also showing true-shape of section

45 Pds.

MACHINE DRAWING

Unit 6: Orthographic projections of machine blocks.

40 Pds.

Unit 7: Construction of Isometric scale showing main devisions of 10 mm and smaller divisions of 1 mm each. Isometric projection (drawn to isometric scale) of figures such as traingles, squares, pentagons, hexagons, circles and semi-circles with their surface parallel to HP or VP and its one side or diagonal or diameter should be either parallel or perpendicular to HP/VP.

5 Pds.

Unit 8: Development of the surfaces of following solids:

- 1. Cube, cuboid, prisms-triangular, square, pentagonal and hexagonal.
- 2. Pyramids (triangular, square, pentagonal and hexagonal).
- 3. Right-circular-cylinder and cone

10 Pds.

ENGINEERING DRAWING

CLASS-XI PRACTICAL

One Paper (Practical)

3 Hours

30 Marks

- 1. Developing "Prisms" & "Pyramids" with the help of card baord (thick paper).
- 2. Developing different types of packing boxes (cartons).
- 3. Making different types of graphics designs/murals for interior/exterior decorations using coloured laminae using the knowledge of circumscribing, inscribing and describing of plane geometrical figures.
- 4. Drawing ellipse by
 - (a) Trammel method
 - (b) Thread method

On ground or drawing-sheets/ply-wood.

- 5. Preparing top-view (plan) of a
 - (a) Class-room
 - (b) Drawing-room
 - (c) Home

Showing different objects in it.

- 6. Drawing through activities:
 - (a) Involutes
 - (b) Cycloid
 - (c) Helix
 - (d) Sine-curves and listing their uses in daily life.
- 7. Preparing the following sections of solids (prisms, pyramids, sphere etc.) with clay, soap, thermocol, plasticine, wax or any other material easily and economically available.
 - When the cutting plane is:
 - (i) Parallel to the base(ii) perpendicular to the base
 - (iii) inclined to the base
 - (iv) cutting at a given height at a given angle above the base.

Also making different objects with combination of above solids and their section models.

Note:

- I. In all the practicals drawing/sketching of the views should be incorporated and evaluated accordingly
- II. The scheme of evaluation is as follows:

(a)	Practicals (2)	15 Marks
(b)	Drawing/Sketch	05 Marks
(c)	Viva-voce	05 Marks
(d)	Sessional Work	05 Marks

30 Marks

Total

PRESCRIBED TEXTBOOK:

1. Basic Engineering Drawing Part I

By: V.P. Kumar

Published by: Kumarson Publishers, New Delhi.

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, cyeloid, helix and sine curve.	6

UNIT-2 SOLID-GEOMETRY

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

UNIT-3 MACHINE DRAWING

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

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
П	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, cyeloid, 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

ENGINEERING DRAWING

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(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)	Dra	wing	4
	(ii)	Fol	ding of edges	2
	(iii)		ishing of objects	1
2.	(i)	Prep	paring to the scale	5
	(ii)	Cut	tting accurately to the given measurement	5
			OR	
	(i)	Nur	mber of geometrical shape used	2
	(ii)		rrect used of shape	3
	(iii)		per 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.	* Vi	va Vo	oce – (at least 5 questions relating to the practical	
			activities mentioned above are to be asked.)	5
5.	* Se	ssion	al work [Regularity, neatness and no. of	
			/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.	Ison	Isometric projections of solids			
II.	Mac	Machine Drawing			
	A.	Drawing of Machine parts	15		
	B.	. Sectional view of assembly of machine parts:			
		1. Bearings			
		2. Rod joints			
		3. Tie-rod and pipe joints			
		4. Couplings			
		5. Pulleys			
		Total Marks	70		

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 porifiles 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

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(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 hiddlen 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) Turnbuckle
- (ii) Flange pipe joint

4. Couplings

- (i) Unprotected Flange Coupling (having socket and spigot arragement)
- 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'

