

**ENGINEERING GRAPHICS (Code No. 046)****CLASS XI (2022-23)****One Paper (Theory): 3 Hours****70 Marks****One paper (Practical): 3 Hours****30 Marks**

<b>Sr. No.</b>	<b>Unit</b>	<b>Marks</b>	<b>Periods</b>
I	<b>PLANE GEOMETRY</b> 1. Lines, angles and rectilinear figures 2. Circles, inscribing and circumscribing of circles	10	15
II	<b>SOLID GEOMETRY</b> 3. Orthographic projection of points and lines 4. Orthographic projection of regular plane figures 5. Orthographic projection of right regular solids 6. Section of solids	30	70
III	<b>MACHINE DRAWING</b> 7. Orthographic projections of simple machine blocks 8. Isometric projection of laminae (plane figures)	30	50
	<b>Practicals</b>	<b>30</b>	<b>30</b>
	<b>Total Marks</b>	<b>100</b>	<b>165</b>

## **THEORY**

### **I. PLANE GEOMETRY**

**15 Periods**

**Printing English alphabets (capital and small) and numerals in standard proportions. Unidirectional/aligned system of dimensioning as per SP 46:2003 (Revised)**

Unit 1: Construction of lines, angles and their divisions. Simple questions based on triangles, square, rhombus, regular polygons-pentagon, and hexagon.

8 Periods

Unit 2: Construction of circles, inscribing and circumscribing of circles in equilateral triangle, square, rhombus, regular polygons-pentagon and hexagon.

7 Periods

### **II. SOLID GEOMETRY**

**70 Periods**

Unit 4: Orthographic projection: dimensioning and conventions strictly as per SP 46:2003 (Revised). Orthographic projection of points and lines. 20 Periods

Unit 5: Orthographic projection of regular plane figures - triangle, square, pentagon, hexagon, circle and semi-circle. 14 Periods

Unit 6: Orthographic projection of right regular solids such as cubes; prisms and pyramids (square, triangular, pentagonal and hexagonal); cones; cylinders; spheres; hemi-spheres; frustum of pyramids and cone, when they are kept with their axis (a) perpendicular to HP/VP (b) parallel to HP and VP both.

20 Periods

Unit 7: Section of right regular solids such as cubes; prisms and pyramids (square, triangular, pentagonal, and hexagonal); cones; cylinders; spheres, kept with their axis perpendicular to HP/VP, made by a vertical cutting plane.

16 Periods

### **III. MACHINE DRAWING**

**50 Periods**

Unit 8: Orthographic projection of simple machine blocks. 25 Periods

Unit 9: Isometric Projection - Construction of isometric scale showing main divisions of 10 mm and smaller divisions of 1 mm each. Isometric projection (drawn to isometric scale) of regular plane figures - triangle, square, pentagon, hexagon, circle and semi-circle with their surface parallel to HP or VP (keeping one side either parallel or perpendicular to HP/VP). 25 Periods

## PRACTICALS

30 Periods

1. Making different types of graphic designs/ murals for interior/ exterior decorations in colour using the knowledge of geometrical figures with the use of any Computer Software such as Collab-CAD and/or any equivalent pertinent software.
2. Drawing the following engineering curve through activities - ellipse (by trammel & thread method) on the ground/ drawing sheet/ plywood/ cardboard etc.
3. Developing the following solids with the help of cardboard/ thick paper.
  - a) cube, cuboid
  - b) prisms & pyramids (triangular, square, pentagonal and hexagonal)
  - c) right circular cylinder and cone
4. Preparing the section 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: parallel to the base, perpendicular to the base or inclined to the base.

### Note:

- I. 10 practicals (minimum two each from aforementioned four points) are to be assessed.
- II. In all the practicals, drawing/sketching of the views should be incorporated and evaluated accordingly.
- III. 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
<b>Total</b>		<b>30 Marks</b>

### ACTIVITY

Industrial Visits (Two) 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. The following links are given as an example for same:

Jindal Industrial visit

<https://www.youtube.com/watch?v=FYPbgr2Md-c>

Manufacturing process of glass bottle

[https://www.youtube.com/watch?v=A\\_M8WBJMcM0](https://www.youtube.com/watch?v=A_M8WBJMcM0)

Power Plant/ Virtually Reality Tour (360<sup>0</sup>)

<https://youtu.be/34cXKIP39Pg>

Machine Tools and Manufacturing Systems

<https://www.youtube.com/watch?v=F2qXYyp0GjY>

## ANNEXURE -- 1



