ELMS

Establishing an Employer led Labour Market Secretariat

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Nepal Industrial and Business Sector
Occupational Standard (OS)
of
Welder Level-2

In jointly implemented by

FNCCI FNCSI

Occupational classification linkage with NSCO

Occupational Title:	**Welder**
Level:	**2 (Foreman Level)**
Sector:	**Construction**
Sub – Sector:	**Associated to construction**
OS ID No:	**CT-006-078**
Major Group:	**7**
Sub-major Group:	**72**
Minor Group:	**721**
Unit Group:	**7212**

Occupation Specific Employers Panel:

S.N.	Name	Designation	Organization
1.	Mr. Punya Bd. Bhattarai	Proprietor	Dikshya Grill Udhyog
2.	Mr. Kedar Adhikari	Proprietor	Adhikari Engineering Workshop
3.	Mr. Shalik Ram Bastola	Proprietor	Bastola Nirman Sewa and Metal Pvt. Ltd.
4.	Mr. Hari Bhakta Gautam	Managing Director	Gautam Energy & Engineering Pvt. Ltd.
5.	Mr. Top Bd. Gaha	Managing Director	Puja Grill and Steel Udhyog
6.	Mr. Gag Bahadur Oli	Managing Director	Subham Engineering Workshop
7.	Mr. Ram Bd. Basnet Kshetri	Managing Director	Shree Krishna Metal Engineering works
8.	Mr. Ashok Barma	Proprietor	Unique Metal Udhyog
9.	Mr. Bishal Dhakal	Proprietor	Bishal Engineering Workshop
10.	Mr. Ramesh Kumar Mahato	Proprietor	Tonika Engineering workshop
11.	Mr. Karim Ansari	Proprietor	Nehal Welding Workshop

Occupation Specific Expert Workers Panel:

S.N.	Name	Designation	Organization
1.	Mr. Ram Krishna Tharu	Head welder	Shuvam Engineering Workshop
2.	Mr. Muna Ram Bhattari	Welder	New Laxmi Grill Udhyog
3.	Ms. Gita Devi Tiwari	Asst. Repair and Maintenance	Korea Nepal Polytechnic Institute
4.	Mr. Gopal Rajbhar	Welder/fabricator	Gopal Metal
5.	Mr. Purna Bahadur Nepali	Head welder	Bishal Engineering Workshop
6.	Mr. Keshab Raj Panta	Welder	Prashna Metal Udhyog
7.	Mr. Ali Ahamad Hawari	Head welder	Nehal Engineering workshop
8.	Mr. Banilal Rajbansi	Head fabricator	Tonica Engineering workshop
9.	Mr. Rajendra Karki	Head welder	Karki Metal Udhyog
10.	Mr. Rohit Shrestha	Head welder	Tripura Railing and Grill Udhyog
11.	Mr. Bhuwan B.K.	Head welder	Sahara Devi Grill Udhyog
12.	Mr. Kamal Chaudhay	Head welder	SK Metal and Engineering

OS Development Workshop facilitated by:

S.N.	Name	Designation	Organization
1.	Raju Bajracharya	Facilitator	Freelance
2.	Yubak Raj Ghimire	Co-facilitator/Recorder	Freelancer

OS Reviewed by ELMS Construction Sector Working Group:

S.N.	Name	Designation	Representation (Organization)
1.	Mr. Gore Sherpa	General Secretary	FNCCI (IPAAN)
2.	Mr. Saurav Sharma	Member	CNI
3.	Mr. Satya Narayan Prajapati	Treasurer	FNCSI
4.	Mr. Santosh Shah	Executive board member	FCAN
5.	Mr. Ramesh Man Shakya	Construction Sector Expert	ELMS

OS Verified by ELMS Technical Advisory Committee:

S.N.	Name	Designation	Organization
1.	Dr. Mahesh Nath Parajuli	Professor	KU
2.	Mr. Kul Bahadur Phadera	Under secretary	MoEST
3.	Mr. Pravat Uprety	Associate Professor	TU
4.	Mr. Kishor KC	Statistics Officer	CBS
5.	Ms. Sharada Ghimire	Deputy Director	CTEVT, Curriculum Division
6.	Mr. Keshab Ghimire	Deputy Director	CTEVT, NSTB

OS Recommended by ELMS Coordination Committee:

S.N.	Name	Designation	Organization
1.	Mr. Rabin Kumar Shrestha	Focal Person/Ex EC Member	FNCCI
2.	Mr. Sumit Kumar Kedia	Executive Committee Member	FNCCI
3.	Mr. Birendra Raj Pandey	Vice President	CNI
4.	Ms. Megh Nath Neupane	Senior Consultant	CNI
5.	Ms. Shobha Gurung	Vice President	FNCSI
6.	Mr. Mohan Katuwal	Vice President	FNCSI
7.	Mr. Binayak Shah	Senior Vice President	HAN
8.	Mr. Sajan Shakya	Secretary General	HAN
9.	Mr. Nicholas Pandey	Senior Vice President	FCAN
10.	Mr. Roshan Dahal	General Secretary	FCAN

OS Approved by ELMS Board:

S.N.	Name	Designation	Organization
1.	Mr. Shekhar Golchha	President	FNCCI
2.	Mr. Vishnu Kumar Agarwal	President	CNI
3.	Mr. Shyam Prasad Giri	President	FNCSI
4.	Ms. Srijana Rana	President	HAN
5.	Mr. Rabi Singh	President	FCAN
6.	Mr. Chandra Kanta Adhikari	Member Secretary	ELMS

Occupational Description:

A welder is a tradesman who specializes in joining two or more similar metal together by means of welding. Welding is usually used on fabrication of metal structure. Welding machines are among the most essential tools for a welding professional. Welders typically have to have good dexterity and attention to detail, as well as some technical knowledge about the materials being joined and best practices in the field.

This occupation includes interpreting engineering drawing, raw material preparation, cutting different cross sectional engineering materials, forging to different shape and size, operating machine equipment to weld various joints in different position, assemble and fabricate different structures. This technician is also responsible to take care of machine equipment as well as needs to take care of environmental safety, keeping workspaces hazard free, walkways clear of debris and litter.

Furthermore, welders generally work in an indoor and outdoor environment while fabricating metal structures. Metal structures include railings, main gate, spiral ladder, fencing of private house and commercial buildings. Modern trends in metal structure change elegant furniture, modern buildings, hydropower assemblies, city tanks, truck buckets, and army tanks. This occupation is blooming in urban and semi-urban context. Till date, workers enter as a labor without prior skills and technical knowledge and after apprenticeship of few months or years they became a semi-skilled workers. Due to the widening of this metal fabrication business in the country, it has great opportunities to hunt jobs in this sub-sector. The investors of this sub-sectors are facing shortage of skilled work force for the extension of their business.

