# GENERAL INFORMATION

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| 1 | Name of the Trade | **Welder (Gas & Electric)** |
| 2 | Entry Qualification | Passed 10th class examination under 10 +2 system of education or its equivalent. |
| 3 | Duration of Crafts Man Training | 1 Year |
| 4 | Duration of Apprenticeship Training | 2 Years including 1 Year Basic Training |

TRADE : WELDER

DURATION OF TRAINING:- 1 YEAR

QUALIFICATION:- PASSED THE 10TH CLASS EXAMINATION UNDER 10+2 SYSTEM OF EDUCATION OR ITS EQUIVALENT

| Week No. | |
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| 1 | Introduction Training:- Familiarization with the Institute. Importance of trade Training. Machinery used in the trade. Introduction to safety equipment and their uses etc. Setting up of Arc and Gas apparatus. Lighting and adjustment of flame . Striking an arc. |
| 2 | G1 Fusion Run with and without filler rod. M.S. Plate 2 mm position. . |
| 3 | E 2 Straight line Beads on M.S. Plate .<br>M.S. Plate 10 mm position . F. |
| 4 | G 3 Butt weld square Butt joint on MS sheet. M.S. Sheet 3 mm Position F.<br>G5 Fillet weld lap joint M.S Sheet .<br>M.S. sheet 3 mm . Position .F. |
| 5 | E4 Weaved bead on M.,S. Plate .<br>M.S. Plate 10 mm position F.<br><br>E6 Fillet weld open corner joint on MS plate<br>M.S. plate . 10 mm position .F.<br><br>E8 Fillet Tee joint on M.S. Plate<br>M.S. Plate 10 mm . Position F. |
| 6 | G7 Oxy-Acetylene hand cutting on M.S.plate straight and bevel. |
| 7 | E 10 Fillet weld lap joint on M.S.plate MS Plate 5mm position F.<br>E12 Butt weld in open square butt joint. MS Plate 5mm. Position F.<br>E14 Butt weld -Single Vee butt joint .<br>M.S.plate10 mm position F |
| 8 | G9 Fillet weld tee joint MS sheet<br>2mm position F<br><br>G11 Fillet weld out side corner joint MS sheet 2mm position F. |

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| 9 | E16 Straight line beads on MS plate. MS plate 10mm position H.<br>E 18 Fillet weld tee joint M.S.10 mm position H. |
| 10 | G 14 Butt weld single butt joint.<br>M.S.plate 12 mm right ward welding technique position.H<br>G15 Fusion runs with filler rod on MS sheet . MS Sheet 8 .15-mm position H. |
| 11 | E20 Butt weld single Vee butt joint<br>On MS Plate. MS Plate 10mm position H.<br>E22 Straight line bead vertical<br>Upward MS plate 10 mm.<br>ACHIVEMENT ; Should be able to weld joint uniformly to a length of not less than 15 cms<br>By Gas and Arc welding respectively. |
| 12<br>Allied Trade Fitter | 1.Marking out on MS plate or<br>Flat<br>2. Filing square to Dimensions |
| 13 | 3 .An edge chipping and cutting.<br>4 .Hacksawing |
| 14 | E 17Fillet weld inside corner joint.<br>MS sheet 2mm. Position.H |
| 15 | E24 Laying weaved beads vertical<br>Upward.<br>MS plate 10-mm position.V.<br>E26 Fillet weld tee joint MS Plate 10mm position.V. |
| 16 | G 19Butt weld square butt joint MS sheet 2 mm position. H.<br>G21 Fusion Run with filler rod on MS Sheet.<br>MS sheet 2-mm position.V |
| 17 | E28 Fillet weld lap joint MS plate 10-mm position V. Up ward.<br>E30 Fillet weld out side corner joint. MS plate 10 mm position V. Upward. |
| 18 | G23 Fillet weld lap joint. MS sheet 2 mm position V.<br>G25Fillet weld Tee joint. MS sheet 2mm position V.<br>G27 Fillet weld outside corner joint. MS sheet 2m Position V. |
| 19 | E 32 Butt weld / single Vee butt joint.<br>E33 MS plate 10 mm position V upward<br>E34 Straight line leads on MS plate 10 mm-position OH<br>E36 Fillet tee joint. MS plate 10 mm position OH. |
| 20 | G29 Butt weld – square butt joint. MS sheet 2mm position V<br>G31 Fusion run with filler rod ms sheet . ms sheet 2mm position OH |
| 21 | E38 Fillet lap joint. Ms plate 10 mm position OH<br>E40. But weld – single vee butt joint. Ms plate 2 mm position OH. |

