ENGINEERING DRAWING

CLASS-XI

THEORY

One Paper ***3 Hours*** ***7O Marks***

Unit	Marks
PLANE 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
SOLID-GEOMETRY	
4. Orthographic-projections of points, lines laminae, (plane) and solids	12
5. Section of solid-figures	15
MACHINE 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.

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.

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

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.

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

MACHINE DRAWING

Unit 6 : Orthographic projections of machine blocks.

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.

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

ENGINEERING DRAWING

CLASS-XI

PRACTICAL

One Paper (Practical) ***3 Hours*** ***3O 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
	Total	**30 Marks**

PRESCRIBED TEXTBOOK :

1. Basic Engineering Drawing Part I
   By : V.P. Kumar
   Published by : Kumarson Publishers, New Delhi.

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DESIGN OF
QUESTION PAPER

Subject : ENGINEERING DRAWING
Paper : Theory
Class : XI
Full Mark : 70
Time : 3 Hours

I — WEIGHTAGE TO OBJECTIVES:

Objectives	Marks	Percentage
Knowledge (K)	11	15
Understanding (U)	38	55
Application (A)	21	30
Skill (S)	-	-
Total:	**70**	**100**

II — WEIGHTAGE TO FORM OF QUESTIONS:

Form of Questions	No. of Question	Time (in minutes)	Marks	Percentage
Essay/Long Answer (E/LA)	1	50	15	21
Short Answer (SA-I)	2	50	20	28
Short Answer (SA-II)	4	60	25	36
MCQ	10	20	10	15
Total:	**17**	**180**	**70**	**100**

III — WEIGHTAGE TO CONTENT:

UNIT		CONTENTS	Marks	Percentage
PLANE GEOMETRY				
1	i)	Construction of lines, angle, rectilinear figures	4	6
	ii)	Construction of Circles, Semi-circle and Tangents	6	9
	iii)	Construction of ellipse, Parabola, involute, cycloid, helix and sine curve	6	9
SOLID GEOMETRY				
2	i)	Orthographic-Projection of points, lines Laminae (Plane) figures	12	17
	ii)	Section of Solid figures	15	21
MACHINE DRAWING				
3	i)	Orthographic-Projection of simple machine blocks	12	17
	ii)	Isometric- Projection of laminate (plane) figures	10	14
	iii)	Development of surfaces	5	7
		TOTAL	70	100

IV — SCHEME OF SECTIONS: Nil

V — SCHEME OF OPTIONS: Internal option will be given in Essay Type Question only

VI — DIFFICULTY LEVEL:

Difficult : 40% of the total marks
Average : 45% of the total marks
Easy : 15% of the total marks

Abbreviation: K(Knowledge), U(Understanding), A(Application), Skill(S), E/LA(Essay /Long Answer Type), SA(Short Answer Type), VSA(Very Short Answer Type), MCQ(Multiple Choice Question)

NOTE- (i) Two questions out of 10 (ten) questions of MCQ will be assertion & reason type question.
(ii) Only one question of SA-I will be Case Study Based question.

ENGINEERING DRAWING

(THEORY)

CLASS - XI

BLUE PRINT

Time : 3 Hours **Full Marks : 7O**

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

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ENGINEERING DRAWING

(PRACTICAL INSTRUCTION)

CLASS - XI

One Paper **3 Hours** **Full Marks : 3O**

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** **7O 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	
		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 paralel 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**

(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*** ***3O 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 te above in three dimensions. (not to scale but approximately proportionately) drawn with any medium i.e. thermocol, soap-cake, plasticine, clay, wax etc.	5x2=10

Part 'B'

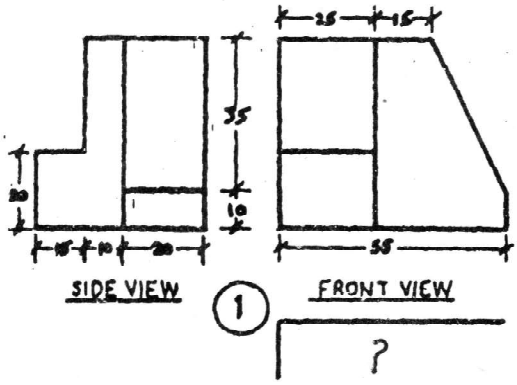
Viva-voce-questions based on the practicals Performed in Part 'A'	5