The occupation **Welder Level-2 (Foreman Level)** describes the individual with required knowledge for applying basic method of performance, knowledge to select tools, equipment and materials appropriate for the given task. S/he possess the ability to apply basic theory and principle of the common duties and tasks to solve the given assignment. Further, the welder has ability to act independently in simple core skills and can work under the supervision of supervisor for some higher level of tasks to ensure the technicality as a co-worker. This individual has to operate machines and supervises assistant worker and labour in the team. Nepal's industrial & business sector expects Individual reserving set level of skills, knowledge and attitudes which reflect for the improvement of production/services and workers' productivity

Occupational and environmental safety:

Health concerns of welders are welders' flash, sore/red/teary eyes, headaches, nosebleeds, and a black mucous discharge from their nasal membrane. Most welders concerned regarding excessive smoke levels in the workplace and inadequate ventilation.
The welding workshop environment is considered polluted based on its sound level, fume composition, and carbon monoxide

levels. Therefore, welding safety equipment should be used by welders when working in the welding zone, including gas masks, earplugs/earmuffs, leather gloves, leather sleeves, and automated welding helmets and fume extraction unit in welding area.

Minimum Job Entry Requirement:

As per the labour law the Nepalese citizen aged 18 years and above and competent as per this occupation standards are eligible to enter in this occupation. In order to attain the necessary knowledge, skills, and abilities of this occupation, graduates from a Secondary Education Examination (SEE) or equivalent qualification with basic welding/metalwork training at level 1 are recommended to enter into the skills and knowledge impartation process.

Worker's traits:

The desired workers traits for the welders of metal fabrication industries are mentally and physically fit and strong, having good sense of humor, disciplined and positive attitudes, prompt responsive to the assignment, good team players, high level of passionate, courteous, can be enjoyed to work with steel and metal profiles, consumable filler metal and electrodes, fabrication tools, equipment and machineries. Further, creative in metal structure design to elegant furniture, modern buildings, hydropower assemblies, city tanks, truck buckets, and army tanks technology, like to work in blue-collar environment. Additionally, individual having friendly behaviors, good interpersonal skills and exhibiting strong organizational loyalty and professional ethics are essential attributes needed to enter in this occupation.

Occupational carrier path:

- **Above the Position-** Senior welder – Level 3 (Supervisor Level)
- **Current Position-** Welder - Level 2 (Foreman Level)
- **Below the Position-** Assistant welder or Helper welder – Level 1 (Assistant Level)

Abbreviation used:

Task Level		Rating number and their meaning
Significance	:	1- Important; 2-Moderately important; 3-Highly important
Ease	:	1- Easy; 2-Moderately easy; 3- Very easy
Occurrence	:	1-Rerely occurred; 2-Moderately occurred; 3-Frequently occurred

N/A	:	Not Applicable
OS	:	Occupation Standard
FNCCI	:	Federation of Nepalese Chambers of Commerce & Industry
CNI	:	Confederation of Nepalese Industries
FNCSI	:	Federation of Nepali Cottage & Small Industries
FCAN	:	Federation of Contractors' Associations of Nepal
HAN	:	Hotel Association Nepal
ELMS	:	Employers Led Market Secretariat
SWG	:	Sector Working Group
TAC	:	Technical Advisory Committee
SOP	:	Standard Operating Procedure
KU	:	Kathmandu University
MoEST	:	Ministry of Education, Science & Technology
TU	:	Tribhuvan University
CBS	:	Central Bureau of Statistics
CTEVT	:	Council of Technical Education and Vocational Training
NSTB	:	National Skill Testing Board
Div.	:	Division
PPE	:	Personal Protective Equipment
MIG	:	Metal Inert Gas
TIG	:	Tungsten Inert Gas
LPG	:	Liquefied Petroleum Gas
DC	:	Direct Current
AC	:	Alternate Current
MAG	:	Metal Active Gas

List of duties and tasks of Welder: level-2 (Foreman level)

Soft Skills Area			
SN	**Duty statements**	**Task No**	**Task statements**
1.	Demonstrate Positive Attitudes	1.	Manage time for occupational assignment
		2.	Exhibit empathy with customer and team members
		3.	Apply the work ethics of welder
		4.	Respond assignment
		5.	Give/ Receive feedback and feed forward
2.	Exhibit Interpersonal Skills	6.	Listen customers' demands, complaints and other information
		7.	Communicate with others about products and services
		8.	Coordinate with customers, team members and stakeholders
		9.	Perform net-working with customers, team and stakeholders
3.	Demonstrate Occupational Leadership	10.	Exhibit behavior of team player among the members
		11.	Make decision at different situation of the occupation
		12.	Solve problem encountered in the occupation
		13.	Take responsibility and accountability of the assignment
		14.	Develop work plan for welder
Core Skills Area			
SN	**Duty statements**	**Task No**	**Task statements**
4.	Maintain fabrication workshop	15.	Clean workshop
		16.	Organize the materials in order
		17.	Organize tools and equipment
		18.	Maintain workshop layout
		19.	Prepare specific platform for welding
		20.	Manage first aid box
		21.	Manage fume extraction system
		22.	Organize Fire extinguisher
5.	Interpret drawing	23.	Prepare sketch
		24.	Interpret welding symbol
		25.	Interpret welding drawing
		26.	Interpret drawing scale
		27.	Recognize fabrication members in drawing
6.	Prepare raw material	28.	Prepare fabrication material
		29.	Prepare hardware fittings
		30.	Prepare consumable materials
7.	Perform cutting	31.	Mark on fabrication material for cutting
		32.	Shear sheet metal profile by snips
		33.	Saw fabrication material /member (flat/angle/rod/pipe profile) by hacksaw
		34.	Cut flat/angle by cutter chisel and hammer
		35.	Cut flat/angle/rod profile by angle grinder
		36.	Cut pipe/rod profile by cut-off saw
		37.	Shear heavy flat/channel profile by oxy-gas cutting
		38.	Cut sheet/flat profile by plasma cutting
8.	Prepare fabrication member	39.	Deburr the sharp corners of the cut pieces
		40.	Make the flat/pipe/angle/rod profile straight
		41.	Make a hole on fabrication members by drilling machine
		42.	Perform edge preparation for welding joint
9.	Perform bending member	43.	Perform sheet metal folding
		44.	Bend metal strips manually
		45.	Bend pipe/rod/sheet section by bending machine
		46.	Roll sheet by rolling machine