| ALLIED TRADE – SHEET METAL WORKER | |
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| 22 | 1. 1. MARKING, CUTTING, DIFFERENT, ANGLES, SHAPES, (GEOMETRICAL) .<br>2. 2. .cutting notches metal sheets<br>3. 3. .. making a cylinder,square , rectangular shapes.<br>4. 4. different sheet metal joints and soldering practice. |
| 23 | 1. 1. taper tray<br>2. 2. Butt joint – soldiering practice.<br>3. 3. Elbow joints. .<br>4. 4. Pipe joints – tee pipes – equal and Unequal pipes. |
| 24 | G32 Fillet weld tee joint. Ms sheet 2mm position OH<br>G35 . Butt weld square butt joint ms sheet 2mm position .OH. |
| 25 | E42 Fillet weld pipe flange joint. (circular cutting). On ms plate 6mm . ms pipe 50mm dia wall thickness 3 mm. Position .1 G.(rolling).<br>E44 Pipe butt weld – butt joint on ms pipe . 75 mm Dia – 6-mm wt. |
| 26 | G37Pipe butt joint on ms pipe. Ms pipe 50 mm Dai 3mm wt position IG (rolling)<br>G40 pipe Teejoint. MS pipe 50-mm Dai 3mm wt. Position F<br>G 41 Pipe 90-degree tee joint. MS pipe 25 mm Dia 2mm wt, position . F. |
| 27 | E46 Fusion welding of cast iron – maintenance work ( only demonstration) position . F.<br>E48 bronze welding of cast iron broken parts position . F |
| 28 | G 43 Fusion welding of cast iron- butt weld. Cast iron block 150x50x10 or 12mm position F.<br>G45 Bronze welding of cast iron butt weld cast iron block 150x50x10 or 12 mm position . F |
| 29 | E 50 Butt weld copper square butt joint copper sheet 150x50x3.15mm bronze electrode. Position F. |
| 30 | G 47 Fusion welding of copper – butt joint copper sheet 150x50x3.15mm position F<br>G49 . Bronze welding of copper – butt joint. Copper sheet 150x50x3.15mm position F |
| 31 | E 52 Hard facing on ms round rod. Micro flow metal spraying – cold and hot process. Ms round 150x50 x 3mm dia. Position F<br>E54 repairing of broker machine parts. By using low heat input electrodes, |
| 32 | G 51 Fusion welding of brass butt weld brass sheet 3.15 position F<br>G53 butt weld of stainless steel square butt joint stainless steel sheet 2 or 3 mm position . F. |
| 33 | E 56 Welding of stainless steel butt weld square butt joint stainless steel sheet 3.15mm position F<br>E 58 arc gouging with gouging electrodes.<br>E 60 Ms plate above 12.. position F. Carbon arc Gouging on M.S. plates 12 mm .<br>By using Carbon Electrodes |

