MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI

<table>
<tr><td>1</td><td>Name of Syllabus</td><td>C. C. IN Welder cum Fabricator
(303205)</td></tr>
<tr><td>2</td><td>Max. No’s of Student</td><td>25 Students</td></tr>
<tr><td>3</td><td>Duration</td><td>1 year</td></tr>
<tr><td>4</td><td>Type</td><td>Part Time</td></tr>
<tr><td>5</td><td>No’s Of Days / Week</td><td>6 Days</td></tr>
<tr><td>6</td><td>No’s Of Hours /Days</td><td>4 Hrs.</td></tr>
<tr><td>7</td><td>Space Required</td><td>1) Workshop/Open Space = 600 sq feet
2) Class Room = 200 sq feet
TOTAL = 800 sq feet</td></tr>
<tr><td>8</td><td>Entry Qualification</td><td>S.S.C. Pass</td></tr>
<tr><td>9</td><td>Objective Of Syllabus/ introduction</td><td>Introduction – the syllabus of C.C.In Welder cum Fabricator has been evolved in such a way that after completion of course of 1 year the student would acquire good working skill suited to work as Welder He would also gain confidence to operate arc and gas welding.
Objective:- .
1) Develop skill in Fabrication by providing adequate knowledge of welding.
2) Develop confidence and entrepreneurship by arranging industrial visit and arranging study lecture of personnel from industries
3)Develop adequate knowledge of engg.drawing</td></tr>
<tr><td>10</td><td>Employment Opportunity</td><td>Self Employment :- Passed candidate can start his own fabrication workshop.
Wage Employment :- Passed candidate may get job in Welding workshop</td></tr>
<tr><td>11</td><td>Teacher’s Qualification</td><td>ITI / NCVT Pass in Welder with 2 year Experience.</td></tr>
<tr><td>12</td><td>Training System</td><td>Training System Per Week
<table><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>06 hrs</td><td>18 hrs</td><td>24 hrs</td></tr></table></td></tr>
<tr><td>13</td><td>Exam. System</td><td><table><tr><th>Sr. No.</th><th>Paper Code</th><th>Name of Subject</th><th>TH/PR</th><th>Hours</th><th>Max. Marks</th><th>Mini. Marks</th></tr><tr><td>1</td><td>30320511</td><td>WELDER</td><td>TH - I</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>2</td><td>30320512</td><td>WORKSHOP CALCULATIONS AND DRAWING</td><td>TH - II</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>3</td><td>30320521</td><td>WELDING JOINT</td><td>PR - I</td><td>6 hrs.</td><td>200</td><td>100</td></tr><tr><td>4</td><td>30320522</td><td>FABRICATION WORK</td><td>PR - II</td><td>6 hrs.</td><td>200</td><td>100</td></tr><tr><td></td><td></td><td>Total</td><td></td><td></td><td>600</td><td>270</td></tr></table></td></tr>
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Syllabus :- Welder cum Fabricator

Theory - I WELDER

1) Safety Precaution :- Introduction, general safety precautions, safety in Oxyacetylene welding & cutting, elementary knowledge of First-Aid.
2) Tools & Equipments :- Description & Use of tools & equipments used in Arc Welding & Gas Welding, Correct method of use of tools & equipments, care & maintenance.
3) Drawing of Welding symbols , Free hand sketches of nut bolt, Screw, hand tools, joints
4) Mathematics – Units, Menstruation, Simple calculations, Estimation, Bill of Materials
5) Metals, Non-metals :- Classification of metal, brief introduction of Non-ferrous metal & alloy, classification of steel.
6) Electrical Terms :- Simple electrical terms & their definitions, A.C., D.C. & difference between A.C. & D.C.
7) Welding & Basic welding joints :- Introduction, types of welding. Types of welding joints, symbolic representation of welding joints, types of weld, various welding position, edge preparation & its application.
8) Electrical Arc Welding :- Introduction, principle of arc welding, welding circuit, A.C. & D.C. electric welding, its advantages & disadvantages & application, polarity, length of arc, penetration, crater, arc blow.
9) Arc Welding Technique :- Striking the Arc, laying long beds.
10) Electrodes :- Types of electrodes, type of flux, electrode size & current required for it, specification of Electrode, care & storage of electrode.
11) Welding Machine :- Types of welding machine, working & principle of transformer, specification of transformer, welding generator, rectifier.
12) Gas Welding :- Common gases used in welding, Acetylene manufacturing.
13) Gas Welding Techniques :- General Techniques of gas welding, fluxes for used for welding different metals, filler metal, specification of filler rod, relation to the job to welded, welding of Non-ferrous metals, faults in gas welding, their effect on welds, its causes, correction method.
14) Soldering & Brazing :- Introduction, Soldering tools & equipments, types of flux, techniques of soldering, description of brazing, types of spelter, brazing flux, methods of brazing.
15) Fabrication :- Pipe welding by Arc & Gas, repairing of broken gear, machine part, cutting of sheet bending, joints grinding, brushing, chipping, pipe bending,