		47.	Make sheet metal cone
10.	Prepare welding accessories	48.	Arrange welding accessories for Arc welding
		49.	Arrange welding accessories for TIG welding
		50.	Arrange welding accessories for MIG welding
		51.	Arrange welding accessories for Oxy-gas cutting
11.	Operate machine and equipment	52.	Perform Arc welding
		53.	Perform TIG welding
		54.	Perform MIG/MAG welding
		55.	Perform Oxy-fuel gas cutting
12.	Perform welding joints	56.	Weld lap joint
		57.	Weld butt joint
		58.	Weld 'T' Joint
		59.	Prepare corner Joint
		60.	Prepare edge Joint
13.	Assemble the members	61.	Make grill/railings
		62.	Fix rolling shutter
		63.	Fabricate spiral staircase
		64.	Assemble main gate
		65.	Fabricate truss fitting
		66.	Fabricate channel gate
		67.	Fabricate modern building structure
		68.	Fabricate out door/emergency staircase
		69.	Repair cast iron body
		70.	Repair defective welding
14.	Maintain tools, equipment and machine	71.	Replace carbon brush in power tools
		72.	Change machine belt
		73.	Repair power cables
		74.	Prepare acetylene gas
		75.	Change transformer oil in welding machine

Task Competency Standard

Soft Skills Area:			
Task number:	**1**		
Task statement:	**Manage time for occupational assignment**		
Level of task:	Significance	Ease	Occurence
	3	2	3
Terminal performance standard	**Given Condition** • Regular duty hours and work plan. **Task:** Manage time for occupational assignment. **Time:** N/A **Standard/Criteria:** • The daily work is started and ended as per given work plan (exhibited punctuality), • The work activities are performed as per the given work plan, • The task is completed within the given time frame.		
Related technical knowledge	• Meaning and importance of time management; • Work priority and rescheduling as per the urgency; • Points to be consider while managing time during duty hours.		

Task number:	**2**		
Task statement:	**Exhibit empathy with customers and team members**		
Level of task:	Significance	Ease	Occurence
	2	2	1
Terminal performance standard	**Given Condition** • Any incident (Problems, awkward situation or unusual situation) of customer or team members. **Task:** Exhibit empathy with customers and team members. **Time:** N/A **Standard/Criteria:** • Feelings (body language, gesture, posture, facial expression) are expressed as per the given incident during the performance; • Acted accordingly as per the feelings.		
Related technical knowledge	• Meaning and importance empathy; • Different situations for empathy; • Points to be considered while exhibiting empathy.		

Task number:	**3**		
Task statement:	**Apply the work ethics of the welder**		
Level of task:	Significance	Ease	Occurence
	3	2	3
Terminal performance standard	**Given Condition:** • Occupational ethics and Code of conduct of organization or Standard operating procedure (SOP). **Task:** Apply the work ethics of the welder. **Time:** N/A **Standard/Criteria:** • Organisational Code of conduct and occupational ethics are followed; • Standard Operating Procedure (SOP) is followed; • The confidentiality of the information is maintained; • The performer is satisfied and motivated in the occupation.		
Related technical knowledge	• Meaning and importance work ethics; • Occupational work ethics; • Code of conducts of organization or SOP.		

Task number:	4		
Task statement:	**Respond assignment**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Any assignment or task order. **Task:** Respond assignment. **Time:** N/A **Standard/Criteria:** • The task is responded promptly; • The given assignment is noted; • The given assignment is completed within the agreed time.		
Related technical knowledge	• Types of work and urgency; • Importance of timely response; • Time requirement of given assignment; • Methods of dealing with stakeholders.		

Task number:	5		
Task statement:	**Give/Receive feedback and feed forward**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition** • Any assignment or task order. **Task:** Give/Receive feedback and feed forward. **Time:** N/A **Standard/Criteria:** • The feedback is listened actively; • The feedback and feed forward given is noted; • Feedback is started with positive part of the performance; • Constructive feedback is given objectively and specific; • Digestible amount of feedback is given.		
Related technical knowledge	• Meaning and importance of feed forward and feedback; • Types of feedback; • Techniques of giving and receiving feed forward and feedback.		

Task number:	6		
Task statement:	**Listen customers demand, complaints or others information**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition** • Customer or team member is complaining/reporting/providing other information; **Task:** Listen customers demand, complaints or others information. **Time:** N/A **Standard/Criteria:** • Complaints/ demand and information is listened actively; • Response (nodding the head) is exhibited during active listening; • Questions are asked for clarification; • Complaints/demands and/or other information are clearly noted; • Reporter or complainant is satisfied with welder's listening skills.		
Related technical knowledge	• Importance of active listening; • Differences between active listening and hearing; • Techniques of active listening.		

Task No:	7		
Task statement:	**Communicate with others about products and services**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition** • Information about products and services to be communicated; • Audience or stakeholders. **Task:** Communicate with others about products and services. **Time:** N/A **Standard/Criteria:** • Voice is clear and audible; • Vocal is pleasant; • Visual expressions are natural; • Information communicated is concise and complete.		
Related technical knowledge	• Meaning and importance of effective communication; • Effective communication model; • Types of communication; • Means of communication; • Techniques of effective communication.		

Task number:	8		
Task statement:	**Coordinate with customers, team members and stakeholders**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition** • Agenda or issue or information to be coordinated; • Team members or relevant stakeholders and • Means of coordination. **Task:** Coordinate with customers, team members and stakeholders. **Time:** N/A **Standard/Criteria:** • The given agenda, issues or information is shared with respective customers, team members and stakeholders; • The customers, team members and stakeholders are identified as per given the target receivers; • Coordination is done based on the given means of coordination.		
Related technical knowledge	• Meaning and importance coordination; • Means of coordination; • Techniques of effective coordination.		

Task number:	9		
Task statement:	**Perform net-working with customers, team and stakeholders**		
Level of task:	Significance	Ease	Occurrence
	3	1	2
Terminal performance standard	**Given Condition:** • Assignment and job description. **Task:** Perform net-working with customers, team and stakeholders. **Time:** N/A **Standard/Criteria:** • List of customers and stakeholders are prepared; • Necessary communication and coordination are made with customers, team and stakeholders; • Service delivery is met the standard of the organization; • Additional service procurement is easily available.		
Related technical knowledge	• Meaning and importance of networking; • Means of networking; • Techniques of effective networking.		

Task number:	10		
Task statement:	Exhibit behavior of team player among the members		
Level of task:	Significance	Ease	Occurrence
	2	1	2
Terminal performance standard	**Given Condition:** • Assignment and • Working team. **Task:** Exhibit behavior of team player among the members. **Time:** N/A **Standard/Criteria:** • Team members are encouraged; • Ownership of the work is taken collectively; • Cooperative and assertiveness are possessed in the team; • Responsibilities and accountabilities are taken.		
Related technical knowledge	• Meaning and importance of team work; • Characteristics of good team player; • Phases of team formation; • Tips of effective team work.		