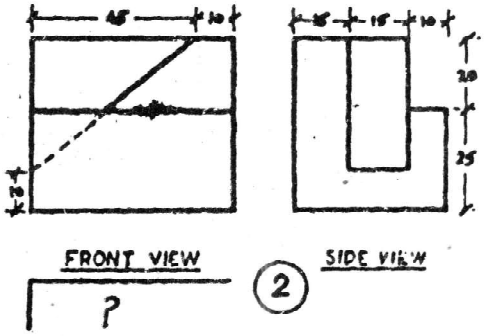
Sessional Work :

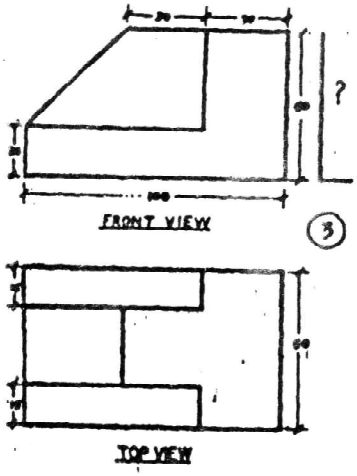
Solution of the fifteen Prescribed Machine Blocks.	5
TOTAL	**30 Marks**

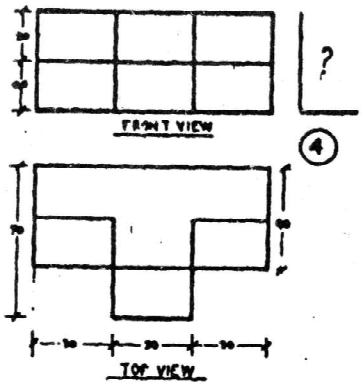
Prescribed Textbook :

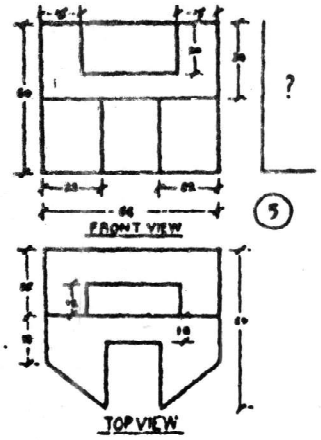
1. Basic Engineering Drawing Part II
   By : V.P. Kumar and Jasbir Singh
   Published by : Kumarsons Publishers, New Delhi.

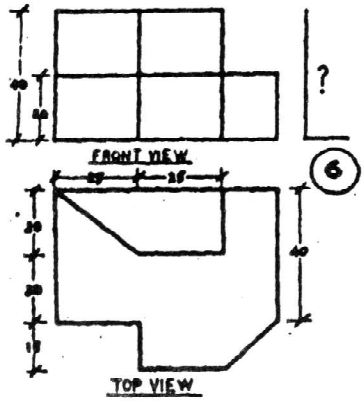

SIDE VIEW
FRONT VIEW
1
?

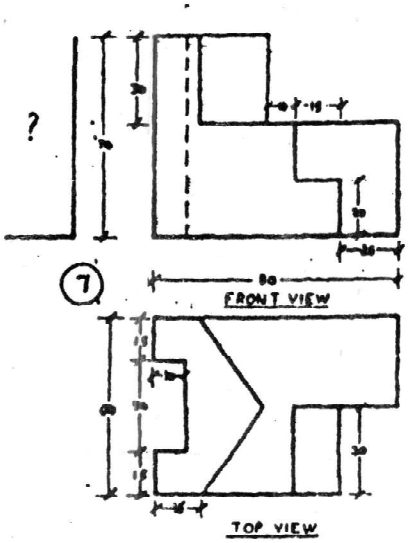

FRONT VIEW
SIDE VIEW
2
?

