	• Borders and Frames (Orientation marks and graduations) • Grid Reference • Item Reference on Drawing Sheet (Item List)
9.	Method of presentation of Engineering Drawing • Pictorial View • Orthogonal View • Isometric view
10.	Symbolic Representation (as per BIS SP:46-2003) of: • Fastener (Rivets, Bolts and Nuts) - Bars and profile sections • Weld, brazed and soldered joints. • Electrical and electronics element • Piping joints and fittings
11.	Construction of Scales and diagonal scale
12.	Practice of Lettering and Title Block
13.	Dimensioning practice: • Position of dimensioning (unidirectional, aligned, oblique as per BIS SP:46-2003) • Symbols preceding the value of dimension and dimensional tolerance. • Text of dimension of repeated features, equidistance elements, circumferential objects.
14.	Construction of Geometrical Drawing Figures: • Different Polygons and their values of included angles. Inscribed and Circumscribed polygons. • Conic Sections (Ellipse & Parabola)
15.	Drawing of Solid figures (Cube, Cuboids, Cone, Prism, Pyramid, Frustum of Cone and Pyramid.) with dimensions.
16.	Free Hand sketch of hand tools and measuring tools used in respective trades.
17.	Projections: • Concept of axes plane and quadrant. • Orthographic projections • Method of first angle and third angle projections (definition and difference) • Symbol of 1st angle and 3rd angle projection as per IS specification.
18.	Drawing of Orthographic projection from isometric/3D view of blocks
19.	Orthographic Drawing of simple fastener (Rivet, Bolts, Nuts & Screw)
20.	Drawing details of two simple mating blocks and assembled view.
SECOND YEAR	
1.	**<u>Sign & Symbol Trade related</u>** **Alternating Current** • Drawing of simple electrical circuit using electrical symbols. • Drawing of sine square & triangular waves. • Diagram of battery charging circuit. • Practice in reading typical example of circuit containing R, L & C.

	• Reading of electrical drawing.
2.	**Electronic components** • Symbols for electronic components. Diode, Transistor, Zener diode, SCR, UJT, FET, IC,Diac, Triac, Mosfet, IGBT etc. • Drawing of half wave, Full wave and Bridge rectifier circuit. • Drawing circuit for a single stage Amplifiers and Multi stage Amplifies and types of signals. • Drawing of circuit containing UJT, FET & Simple power control circuits. • Free hand drawing of Logic gates and circuits.
3.	**Electric wirings &Earthing** • Detailed diagram of calling bell, & Buzzers etc • Free hand sketching of Staircase wiring. • Drawing the schematic diagram of plate and pipe earthing. • Diagram for electroplating from A.C / D.C source.
4.	**DC machines** • Graphic symbols for Rotating machines. • Sketching of brush and brush gear of D.C. machines. • Sketching of D.C. 3-point and 4-point starter . • Layout arrangement of D.C. Generators & motors, control panel. • Exercises on connection to motors through Ammeter, voltmeter & K.W. meters of electrical wiring diagram. • Drawing the schematic diagram of D.C. motor speed control by Thyristor / DC Drive.
5.	**Transformer** • Graphic symbols for Transformers. • Free hand sketching of transformer and auxiliary parts and sectional views. • Sketching a breather. • Drawing the diagram of typical marking plate of a distribution transformer.
6.	**Illumination** • Free hand sketching of Mercury vapour lamp, sodium vapour lamp, fluorescent tube (Single & Twine), MHL lamp and their connection.
7.	**Three phase Induction motor** • Free hand sketching of Slip-ring and Squirrel cage Induction motor. • Typical wiring diagram for drum controller operation of A.C. wound rotor motor. • Drawing the schematic diagram of Autotransformer starter, DOL starter and Star Delta Starter. • Drawing the schematic diagram of A.C. motor speed control by SCR /AC Drive.
8.	**Alternator** • Tracing of panel wiring diagram of an alternator. • Drawing the schematic diagram of automatic voltage regulators of A.C. generators.
9.	**Winding** • Drawing the development diagram for D.C. Simplex Lap & Wave winding • with brush position. Drawing the development diagram of A.C 3 – Phase, 4 Pole 24

	slots single layer winding.
10.	**Control Panel** • Practice in reading panel diagram. • Local & Remote control of Induction motor with inching. • Forward & Reverse operation of Induction motor • Automatic Star Delta Starter • Automatic star delta starter with change of direction of rotation • Sequential control of three motors.
11.	**Domestic Appliances** • Fire, Alarms, Electric Iron, Heater, Electric Kettle, Heater / Immersion Heater, Hot Plate, etc.
12.	**Distribution of Power** • Types of insulator used in over head line. (Half sectional views) • Different type of distribution systems and methods of connections. • Layout diagram of a substation. • Single line diagram of substation feeders.