Task number:	11		
Task statement:	Make decision at different situation of the occupation		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Any assignment with possible unusual situation during the process and problem or case and time frame. **Task:** Make decision at different situation of the occupation. **Time:** N/A **Standard/Criteria:** • Decision is taken within given time frame; • Desired result is achieved; • Decision has considered efficient use of time, money and resources.		
Related technical knowledge	• Meaning and importance of decision making; • Simple decision making process.		

Task number:	12		
Task statement:	Solve problem encountered in the occupation		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Any problem or case and time frame. **Task:** Solve problem encountered in the occupation. **Time:** N/A **Standard/Criteria:** • Problem is analyzed; • Possible solutions are identified; • Effective solution is selected; • Solution has considered efficient use of time, money and resources; • Problem is solved in given time frame; • Desired result is achieved.		
Related technical knowledge	• Meaning and importance of problem solving; • List of potential problems in welding; • General problem solving techniques.		

Task number:	13		
Task statement:	**Take responsibility and accountability of the assignment**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Assignment; • Job description. **Task:** Take responsibility and accountability of the assignment. **Time:** N/A **Standard/Criteria:** • All team members exhibited dedication to the assignment; • Every member has taken their respective responsibilities and attempted to complete the assignment; • The assignment is completed in time; • The ownership of the results of the assignment are taken collectively.		
Related technical knowledge	• Meaning of responsibility and accountability; • Importance of responsibility and accountability for welder.		

Task No:	14		
Task statement:	**Develop work plan for welder**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • List of tasks and their priority order; • Planning forms and format; • Job description. **Task:** Develop work plan for welder. **Time:** N/A **Standard/Criteria:** • Plan is developed as per given task; • Planning is done in given forms and formats; • Activities are listed sequentially in the given forms and format; • The start time and end time of every activity is mentioned; • The responsible person for the activity is mentioned in the plan; • The work plan has considered efficient use of resources (time, money, and people).		
Related technical knowledge	• Meaning of planning; • Importance of planning; • Different planning tools; • Points to be considered while planning.		

Core Skills Area			
Task number:	**15.**		
Task statement:	**Clean workshop**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition** • End of working day; • End of task; • As per cleaning routine. **Task:** Clean workshop. **Time:** 15 minutes /routine work (depend on routine). **Standard/Criteria:** • Workshop floor area is broomed; • All debris, metal scraps and waste materials are managed outside of workshop; • Machine body, glasses, tables and chairs are wiped off; • Workshop ceiling and walls are cleaned and cobwebs are removed; • Tools, equipment and materials are cleaned and stored in their original places; • Power cables are rolled up and hanged at a side.		
Related technical knowledge	• Workshop and importance of regular cleaning the workshop; • Management of debris, metal scraps and waste materials; • Storing tools, equipment and materials in workshop; • Tips for cleaning workshop.		
Safety/precaution	• Wear PPE (mask and gloves); • Handle broken glasses, scraps and metal chips safely.		
Tools, equipment and materials	• Broom; • Cobweb remover; • Cotton cleaning cloth; • Brush; • Dust pan; • Wheel barrow; • Water; • Sack/collecting bin bag/ plastic bag.		

Task number:	**16.**		
Task statement:	**Organize the materials in order**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Scattered materials in the workshop. **Task:** Organize the materials in order. **Time:** 15 minutes /organizing event. **Standard/Criteria:** • Scattered materials are categorised with tag label; • Categorised materials are stacked in storage racks as per its shape and size; • Cut members are stacked as per its shape and size.		
Related technical knowledge	• Importance of material stacking in storage racks; • Tips of keeping material with tag label; • Proper handling of materials.		
Safety/precaution	• Wear PPE (gloves and safety shoes); • Fold or cover the sharp edges of the metal to protect from scratching. • Keep round metal pieces in a box to protect from slip and trip. • Follow the safety procedures for handling long, heavy and sharp edged materials.		
Tools, equipment and materials	• Tag card, storage rack; • Snips, pliers, hammer.		

Task number:	17.		
Task statement:	**Organize tools and equipment**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Different quantity and types of tools and equipment. **Task:** Organize tools and equipment. **Time:** 15 minutes /routine work (depend upon the quantity and category). **Standard/Criteria:** • Tools and equipment are registered as per their category; • Hand tools that are used regularly are kept in pegboard; • Power tools are orderly placed in open shelves; • Close cabinets are placed aside to keep small and precision tools and equipment; • Broken and damaged tools are stored separately.		
Related technical knowledge	• Importance of organizing tools and equipment; • Tips for keeping tools visible and in accessible place; • Labelling tools as per its category; • Display and organising different tools and equipment in the workshop.		
Safety/precaution	• Wear Gloves; • Handle tools and equipment safely; • Avoid damaging tools by keeping them in one place.		
Tools, equipment and materials	• Pegboard; • Open shelves; • Close cabinets; • Tag label.		

Task number:	18.		
Task statement:	**Maintain workshop layout**		
Level of task:	Significance	Ease	Occurrence
	3	2	2
Terminal performance standard	**Given Condition:** • Fabrication workshop layout. **Task:** Maintain workshop layout. **Time:** 15 minutes /layout **Standard/Criteria:** • Cutting, grinding, drilling area, welding platforms, assembly area, storage area, allied items, shipping area, supervisor area, employee amenities, gangways are laid out as per fabrication workshop layout; • Gangway is clearly marked and visible to everybody including visitors; • Machine area is clearly marked and laid in separate area; • Machine sides are free from material stacking and debris.		
Related technical knowledge	• Introduction of workshop layout; • Importance of maintaining workshop layout; • Basic Types of workshop layout; • Benefits of layout in fabrication workshop.		
Safety/precaution	• Wear PPE (Gloves, safety helmet and safety shoes); • Use of safety signs, symbols and colour code.		
Tools, equipment and materials	• Yellow enamel paint; • Painting brush; • Measuring tape; • Mason thread; • Chalk.		

Task number:	19.		
Task statement:	**Prepare specific platform for welding**		
Level of task:	Significance	Ease	Occurrence
	3	2	1
Terminal performance standard	**Given Condition:** • Fabrication workshop with layout; • Separate area for welding. **Task:** Prepare specific platform for welding. **Time:** N/A **Standard/Criteria:** • Welding platform is prepared with plain, dry and hard floor; • Enough light and ventilation is ensured; • Fume extraction unit is operational ; • Electrical power supply units are installed as per welding requirement; • No of electrical power supply units are matched with the platform; • Welding platform is barricaded.		
Related technical knowledge	• Definition of specific platform for welding; • Advantages of preparing specific welding platform; • Tips for managing specific platform for welding.		
Safety/precaution	• Use fire blanket; • Use fume extraction system; • Barricade specific welding platform; • Prevent workers from getting welding hazards.		
Tools, equipment and materials	• Fume extraction system; • Warning tape; • Fire blanket; • Fire extinguisher.		