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| 34 | G55 Butt weld – Square butt joint on aluminum . Aluminum sheet 3.15 mm . position .F.<br>G57 brazing of copper to brass tube. (bell mouth joint ). Copper tube and brass tube 25 mm od x2mm wt. Position .F. |
| | **ACHIVEMENT** THE TRAINEES should be able to weld ferrous and non ferrous mental to a reasonable standard . |
| 35 | E62 Producing jobs as per drawings .(jobs involving all position welding). |
| 36 | G59 Silver brazing of copper to stainless tube – 12mm dia.<br>G61oxy acelvlene machine cutting<br>G63 .oxy- acetylene flame gouging removing welds. |
| 37 | E 64 Production jobs as per drawing such as furniture items . windows grills. |
| 38 | G 65 Production jobs as per drawing such as furniture items. Window grills. |
| 39 | G65 Production jobs as per drawing such as furniture items .window grills.<br><br>TIG WELDING |
| 40 | TIG 66 Fusion runs Without filler rod on aulminium aulminium sheet 3mm –positional . F<br>TIG 67 . fusion run with filler rod aluminium aluminium sheet 3mm – postion. F. |
| 41 | TIG 68 Fillet weld lap joint on aluminium aluminium sheet 3mm – position F.<br>TIG 69 fillet weld tee joint on aluinim aluminim sheet 3mm – position F.<br>TIG 70 butt weld square butt joint on aluiminium aluinmium sheet 3mm – position F. |
| 42 | TIG 71 Fillet weld outside corner joint on Aluminium. aluminium sheet 3mm- position F.<br>TIG 72Butt weld – square butt joint on aluminum pipe . aluminium pipe 50-mm dia x3mm wt. Position .F.<br>TIG 73 fusion run without filler rod on stainless steel sheet . stainless steel sheet –2mm position .F. |
| 43 | TIG 74Fusion run with filler rod on stainless steel sheet. Stainless steel sheet –2mm position .F.<br>TIG 75Fillet weld lap joint on stainless steel sheet. Stainless steel sheet 2mm position .F.<br>TIG 76 Fillet weld – TEE joint on stainless steel sheet . stainless steel sheet . 2mm position . F. |
| 44 | TIG 77 Fillet weld – out side corner joint . stainless steel sheet 2mm . position F.<br>TIG 78Butt weld square butt joint stainless steel sheet 2mm position . F<br>TIG 79. Butt weld – square butt joint on stainless steel tube. Stainless steel 30 or 40mm OD. 3mm wt. Position F. |

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| 45 | TIG 80 But weld on M.S. pipe . MS pipe 50mm ODx 3 mm wt<br>Position . IG (rolling).<br>TIG 81Fillet Tee joint on MS pipe<br>MS pipe 50 mm OD x 3mm wt. |
| 46 | TIG 82 Pipe elbow joints on MS pipe.<br>MS pipe 50mm OD x 3mm wt<br>Position.F. |
| 47 | CO2 WELDING<br><br>CO2 .83 Straight line beads on MS plate<br>10mm position-F.<br>CO2.84 Fillet weld Tee joint on M.S.Flat 50 x 12mm<br>Position.F.<br>CO2. 84fillet weld Tee joint MS flat 50 x 12 mm piosition F. |
| 48 | CO2.85 Fillet weld lap joint.<br>MS flat 50 X 12mm. Position. F. |
| 49 | CO2.87 Straight line beads.<br>In horizontal position.<br>MS plate 10 mm. |
| 50 | CO2.88 Fillet weld Tee joint.<br>MS flat 50 x 10mm. Position.H. |
| 51 | Preparation for Trade Test. |
| 52 | Trade Test. |

**TRADE –WELDER**

**THEORY**

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| 1 | General discipline in the institute-Elementary First Aid- Importance of welding-in industry<br>Safety in Manual Metal Arc welding – safety in oxv acetvlene welding and cutting- marking and measuring tools-materials preparation method |
| 2 | Gas welding hand tools – uses –care and maintenance – various welding processes their<br>Classification and their application. |

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| 3 | Different process of metal joining – bolting – riveting –<br>Soldering – brazing etc. |
| 4 | Oxy – acetylene cutting equipment – principle and<br>Application their care and maintenance. |
| 5 | Simple electrical terms and their definitions- uses of electricity as applied to welding – electricity –ac – dc – types Electric welding and application. |
| 6 | Common gases used for welding – oxyqen . hydroqen<br>Acetylene . coal gas etc.<br>Types of oxv – acetvlene flames- their setting- uses – various gas combinations – flame temperatures and their uses- states of matter. |
| 7 | Nomenclature of welding joints –<br>terms applied to each joint-<br>explanation with simple<br>Sketches welding symbols –<br>Description and uses.<br>Edge preparation – application. |
| 8 | Chemistry and structure of oxy-acetylene flame. Manufacture of calcium carbide – quality control – properties- its impurities effect of each element on metals. |
| 9 | Principle of arc welding – necessity of welding machines – types of machines – construction – advantages and disadvantages of each machine- care and maintenance. |
| 10 | Acetylene- its properties – acetvlene generators carbide to water type – working principle – care and maintenance-- Water to Carbide type –working principle – care and maintenance. Comparison of two types of generators. Acetylene purifier – hydraulic back pressure valve. |
| 11 | Arc and its characteristic – arc length – types uses – advantages and disadvantages. Polarity types-Method of identification –uses of each type-Importance and indication of wrong polarity. |
| 12 | Safety precaution in fitter shop – steel rule types and its uses – punches – types and its uses Trysquare – scriber – its functions. |
| 13 | Chisel types and construction- – hacksaw frame hacksaw blade – its types , files – parts types and uses – hammer types – parts and its uses. Vices and clamps – their types. |
| 14 | Oxygen – its properties- manufacturing methods oxygen cylinder – DA. cylinder – description method of charging – care and maintenance. |
| 15 | Welding position – flat – horizontal – vertical and overhead-slope and rotation.<br>Electrodes- types – object of flux<br>Coating – characteristic of flux-<br>IS. – BS .-AWS.-specification .<br>Criteria for choice of electrodes.<br>- |