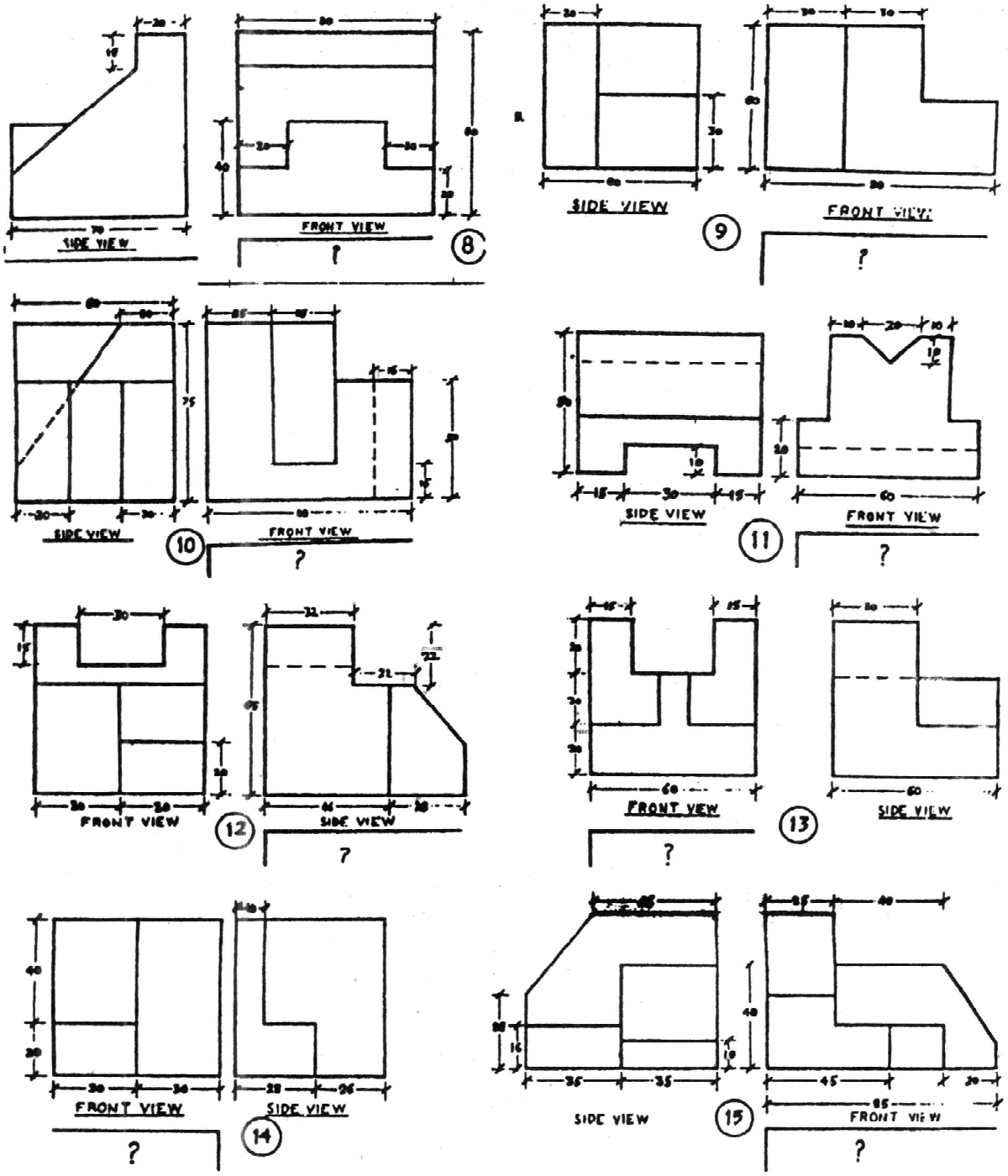

FRONT VIEW
3
TOP VIEW


FRONT VIEW
4
TOP VIEW


FRONT VIEW
5
TOP VIEW


FRONT VIEW
6
TOP VIEW


FRONT VIEW
7
TOP VIEW


SIDE VIEW
FRONT VIEW
8
SIDE VIEW
FRONT VIEW
9
SIDE VIEW
FRONT VIEW
10
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11
FRONT VIEW
SIDE VIEW
12
FRONT VIEW
SIDE VIEW
13
FRONT VIEW
SIDE VIEW
14
SIDE VIEW
FRONT VIEW
15

FOR THE ACADEMIC SESSION 2024-25

DESIGN OF QUESTION PAPER

Subject : **ENGINEERING DRAWING**
Paper : Theory
Class : XII
Full Mark : 70
Time : 3 Hours