Task number:	20.		
Task statement:	**Manage first aid box.**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • List of contents of first aid kit; **Task:** Manage first-aid box. **Time:** 15 minutes /first aid box. **Standard/Criteria:** • First aid box contains all medicines and materials as per the given list; • First aid box is placed at visible and accessible place to all; • First aid manual is kept at the front of the first aid box; • Validity date of the emergency medicines are maintained; • Emergency contact numbers of medical person and ambulances are pasted.		
Related technical knowledge	• First aid box and its contents for welding industry; • Awareness on first aid and its manual; • Tips for first aid treatment.		
Safety/precaution	• Follow strictly the instructions given in the first aid manual; • Handle the first aid box safely.		
Tools, equipment and materials	• First aid box containing: Band-Aids, Hydrogen peroxide, Thermometer, Sterile gauze pads, Adhesive tape and bandages, Triangular bandages, Safety pins, Scissors, Tweezers, Disposable non-latex gloves, Antiseptic wipes or soap, Instant cold packs, Emergency blanket, Eye patch, Cotton roll, Dettol, Betadine, Tincher Iodine, Pain killer tablet, Para cetamol, Eye drops, Barrier devices, such as a CPR mask or face shield, First aid kit manual.		

Task number:	21.		
Task statement:	**Manage fume extraction system**		
Level of task:	Significance	Ease	Occurrence
	2	3	3
Terminal performance standard	**Given Condition:** • Fume extraction system. **Task:** Manage fume extraction system. **Time:** 10 minutes /fume extraction system managing **Standard/Criteria:** • Flexible fume pipe is place near the welding area; • Welding fume is fully suctioned by the flexible fume pipe.		
Related technical knowledge	• Meaning and importance of fume extraction system and its function; • Do's and Don'ts for using fume extraction system.		
Safety/precaution	• Make sure that the flexible fume pipe does not affect the welding; • Wear gloves and mask.		
Tools, equipment and materials	• N/A		

Task number:	22.		
Task statement:	**Organise fire extinguisher**		
Level of task:	Significance	Ease	Occurrence
	2	2	1
Terminal performance standard	**Given Condition:** • Quantity of fire extinguisher; • Workshop. **Task:** Organize fire extinguisher. **Time:** 15 min /fire extinguisher. **Standard/Criteria:** • Valid date (as mentioned by suppliers) of fire extinguisher is maintained; • At least one fire extinguisher is placed in accessible and visible place.		
Related technical knowledge	• Meaning and importance of fire fighting system and its type; • Measures of fire fighting based on its types, • Fire extinguisher and its validity time; • Tips of using fire extinguisher.		
Safety/precaution	• Use mask, gloves and goggles; • Handle fire extinguisher safely.		
Tools, equipment and materials	• Fire extinguisher.		

Task number:	23.		
Task statement:	**Prepare sketch**		
Level of task:	Significance	Ease	Occurrence
	2	2	2
Terminal performance standard	**Given Condition:** • Customer concept and demand/ original drawings provided by customer; • Selected pictures from the catalogue and photographs. **Task:** Prepare sketch. **Time:** 30 minutes /sketch. **Standard/Criteria:** • Customer concept and requirements are captured in the prepared sketch; • Dimensions/measurements in the sketch are matched with costumer requirement/concept; • Customer is agreed with the conceptual sketch; • Front and side views are clear for fabrication; • Sketch is approved by supervisor/engineer/costumer; • Detail sketches are drawn on the basis of the given original drawing provided by the customer.		

Related technical knowledge	• Meaning and importance of conceptualization; • Sketching the concept; • Dimensions/measurements in the sketch; • Orthographic views (top, front and side) for fabrication.
Safety/precaution	• Handle the geometry box safely.
Tools, equipment and materials	• Geometry box; • Copy; • Photocopy paper; • Photographs; • Selected pictures from catalogue; • Original drawing provided by the customer.

Task number:	**24.**		
Task statement:	**Interpret welding symbol**		
Level of task:	Significance	Ease	Occurrence
	3	3	2
Terminal performance standard	**Given Condition:** • Original drawing provided by customer with clear welding symbols. **Task:** Iinterpret the welding symbol. **Time:** 30 minutes /drawing. **Standard/Criteria:** • Welding symbols in the given drawing are identified; • Correct meaning of identified welding symbols are interpreted; • Welding joints and position is identified as per given drawing; • Length and pitch of weld is identified; • Root opening and depth of filling is identified; • Welding gap and penetration is identified; • Finish and contour symbol is identified.		
Related technical knowledge	• Introduction of welding symbols; • Welding symbols and its representation lines; • Welding symbols and its meaning; • Welding drawing.		
Safety/precaution	• N/A		
Tools, equipment and materials	• Original drawing provided by customer; • List of welding symbols and its meaning.		

Task number:	**25.**		
Task statement:	**Interpret welding drawing**		
Level of task:	Significance	Ease	Occurrence
	2	3	3
Terminal performance standard	**Given Condition:** • Welding drawing or sketch. **Task:** Interpret welding drawing. **Time:** 15 minutes /drawing **Standard/Criteria:** • Front, side and top views are identified and interpreted; • Hidden parts in drawing is identified and interpreted; • Measurements and dimensions are identified and interpreted.		
Related technical knowledge	• Welding/mechanical drawing and its components; • Dimensions and measurements in welding/mechanical drawing.		
Safety/precaution	• Keep welding drawing/sketch free from unnecessary folds.		
Tools, equipment and materials	• Welding/mechanical drawing; • Drawing scale.		

Task number:	26.		
Task statement:	Interpret drawing scale		
Level of task:	Significance	Ease	Occurrence
	3	3	2
Terminal performance standard	**Given Condition:** • Welding/mechanical drawing/sketch; • Engineering scale. **Task:** Interpret drawing scale. **Time:** 5 minutes /drawing scale **Standard/Criteria:** • The measurement in the sketch/drawing is matched with the measurement in real field; • Missing dimensions are calculated using engineering scale; • Missing dimension is interpreted and matched with drawing/real field.		
Related technical knowledge	• Measurement in welding/mechanical drawing and in real field, drawing scale and calculation; • Importance of interpret drawing scale.		
Safety/precaution	• N/A		
Tools, equipment and materials	• Engineering scale, drawing scale, calculator and welding/mechanical drawing		

Task number:	27.		
Task statement:	Recognize fabrication members in drawing		
Level of task:	Significance	Ease	Occurrence
	3	3	2
Terminal performance standard	**Given Condition:** • Welding or mechanical drawing/sketch. **Task:** Recognize fabrication members in drawing. **Time:** 5 minutes /drawing. **Standard/Criteria:** • All fabrication members are recognised from the respective given table in the drawing; • All different fabrication members are listed with shape and size; • Recognised different fabrication members are considered with margin tolerance; • Recognised different members are matched with the members identified by supervisor.		
Related technical knowledge	• Fabrication members; • Types of fabrication members (shape and size); • Calculation of fabrication members.		
Safety/precaution	• N/A		
Tools, equipment and materials	• N/A		

Task number:	28.		
Task statement:	Prepare fabrication material		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Welding/ mechanical drawing/sketch; • Customer demand; • Different types of materials. **Task:** Prepare fabrication materials (engineering materials). **Time:** 20 minutes /materials (depends on the quantity and size). **Standard/Criteria:** • Fabrication materials are selected from given different types of materials; • Quantity of selected materials are matched with given specification and welding/mechanical drawing or given sketch.		