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| 16 | Regulators – types – construction<br>And uses care and maintenance.<br>Welding blow pipes-types – description – operation – construction- uses-care and<br>Maintenance – difference between H.P and L.P system. |
| 17 | Effect of moisture on electrodes<br>- - necessitv and importance<br>- - of baking the electrodes before use-storage conditions and handling of<br>- - Electrodes for better welding quality.<br>- |
| 18 | Faults in gas welding – definition of faults their effects, causes<br>-Corrections. Manifold system- necessity- operations limitation-care and maintenance. |
| 19 | Arc blow- definition – its causes and effects- methods to<br>overcome in practice – faults in<br>arc welding- definition- effects– causes and correction of each fault. |
| 20 | Welding technique – right hand<br>-left hand – left hand explanation – method – application – Linde<br>welding – application. |
| 21 | Distortion in Arc welding – causes and effects Methods employed to minimise its effects. |
| 22 | Sheet Metal Shop Safety rules<br>Measuring tools- Marking tools –Sheet Metal Hammers , Pullers –Mallets punches. Grooves – Rivet- set and uses<br>Types of sheets and uses – Soft<br>Solder and soldering process. |
| 23 | Development of parallel line method –Examples Taper tray<br>And different elbow and T pipes – Hand lever shears – Guilletine shearing machine circular cutting –Machine parts.<br>Description uses Nibbling shearing parts and uses. |
| 24 | Methods employed to control distortion in Gas Welding –Stress relieving – outdoor method- Edge preparations- Methods- applications. |
| 25 | Welding of M.S. Pipe –Difference between pipe and plate welding –pipe development 90 degree and 45 degree branch pipe.<br>Pipe Welding – position 16.26.56. 66.-<br>Procedure of pipe welding. |
| 26 | Specifications for filler rods and wires for Gas Welding .Effect of atmosphere on metals Use of Gas Welding flux and rods for different methods – Effect of alloying elements on Weldability . |