Theory - II WORKSHOP CALCULATIONS AND DRAWING

1. Shop problems : Multiplications, Additions, Subtractions, Division of fraction.
2. Properties and uses of metal : i.e. Cast iron, Mild steel High speed Steel.
3. Alloy Steel : Properties and Uses.
4. Properties of non-ferrous metal : Copper zink, Aluminimum, Brass etc.
5. Decimal-Addition, Substractions, Multiplications, Conversion-Decimal to simple fraction & viceversa.
6. Manufacturing process of cast Iron, Pig Iron.
7. Reduction of common fraction, conversion to Decimal fraction.
8. Shop problems : Continued as per above.
9. F.F.S. & C.G.S. System.
10. F.F.S. & C.G.S. Weight & measurements & convertion.
11. Problems – continued.
12. Effects of alloying elements, properties of cast iron.
13. Square root of whole number and decimal.
14. -- do –
15. Mass – Unit of mass.
16. Percentage Radio & properties and its applications shops problems.
17. Algebra symbols Simple equilations.
18. Algebra symbols simple equilations.
19. Simple problems equalien.
20. Standard Algebra Formulas.
21. Mansuration Area of rectangle, square, circle, Triangle.
22. Problems.
23. Use of log table for multiplication and division.
24. Simple problems.
25. Calculation on volume.
26. Problem volume and density.
27. --do—
28. Heat and Tempertature, Name and uses of 'Temp measuring instrument'.
29. Fetiranheit and centrigale convertion.
30. Head Treatment – Defination, Advantages & Disadvantages Hardening temperting.
31. Cont Normalising and annealing.
32. Count Case hardening advte & disadvantages.
33. Trigonometical Ratio-Ise of table.
34. Reading of simple graph.
35. Revision.
36. Test.

PRACTICAL - I WELDING JOINT

- Gas welding on various thickness of plate, Plate cutting & various sectional material cutting by gas.
- Practice of soldering & brazing.

• PRACTICAL - II, WELDING JOINT

- One job on each item :- Grills, collapsible gate, shutter, sheet metal work such as bending, riveting, welding etc. use of shearing machine. Pipe bending – chair, table etc.

TOOLS AND EQUIPMENTS

Sr No	Name Of Items.	Qty.
1	Gloves pair leather	8
2	Apron leather	8
3	Screen Welding helmet	8
4	Screen Welding (hand type)	8
5	Goggles pair (welder)	8
6	Hammer 0.25 kg., 0.5 kg., 1 kg.	8 Each
7	Chisel cold flat 19 mm & cross 9 mm	
8	Centre punch 9 mm x 127 mm	8
9	Divider 200 mm	8
10	Caliper out side 150 mm	8
11	Rule 300 mm, 600 mm (steel)	8
12	Wire brush 150 mm x 37 mm	8
13	Spark lighter	2
14	Chipping screen hand	8
15	Safety boots for welder	8
16	Try square 150 mm	8
17	Tongs holding 300 mm	8
18	Screw driver	1 set
19	Spanner	1 set
20	Cutting pliers	2
21	Files flat, round , square, triangular 150 mm & 200 mm second cut	1 each
22	Leg vice	1
23	Number punch	1 set
24	Hack saw frame	8
25	C- Clamp 50 mm, 75 mm	8 Each
26	Oil can 0.5 liter	2
27	Reamer set	1
28	Die set	1
29	Tap set	1
30	Twist drill bits set	2 set
31	Scraper triangular, half round	3 each
32	Bench vice 100 mm jaw	3
33	Spirit level	1
34	Hand vice 100 mm	3
35	Tool box	As. Req.
36	Welding Measuring gauge Fillet & Butt	1
37	Steel tape 182 cm - flexible	4

38	Pipe cutter	1
39	Z – angle cutter	1
40	Gas cylinder	1
41	Trolley for cylinder	1
42	Cutting Torches tips assorted	6
43	Welding Torch with 5 to 10 Nozzles	1
44	Welding Rubber Hose (gas) 7 mm	60 mtr.
45	Rubber hose clips	30
46	Spindle key (for opening cylinder)	4
47	Pressure regulator (one Heavy) for Oxygen	3
48	Pressure regulator for acetylene	2
49	Tip cleaner	2
50	Glasses white & colored 108 mm x 58 mm	8
51	Rubber hose pipe Black & Red 4 mm	60 mtr.
52	Welding Transformer	3
53	Welding Cable	50 mtr.
54	Arc welding table	2
55	Gas welding table	1
56	Lockers stand	1
57	Fire Bucket with stand	2
58	Fire Extinguisher	1
59	Instructor table & chair	1
60	First – Aid box	1
61	Chain & pulley	1
62	Power Hack saw	1
63	Hand Grinder	1
64	Bench drilling m/c	1
65	Blow Lamp	1

Reference Books

Sr No	Name of Books	Authors
1	Welding Theory	Dandagavhal M.B
2	Workshop cal& science	Kapil dev
3	Engg. Drawing	N.D.Bhatt
4	Work shop cal& science	Dandagavhal M.B

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