Related technical knowledge	• Fabrication materials and its types; • Standard sizes of the fabrication materials; • Specification of fabrication materials.
Safety/precaution	• Wear safety gloves and safety helmet.
Tools, equipment and materials	• Specification of fabrication materials; • Measuring tape; • Catalogue of fabrication materials.

Task number:	**29.**		
Task statement:	**Prepare hardware fittings**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Drawing/sketch; • Customer demand; • Standard format. **Task:** Prepare hardware fittings. **Time:** 20 minutes /fitting. **Standard/Criteria:** • List of hardware fittings are prepared in given format; • Quantity of hardware fittings are matched with given drawing; • Hardware fittings are matched with the agreed specification and drawing.		
Related technical knowledge	• Meaning and importance of hardware fittings and its types; • Use of hardware fittings; • Use of hardware fittings catalogues; • Specification of hardware fittings.		
Safety/precaution	• N/A		
Tools, equipment and materials	• Format; • Catalogues; • Drawing/sketch.		

Task number:	**30.**		
Task statement:	**Prepare consumable materials**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Drawing/sketch; • List of fabrication materials. **Task:** Prepare consumable materials. (Welding electrodes, filler metals, cutting wheel, emery, argon gas, oxygen gas, acetylene gas, CO_2). **Time:** 20 minutes /provided list. **Standard/Criteria:** • Electrodes and filler metals are matched with prepared fabrication materials; • Quantity of cutting wheel, emery, are as per volume of prepared fabrication materials and verified by supervisor; • Electrodes are de-moisturized for use.		
Related technical knowledge	• Consumable materials for welding; • Types of consumable materials; • Importance of preparing consumables; • Meaning of electrodes and filler metal specification and their application; • De-moisturization of the electrodes and filler metal.		
Safety/precaution	• Wear safety gloves; • Store electrodes and filler metal in dry places.		
Tools, equipment and materials	• Arc welding electrodes, electrode drying oven, MIG wire, TIG filler rod, • Grinding wheel, cutting wheel, shielding gas.		

Task number:	31.		
Task statement:	**Mark on fabrication material for cutting**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Drawing/sketch; • Fabrication materials. **Task:** Mark on fabrication material (member) for cutting. **Time:** 20 minutes / fabrication material. **Standard/Criteria:** • Fabrication material are measured and marked as per given measurement in the drawing; • Mark is done by scriber/dot punch/engineering pen for cutting.		
Related technical knowledge	• Measuring and marking in fabrication materials for cutting; • Use of measuring and marking tools; • Marking process.		
Safety/precaution	• Wear safety gloves; • Handle punches and scriber safely.		
Tools, equipment and materials	• Chalk; • Centre punch; • Scriber; • Hammer; • Measuring tape; • Try square; • Centre square; • Combination square; • Engineering pen.		

Task number:	32.		
Task statement:	**Shear sheet metal profile by snips**		
Level of task:	Significance	Ease	Occurrence
	3	3	2
Terminal performance standard	**Given Condition:** • Marked sheet metal for shearing; • Development drawing or sketch; • Development template. **Task:** Shear sheet metal profile by snips. **Time:** 30 minutes /sheet metal. **Standard/Criteria:** • Sheet metal is marked as per given development drawing or sketch or template; • Sheet metal is sheared at the marking line; • Cut piece is matched with the template or development drawing; • Cut edges are at the mark, endure margin is maintained; • Sharp edges of the cut piece is deburred; • Quantity of sheared sheet metal matched with the given drawing/sketch.		
Related technical knowledge	• Measuring and shearing of sheet metal by snip; • Types of snips; • Sketch out development drawing; • Preparation and use of template; • Snip cutting procedure.		
Safety/precaution	• Apply PPE (gloves and safety shoes); • Deburr and fold the cutting edges of sheet metal.		
Tools, equipment and materials	• Development drawing, sketch; • Right, left and straight snips; • Marking scriber, sheet metal template; • Vice grip, c-clamp.		

Task number:	33.		
Task statement:	**Saw fabrication material/member (flat/angle/rod/pipe profile) by hacksaw.**		
Level of task:	Significance	Ease	Occurrence
	3	3	2
Terminal performance standard	**Given Condition:** • Marked fabrication material (member) for cutting; • Cutting list of members. **Task:** Saw fabrication material/member (flat/angle/rod/pipe profile) by hacksaw. **Time:** 30 minutes /fabrication materials. **Standard/Criteria:** • Fabrication material (member) is cut at the marked place in straight and to 90^0; • Cut fabrication material (member) is within the given tolerance in the drawing.		
Related technical knowledge	• Definition of saw, hacksaw fabrication material/member (flat/angle/rod/pipe profile); • Types of hacksaw and fabrication materials; • Hacksawing procedure; • Do's and Don'ts during for clamping of fabrication materials.		
Safety/precaution	• Apply PPE (gloves, safety shoes, goggles); • Position the teeth of the hacksaw blade as required and tight the hacksaw blade uniformly; • Discharge sufficient coolant in cutting zone.		
Tools, equipment and materials	• Power hacksaw machine; • Hand hacksaw frame • Hacksaw blade • Coolant • Measuring tape.		

Task number:	34.		
Task statement:	**Cut flat/angle by cutter chisel and hammer**		
Level of task:	Significance	Ease	Occurrence
	2	3	1
Terminal performance standard	**Given Condition:** • Marked flat/angle for cutting; • Cutting list of flat/angle. **Task:** Cut flat/angle by cutter chisel and hammer. **Time:** 30 minutes /cut. **Standard/Criteria:** • Flat/angle is cut at the marked line in straight and to 90^o degree; • Cut flat/angle is within the given tolerance in the given drawing; • Accurate coordination is done between the people holding chisel and hammering.		
Related technical knowledge	• Introduction of chisel and cutter chisel; • Types of chisel; • Different size of flat and angle; • Coordination between people holding chisel and hammering; • Holding cutter chisel and hammering procedure; • Do's and Don'ts for laying flat/angle.		
Safety/precaution	• Apply PPE (gloves, goggles, safety shoes, safety helmet); • Match the position of male and female part of cutter chisel; • Position the flat/angle on the female cutter chisel; • Accurately coordinate between people holding chisel and hammering.		
Tools, equipment and materials	• Anvil; • Cutter chisel (male and female); • Sledge hammer (2 Kg); • Measuring tape.		