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| 27 | Cast Iron- determination of weldability Preheating methods –Choice of Methods of welding (Arc).<br>Bronze Welding of Cast Iron –its limitation. |
| 28 | Fusion Welding of Cast Iron Bronze welding of Cast Iron- determination of weldability. |
| 29 | Welding of Copper –Properties<br>-weldability Methods –Preheat<br>and postheat- Finishing of Weld- Effect of alloying elements. |
| 30 | Welding of copper by gas –procedure- Finishing of weld –<br>Welding of copper .Bronze welding process- Finishing of<br>Welding. |
| 31 | Conservation of metallic resources –welding repairing need of the hour –<br>Advantage of low heat input alloys in weld repair –Powder Welding –Tribology (wear and tear)-Hard surfacing<br>electrodes- uses. |
| 32 | Classification of steel Welding of High carbon steel<br>-low and medium alloy steels<br>Limitations preheating and interpass temperature of plate<br>For such alloys during welding.<br>Welding of stainless steel –Grades Edge preparation –Method of welding. |
| 33 | Welding of aluminum – Edge preparation Flame and angle of<br>Blow pipe and filler rod- Flux preheating welding of cast Aluminium<br>preheating – determination of preheating – Technique of welding. |
| 34 | Arc cutting of mild steel – selection methods. Arc cutting<br>Equipment -Arc gouging and its application Types of Arc cutting electrodes. Air Arc cutting and its<br>Applications. |
| 35 | Welding of dissimilar metals- choice of methods. Application<br>of each method – limitations.<br>Different flame cutting machines and cutting of quality care and maintenance. |
| 36 | Resistance Welding- Principle of resistance welding –Types , Application advantages- laser beam welding and cutting – principle of laser beam ,<br>Description of equipments. |
| 37. | Modern welding process—Submerged Arc Welding Principle of the process—Equipment used Weld Procedure –advantages –Limitations. Electro Slag Welding –Weld Procedure-Advantages Limitations. |
| 38 | Inspection and Testing of Weld- Destructive . Non –destructive Test—Semi Destructive Test ..Explanation of each method.<br>Thermit welding. Economy in Welding . Simple Weld Estimation. |
| 39 | Introduction to TIG Welding—TIG Welding equipment –Advantages of TIG Welding Process over Manual Metal Arc Welding and Oxy-Acetylene Welding Process. |
| 40 | Power Sources for TIG Welding—Types—Applications –Care and maintenance –High frequency unit –parts, construction and uses–D.C. Suppressor unit |

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| | construction application –Care and Maintenance. Tungsten Electrodes Types , sizes, uses |
| 41 | Argon Gas- Properties- Uses –Ceramic shield Defects- Cause, and correction in TIG welding Types of polarity and its application. |
| 42 | Datas/ Tables for TIG Welding. |
| 43 | Introduction to $CO_2$ Welding., $CO_2$ welding equipment and Accessories—Description of $CO_2$ Welding set with diagram. |
| 44 | Mode of metal transfer in $CO_2$ welding . Dip Transfer or short circuiting transfer spray Transfer [Free Flight] Gloubler Transfer [Intermittent]. |
| 45 | Welding wires used in $CO_2$ welding, its composition ,diameters, applications. Various Gas mixtures and its applications in $CO_2$ welding. Wire feed system -Types- applications, --limitations-care and maintenance.. |
| 46 | Tables/ Datas related to $CO_2$ welding. Information on solid flux cored Wires. |
| 47 | Electron Beam Welding- Principle of the process . Description of equipment . application of the process . Advantages over the metallic Arc Welding. Limitations. |
| 48 | Friction Welding –Principle of the process Description of the Equipments. Application of the process-Advantages over the Metallic Arc Welding – Limitations |
| 49 | Arc Brazer- Principle of the process- Description of the Equipment—application of the process-Advantages. |

Refer the following Indian Standards for the trade Theory and practical.

S. 2811 –1964 Recommendations for Manual Tungsten Inert Gas Arc Welding of stainless steel

S.2812 –1964 Recommendations for manual Tungsten Inert Gas Arc Welding of Aluminium and Aluminium Alloys