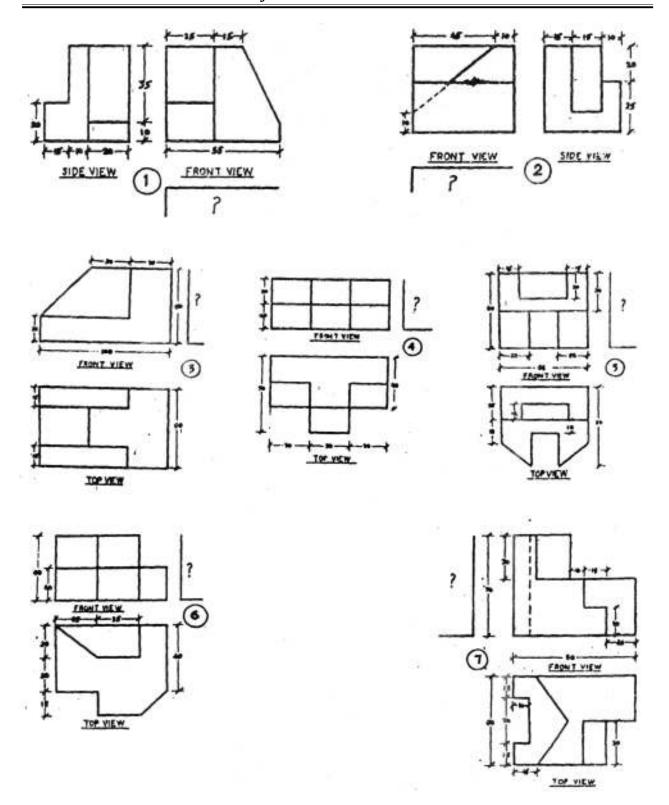
TOTAL	30 Marks
tion of the fifteen Prescribed Machine Blocks.	5
Vork:	
formed in Part 'A'	
n-voce-questions based on the practicals	5
i.e. thermocol, soap-cake, plasticine, clay, wax etc.	5x2=10
To make the machine block of te above in three dimensions.	
Sketching the Isometric view without hidden edges	$2\frac{1}{2}x2=5$
Drawing the missing view with hidden line	$1\frac{1}{2}x2=3$
Copy the given views	1x2=2
	Drawing the missing view with hidden line Sketching the Isometric view without hidden edges To make the machine block of te above in three dimensions. (not to scale but approximately proportionately) drawn with any medium i.e. thermocol, soap-cake, plasticine, clay, wax etc. a-voce-questions based on the practicals formed in Part 'A' Work: tion of the fifteen Prescribed Machine Blocks.

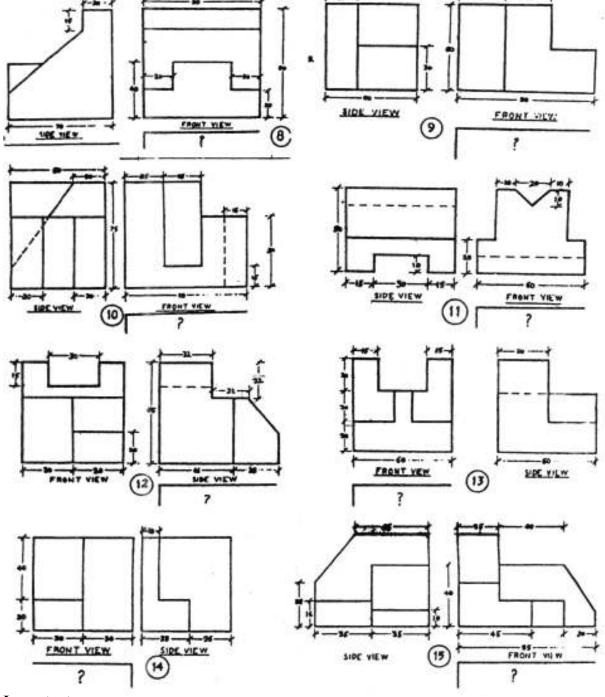
Prescribed Textbook:

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.

ENGINEERING DRAWING

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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	Ison	netric Projection of Solids	25
П	Mac	hine Drawing	
	A.	Machine Parts	15
	B.	Secional view of assembly of machine parts:	30
		1. Bearings	
		2. Rodjoints	
		3. Tie-rod and pipe joints	
		4. Couplings	
		5. Pulleys	
	•	Total Marks	70

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 - 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.	Isomectric 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	9
	(using instruments)	
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

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	$1\frac{1}{2}x2=3$
	(iii)	Sketch the isometric view without hidden edge.	
		(a) Isometric sketch	2x2=4
		(b) Dimension	$\frac{1}{2}x2=1$
	(iv)	Make the machine block of the above in 3 dimension (not to scale but approximately proportionally drawn with any medium i.e. thermocal, socket, plasticine, clay, waxes etc.)	
		(a) Model	4x2=8
		(b) Neat & Tidy	1x2=2
2.	* Viv	va Voce – (at least 5 questions based on the above activities.	5
3.	* Ses	ssional work	5