Task number:	35.		
Task statement:	**Cut flat/angle/rod profile by angle grinder**		
Level of task:	Significance	Ease	Occurrence
	2	3	3
Terminal performance standard	**Given Condition:** • Marked flat/angle for cutting; • Cutting list of flat/angle; • Cutting wheel. **Task:** Cut flat/angle/rod profile by angle grinder. **Time:** 10 minutes /cut. **Standard/Criteria:** • Flat/angle/rod is clamped securely; • Flat/angle/rod is cut at the marked place in straight and to 90º degree; • Cut flat/angle/rod is within the given tolerance in the given drawing.		
Related technical knowledge	• Introduction of angle grinder; • Types of wheel; • Different size of flat and angle; • Do's and Don'ts for clamping and cutting procedure.		
Safety/precaution	• Apply PPE (gloves, goggles, safety shoes, safety helmet); • Clamp the profile(flat/angle/rod) tightly; • Position and tight the wheel guard.		
Tools, equipment and materials	• Angle grinder; • Cutting wheel; • Measuring tape.		

Task number:	36.		
Task statement:	**Cut pipe/rod profile by cut off saw**		
Level of task:	Significance	Ease	Occurrence
	2	3	3
Terminal performance standard	**Given Condition:** • Marked fabrication material (member) for cutting; • Cutting list; • Cutting wheel. **Task:** Cut fabrication material (member) by cut off saw. **Time:** 10 minutes /cut **Standard/Criteria:** • Fabrication material (member) is cut at the marked line in straight and to 90º degree; • Cut fabrication material (member) is within the given tolerance in the given drawing.		
Related technical knowledge	• Introduction of cut off machine; • Types of cutting wheel; • Do's and Don'ts for clamping and cutting procedure.		
Safety/precaution	• Apply PPE (gloves, goggles, safety shoes, safety helmet, face mask); • Clamp the fabrication material (member) tightly; • Position and tight the wheel guard.		
Tools, equipment and materials	• Cut off machine; • Cutting wheel; • Measuring tape; • Slide wrench.		

Task number:	37.		
Task statement:	**Cut heavy flat/channel profile by oxy-gas cutting**		
Level of task:	Significance	Ease	Occurrence
	2	2	2
Terminal performance standard	**Given Condition:** • Marked fabrication material (member) for cutting; • A set of oxy-gas cutting. **Task:** Cut frictional material (member) (heavy flat/channel profile) by oxy-gas cutting. **Time:** 60 minutes /cut. **Standard/Criteria:** • Fabrication material (member) is cut within 10-15 mm margin of marked line; • Fabrication material (member) is cut straight and to 90º degree.		
Related technical knowledge	• Introduction of oxy-gas cutting; • Setting up the accessories for oxy-gas cutting; • Mixing ratio of oxygen, LPG gas and setting gas flame; • Do's and Don'ts for laying and cutting of fabrication material (member).		
Safety/precaution	• Apply PPE (gloves, goggles, safety shoes, safety helmet); • Position the cutting fabrication material above the ground and no materials are kept in between the cutting material and the ground; • Place the gas hose pipe away from cutting area.		
Tools, equipment and materials	• Oxygen gas in cylinder with gas regulator; • LPG Gas with regulator; • Cutting torch with sufficient length of oxygen and LPG hose; • Centre punch and hammer; • Lighter; • Measuring tape.		

Task number:	38.		
Task statement:	**Cut sheet/flat profile by plasma cutting**		
Level of task:	Significance	Ease	Occurrence
	2	1	1
Terminal performance standard	**Given Condition:** • Marked sheet/flat for cutting; • Cutting list. **Task:** Cut sheet/flat profile by plasma cutting. **Time:** 25 minutes /cut. **Standard/Criteria:** • Flat/angle is cut at the marked line in straight and to 90º degree; • Cutting flat/angle is placed above the ground; • Cutting flat/angle position is in horizontal and straight; • Colours of plasma arc is sharp blue: • Cutting edge is smooth.		
Related technical knowledge	• Introduction of plasma cutting and cutting machine; • Different size of sheet and angle; • Plasma cutting procedure with setting up of the accessories; • Mixing ratio of air pressure, and setting plasma arc.		
Safety/precaution	• Apply PPE (gloves, goggles, safety shoes and safety helmet); • Make sure the gas hose is away from cutting area.		
Tools, equipment and materials	• Plasma cutting machine; • Cutting nozzle with sufficient hose; • Air compressor with sufficient hose; • Slide wrench; • Screw driver (flat and plus).		

Task number:	39.		
Task statement:	**Deburr the sharp corners of the cut pieces.**		
Level of task:	Significance	Ease	Occurrence
	2	3	3
Terminal performance standard	**Given Condition:** • Cut piece (members) with sharp corners. **Task:** Deburr the sharp corners of the cut pieces. **Time:** 10 minutes /piece. **Standard/Criteria:** • Corners of the cut pieces (members) are made smooth; • Quantity of the deburred cut pieces are matched with the given no of cut pieces.		
Related technical knowledge	• Deburring and its importance; • Deburring procedure; • Deburring tools.		
Safety/precaution	• Apply PPE; (gloves) • Use deburring tools safely.		
Tools, equipment and materials	• Flat file, angle grinder, scriber.		

Task number:	40.		
Task statement:	**Make the flat/pipe/angle/rod profile straight**		
Level of task:	Significance	Ease	Occurrence
	3	3	2
Terminal performance standard	**Given Condition:** • Cut members from bended flat/pipe/angle/rod profile. **Task:** Make the flat/pipe/angle/rod profile straight. **Time:** 10 minutes /profile. **Standard/Criteria:** • End to end of flat/pipe/angle/rod profile are observed straight; • The surface of flat/pipe/angle/rod profile is wiped off.		
Related technical knowledge	• Importance of straightening the flat/pipe/angle/rod profile; • Hammering procedure for straightening flat/pipe/angle/rod profile.		
Safety/precaution	• Apply PPE (gloves, goggles, safety helmets, safety shoes); • Use the hammers safely; • Hold the flat/pipe/angle/rod profile safely; • Prevent getting injured during wiping of the flat/pipe/angle/rod.		
Tools, equipment and materials	• Anvil; • Hammer; • Straight gauge; • Measuring tape; • Cotton cleaning cloth; • Scriper.		