S. 1393 –1961 Code of practice for Training and Testing of Oxy-Acetylene Welders

s. 817-1966 Code of practice for Training and Testing of Metal Arc Welders

S. 10178-1981 Recommended Procedure for $CO_2$. Gas shield metal Arc Welding for structural steel

TRADE : WELDER

WORKSHOP CALCULATION AND SCIENCE

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| 1 | Importance of Science and Calculations to the trade skill and Fundamental Arithmetical Operations- Addition, Subtraction, Multiplication and Division. |
| 2 | Properties and uses of cast iron, wrought iron plain carbon steels and alloy steels |
| 3 | Properties and uses of cast iron, wrought iron Plain carbon steels and alloy steels. |
| 4 | Properties and uses of Copper, Zinc, Lead ,Tin and Aluminum. |
| 5 | Properties and uses of Brass, Bronze, Bearing Metal, Solder, Rubber and Timber. |
| 6 | Fraction- Addition, Subtraction , Multiplication and Division – problems. |
| 7 | Fraction – Addition, Subtraction; Multiplication and Division – problems. |
| 8 | Decimal – Addition, Subtraction , Multiplication, and Division –problems. |
| 9 | Decimal – Addition, Subtraction, Multiplication, and Division – problems. |
| *10* | Fraction and decimals conversion- fraction to decimal and vice versa. |
| *11* | System of units- British ,Metric and S.I.units for length, mass, area, volume, capacity, time. |
| 12 | Conversions between British and Metric Systems |
| 13 | The Square root – The Square and square root of a whole Number and Decimal. |
| 14 | The square root-Shop Problems. |
| 15 | Heat and Temperature-Effects of Heat, Thermometric scales such as a Celsius, Farahenheit and Kelvin – Temperature measuring Instruments. |
| 16 | Conversion between the above scales of Temperature. |
| 17 | Units of Heat- Calorie, B.Th, U. , C.H.U. – Specific Heat, Latent Heat Heat loss and Heat Gain- Simple Problems |
| 18 | Percentage – Changing Percent to Decimal and Fraction and Vice versa- Problems on percentages related to the Trade. |
| 19 | Percentage- Changing percent to Decimal and Fraction and vice versa – Problems on percentages related to the trade. |
| 20 | Definition of speed , Velocity, Acceleration Mass Weight and difference between Mass and Weight. |
| 21 | Newton's laws of Motion – Definition of Force –Units of Force in M.K.S. Systems and S.I. Unit of Force. |
| 22 | Ratio – Simple Problems in Ratios |
| 23 | Proportion – Direct and Inverse proportion – Shop Problems. |
| 24 | Work – Units of Work in M.K.S. System and S,I. Unit of work – Simple Problems |
| 25 | Power – Practical Units of Power such as Watt and Horsepower – Definition of H.P. B.H.P. and efficiency. |
| 26 | Definition of Energy Potential Energy, Kinetic Energy , law of conservataion of Energy. S.I. Unit of Energy – Simple Problems in P.E. and K.E. |
| 27 | Pythagora's Theorem – Shop Problems |
| 28 | Algebraic Symbols and Fundamentals – Addition, Subtraction, Multiplication and |

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| | Division,- Problems. |
| 29 | Algebraic Symbols and fundamentals –addition, subtraction, multiplication and division -problems |
| 30 | Algebra – Simple Equation – Problems |
| 31. | Algebra – simultaneous equation – problems. |
| 32. | Algebra - quadratic equation problems |
| 33. | Lever – types of lever with their example. |
| 34. | Simple problems on straight and bell cranked levers. |
| 35 | Logarithms – use of logarithmic tables – problems on multiplication and division by using logarithmic tables. |
| 36. | Logarithms-problems on power and roots by using logarithmic tables. |
| 37. | Further practice in the use of Log Table. |
| 38. | Meaning of stress, strain-simple problems. |
| 39. | Mensuration-areas-square, rectangle, equilateral triangle, isoscales triangle, rights angled triangle, scalene triangle- problems. |
| 40 | Mensuration-areas- square, rectangle, equilateral triangle, isoscales triangle, right-angled triangle, and scalene triangle-problems. |
| 41 | Areas – hexagon, circle, circular ring, sector, ellipse-problems. |
| 42. | Areas-hexagon, circle, circular ring sector ellipse – problems. |
| 43. | Mensuration – volume and weight of simple solid bodies such as cube, square prism, rectangular prism, hexagonal prism , triangular prism, cone, cylinder, hollow cylinder-shop problems. |
| 44. | Mensuration – volume and weight of simple solid bodies such as cube, square prism, rectangular prism, hexagonal prism, triangular prism, cone, cylinder, hollow cylinder-shop problems. |
| 45. | Mensuration-volume and weight of simple solid bodies such as cube, square prism, rectangular prism, hexagonal prism, triangular prism, cone, cylinder, hollow cylinder-shop problems. |
| 46. | Finding the capacity in liters of square, rectangle, hexagon, cone and cylinder shaped vessels. |
| 47. | Finding the lateral surface area and total surface area of square, rectangle, hexagon, cone and cylinder shaped solids and vessels. |
| 48. | Finding the lateral surface area and total surface area of square , rectangular, hexagon, cone and cylinder shaped solid and vessels. |
| 49. | Further practice of mensuration problems by using the logarithm. |
| 50. | Revision. |
| 51. | Revision. |
| 52. | Test. |

TRADE:- WELDER

ENGINEERING DRAWING

WEEK NO.