<table>
<tr><td rowspan="6">I.</td><td colspan="6">WEIGHTAGE TO OBJECTIVES :</td></tr>
<tr><td colspan="4">Objectives</td><td>Marks</td><td>Percentage</td></tr>
<tr><td colspan="4">Knowledge (K)</td><td>14</td><td>20</td></tr>
<tr><td colspan="4">Understanding (U)</td><td>35</td><td>50</td></tr>
<tr><td colspan="4">Application (A)</td><td>21</td><td>30</td></tr>
<tr><td colspan="4">Total :</td><td>70</td><td>100</td></tr>
<tr><td rowspan="7">II.</td><td colspan="6">WEIGHTAGE TO FORM OF QUESTIONS :</td></tr>
<tr><td colspan="2">Form of questions</td><td>No. of Questions</td><td>Time (in minutes)</td><td>Marks</td><td>Percentage</td></tr>
<tr><td colspan="2">Essay/Long Answer(E/LA)</td><td>1</td><td>60</td><td>28</td><td>40</td></tr>
<tr><td colspan="2">Short Answer(SA-I)</td><td>2</td><td>50</td><td>21</td><td>30</td></tr>
<tr><td colspan="2">Short Answer(SA-II)</td><td>3</td><td>65</td><td>16</td><td>23</td></tr>
<tr><td colspan="2">MCQ</td><td>5</td><td>5</td><td>5</td><td>7</td></tr>
<tr><td colspan="2">Total:</td><td>11</td><td>180</td><td>70</td><td>100</td></tr>
<tr><td rowspan="11">III.</td><td colspan="6">WEIGHTAGE TO CONTENTS :</td></tr>
<tr><td colspan="3">Unit / Content:</td><td>Marks</td><td>Percentage</td></tr>
<tr><td>I</td><td colspan="2">Isometric projection of solids</td><td>25</td><td>36</td></tr>
<tr><td rowspan="7">II.</td><td colspan="2">Machine Drawing</td><td></td><td></td></tr>
<tr><td>A</td><td>Drawing of Machine parts</td><td>15</td><td>21</td></tr>
<tr><td rowspan="6">B</td><td>Sectional view of assembly / disassembly of Machine parts</td><td rowspan="6">30</td><td rowspan="6">43</td></tr>
<tr><td>1. Bearing</td></tr>
<tr><td>2. Rod Joints</td></tr>
<tr><td>3. Tie- rod and Pipe joints</td></tr>
<tr><td>4. Couplings</td></tr>
<tr><td>5. Pulleys</td></tr>
<tr><td colspan="3">Total :</td><td>70</td><td>100</td></tr>
<tr><td>IV.</td><td colspan="6">SCEHEME OF SECTIONS : Nil</td></tr>
<tr><td>V.</td><td colspan="6">SCHEME OF OPTIONS : Internal option may be given in Essay Type, SA-I & SA-II</td></tr>
<tr><td>VI.</td><td colspan="6">DIFFICULTY LEVEL :
Difficult : 30 %
Average : 50 %
Easy : 20 %</td></tr>
</table>

Abbreviation : K(Knowledge), U(Understanding), C(Comprehension), Exp.(Expression), Skill(S), E(Essay Type), SA (Short Answer Type), VSA (Very Short Answer Type), MCQ(Multiple Choice Question)

FROM THE ACADEMIC SESSION 2025-26

DESIGN OF QUESTION PAPER

Subject : ENGINEERING DRAWING
Paper : Theory
Class : XII
Full Mark : 70
Time : 3 Hours

I	**WEIGHTAGE TO OBJECTIVES:**				
	Objectives			**Marks**	**Percentage**
	Knowledge (K)			11	15
	Understanding (U)			38	55
	Application (A)			21	30
	Skill (S)			-	-
	Total:			70	100
II	**WEIGHTAGE TO FORM OF QUESTIONS:**				
	Form of Questions	**No. of Question**	**Time (in minutes)**	**Marks**	**Percentage**
	Essay/Long Answer (E/LA)	1	60	28	40
	Short Answer (SA-I)	2	50	21	30
	Short Answer (SA-II)	2	50	11	16
	MCQ	10	20	10	14
	Total:	**15**	**180**	**70**	**100**
III	**WEIGHTAGE TO CONTENT:**				
	UNIT/CONTENTS:			**Marks**	**Percentage**
	I	Isometric projection of solids		25	36
	II	Machine Drawing			
		A	Drawing of Machine parts	15	21
		B	Sectional view of assembly / disassembly of Machine parts	30	43
			Bearing		
			Rod Joints		
			Tie- rod and Pipe joints		
			Couplings		
			Pulleys		
	TOTAL			**70**	**100**
IV	SCHEME OF SECTIONS: Nil				
V	SCHEME OF OPTIONS: Internal option will be given in Essay Type Question & SA-I				
VI	DIFFICULTY LEVEL: Difficult : 40% of the total marks Average : 45% of the total marks Easy : 15% of the total marks				

Abbreviation: K(Knowledge), U(Understanding), A(Application), Skill(S), E/LA(Essay /Long Answer Type), SA(Short Answer Type), VSA(Very Short Answer Type), MCQ(Multiple Choice Question)

NOTE- (i) Two questions out of 10 (ten) questions of MCQ will be assertion & reason type question.
(ii) Only one question of SA-I will be Case Study Based question.

ENGINEERING DRAWING

(THEORY)

CLASS - XII

BLUE PRINT

Time : 3 Hours **Full Marks : 7O**

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 (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 : 3O**

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 (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.	* Viva Voce – (at least 5 questions based on the above activities.		5
3.	* Sessional work		5

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