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| 1. | Importance of engineering drawing and its knowledge. |
| 2. | Use of drawing instruments, T- square, drawing board etc. |
| 3. | Letters numbers and alphabets as per IS 696/1972. |
| 4. | Letters numbers and alphabets as per IS 696/1972. |
| 5. | Free hand sketching of straight lines, rectangles, circles, polygons etc. |
| 6. | Use of different types of lines and symbols for drawing importance of putting dimension on the drawing as per IS 696/1972.. |
| 7. | Freehand sketching with dimension, scale and proportionate sketching. |
| 8. | Reading of simple blue print. |
| 9. | Isometric views and oblique views with dimensions of such as cube, rectangular, block, cylinder etc. |
| 10. | Explanation of simple orthographic projection 1st angle, as per IS 696/1972. |
| 11. | Explanation of simple orthographic projection 3rd angle as per IS 696/1972.` |
| 12 | Sketching the views solid bodies when viewed perpendicular to their surfaces and axes. |
| 13 | Sketching the views solid bodies when viewed perpendicular to their surfaces and axes. |
| 14 | Freehand sketching of plan and elevation of simple objects like Hexagonal bar, square bar, circular bar, tappered bar and Hollow bar etc. |
| 15 | Reading of simple Blue print. |
| 16 | Views of simple Hollow and solid Bodies with dimensions. |
| 17 | Views of simple Hollow and Solid Bodies with dimensions. |
| 18 | Construct a Orthographic Projection from the given isometric view of shaped Blocks in first angle method. |
| 19 | Construct a Orthographic Projection form the given isometric view of shaped Blocks in first angle method. |
| 20 | Construct a Orthographic Projection from the given isometric view of shaped Blocks in 3rd angle method. |
| 21 | Construct a Orthographic Projection from the given isometric view of shaped blocks in 3rd angle method. |
| 22 | Exercise on Blue print Reading, related to missing lines and missing views. |
| 23 | Simple Isometric drawing – from the given Orthographic views of simple objects. |
| 24 | Welding symbols as per I.S.I employed on drawings. |
| 25 | Freehand sketching of rivets and washers with dimensions from samples as per I.S.I. |
| 26 | Freehand sketching of Riveted joints. |
| 27 | Freehand sketching of Riveted joints. |
| 28 | Exercises on Blue print Reading related to missing dimensions and missing section. |
| 29 | Freehand sketching of nuts and bolts with dimensions from samples. |
| 30 | Freehand sketching of hand tools of the trade. |
| 31 | Freehand sketching of hand tools of the trade. |

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| 32 | Freehand sketching of hand tools of the trade. |
| 33 | Freehand sketching of keys and cotters with their dimensions from samples as per I.S.I. |
| 34 | Freehand sketching of screw threads with their dimensions from samples as per I.S.I |
| 35 | Geometrical Development of Prism, Pyramids and Isometrics |
| 36 | Exercise on Blue Print reading related identification of surface symbols |
| 37 | Triangular Prism and hexagonal Prism- Projection and Development |
| 38 | Triangular Prism and Hexagonal Prism, Projection and Development. |
| 39 | Cylinder Projection and Development cone projection and Development. Example based on right cones |
| 40 | Cylinder projection and development cone projection and development. Examples based or right cones. |
| 41 | Views of simple solid bodies cut by section plane on drawing standard methods (full and half Sections)<br>I.S. 696/1972 |
| 42 | Views of simple Hollow Bodies cut by section plane on drawing standard methods (Full and Half<br>Sections) I.S. 696/1972 |
| 43 | Exercise on Blue Print Reading |
| 44 | Sketching of finished articles from drawing and preparation of sequence of operations. |
| 45 | Sketching of finished articles from drawing and preparation of sequence of operations. |
| 46 | Free sketching of simple objects related to the trade and preparation of simple working<br>Drawing from sketches. |
| 47 | Free sketching of simple objects related to the trade and preparation of simple working<br>Drawing from the sketches |
| 48 | Exercises on Blue print Reading |
| 49 | Conventional representation of materials by I.S.I. |
| 50 | Method of indicating surface roughness by I.S.I. |
| 51 | REVISION |
| 52 | TEST |