Task number:	41.		
Task statement:	**Make a hole on fabrication members by drilling machine**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Fabrication member with centre punched mark; • Stopper fitted on machine table. **Task:** Make a hole on fabrication members by drilling machine. **Time:** 5 minutes /hole **Standard/Criteria:** • Hole is made at the centre punched mark; • Drill bit and hole is matched with the given size; • The hole is straight throughout; • The surface of fabrication members is wiped off.		

Related technical knowledge	• Introduction of drills and drilling; • Type of drill machine; • Size and types of drill bits; • Do's and Don'ts during drilling procedure.
Safety/precaution	• Apply PPE (goggles, gloves, safety shoes, safety helmet); • Clamp hole making member horizontal with the drilling machine table.
Tools, equipment and materials	• Drill machine, drill bit, chuck key, drill vice, slide wrench, measuring tape; • Vernier caliper

Task number:	**42.**		
Task statement:	**Perform edge preparation for welding joint**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Cut fabrication members. • Welding drawing with welding symbol **Task:** Perform edge preparation for welding joint. **Time: 1**5 minutes / edge (depends on drawing and quantity) **Standard/Criteria:** • Cut members are clamped in required angle; • Surface is prepared as per given throat thickness; • Edge is prepared in all welding sides; • Prepared edge surface is plain and even.		
Related technical knowledge	• Edge preparation and its importance; • Methods of edge preparation (grinding, oxy-acetylene, cutting, machining, gauging) • Procedure for clamping members in required angle alignment;		
Safety/precaution	• Apply PPE (safety gloves, safety goggles, safety helmet, safety shoes);		
Tools, equipment and materials	• Angular clamping fixture, measuring tape, straight edge • Angle gauge, bevel protractor		

Task number:	**43.**		
Task statement:	**Perform sheet metal folding**		
Level of task:	Significance	Ease	Occurrence
	3	2	2
Terminal performance standard	**Given Condition:** • Cut sheet metal members ready for folding; • Sheet metal development drawing. **Task:** Perform sheet metal folding **Time:** 15 minutes /sheet metal (depends on size and shape of development) **Standard/Criteria:** • The edges of the seam is smooth. • The joints of the seam is flawless; • The dimension of the folded sheet metal is matched with the given sheet metal development drawing;		
Related technical knowledge	• Sheet metal folding and its importance; • Types of sheet metal folding and bending; • Sheet metal development drawing; • Use of folding tools and machines; • Folding procedure.		
Safety/precaution	• Aapply PPE (safety gloves, safety goggles); • Handle sheet metal safely; • Use folding tools and machine safely.		
Tools, equipment and materials	• Sheet metal development drawing, sheet metal; • Folding hand tools and machines, mallet; • Folding bar.		

Task number:	**44.**		
Task statement:	**Bend metal strips manually**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Cut metal strips ready for bending; • Fabrication drawing. **Task:** Bend metal strips manually. **Time:** 30 minutes /metal strip (depends on size) **Standard/Criteria:** • The bend metal strip is matched with shape and size given in the fabrication drawing; • The finishing of the bend metal strip is smooth.		
Related technical knowledge	• Bending and its types; • Importance of bending; • Use of bending hand tools, machines and devices; • Manual bending procedure.		
Safety/precaution	• Apply PPE (safety gloves, safety goggles, safety helmet); • Handle bending tools and devices safely.		
Tools, equipment and materials	• Bending bar; • Hammer; • Anvil; • Bending wrench; • Swage block; • Bending devices.		

Task number:	**45.**		
Task statement:	**Bend pipe/rod/sheet section by bending machine**		
Level of task:	Significance	Ease	Occurrence
	2	3	2
Terminal performance standard	**Given Condition:** • Cut members pipe/rod/sheet ready for bending; • Fabrication drawing. **Task:** Bend pipe/rod/sheet section by bending machine**.** **Time:** 5 minutes /section (depends on size). **Standard/Criteria:** • The pipe/rod/sheet is matched with the shape and size given in the fabrication drawing; • The finishing of the pipe/rod/sheet bend is smooth.		
Related technical knowledge	• Bending and its types; • Importance of bending; • Use of bending hand tools, machines and devices; • Bending procedure.		
Safety/precaution	• Apply PPE (safety gloves, safety goggles, safety helmet); • Handle bending tools, machines and devices safely.		
Tools, equipment and materials	• Bending machine; • Metal bender; • Profile bending machine; • Hammer; • Anvil; • Bending devices.		

Task number:	46.		
Task statement:	**Roll sheet by rolling machine**		
Level of task:	Significance	Ease	Occurrence
	2	2	2
Terminal performance standard	**Given Condition:** • Sheet metal ready for rolling; • Sheet metal development drawing. **Task:** Roll sheet by rolling machine. **Time:** 20 minutes /sheet (depends on size and thickness). **Standard/Criteria:** • The rolled sheet metal is matched with shape and size given in the sheet metal development drawing; • Dimension of the rolled sheet metal is within the given tolerance; • The finishing of the rolled sheet metal is smooth.		
Related technical knowledge	• Meaning of sheet metal rolling and its importance; • Types of rolling; • Use of rolling machine; • Rolling procedure.		
Safety/precaution	• Apply PPE (safety gloves, safety goggles, safety helmet, safety shoes); • Handle the sheet metal and rolling machine safely.		
Tools, equipment and materials	• Rolling machine; • Rolling bar; • Hammer; • Measuring tape; • Marker.		

Task number:	47.		
Task statement:	**Make sheet metal cone**		
Level of task:	Significance	Ease	Occurrence
	2	2	2
Terminal performance standard	**Given Condition:** • Design and size; • Metal sheet. **Task:** Make sheet metal cone. **Time:** 30 minutes /metal cone. **Standard/Criteria:** • Sheet metal cone is made matching the given shape, size and design; • The joint of the seam is smooth.		
Related technical knowledge	• Cone and its different sizes; • Use of cone in fence and railing; • Cone making procedure.		
Safety/precaution	• Apply PPE (safety gloves, safety goggles, safety helmet); • Handle bending tools and devices safely; • Handle sheet metal safely.		
Tools, equipment and materials	• Hammer; • Taper bar; • Anvil; • Snip.		

Task number:	48.		
Task statement:	**Arrange welding accessories for arc welding**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Arc welding quality; • Specification of electrodes; • List of accessories; • Fabrication member. **Task:** Arrange welding accessories for arc welding. **Time:** 10 minutes /arrangement. . **Standard/Criteria:** • All accessories (vice grip, electrode holder, earth lamp, wire brush, chipping hammer, tongs, magnetic holder, c-clamp, mitre vice, hand vice) are arranged as per given list of accessories; • Welding machine is arranged matching the given welding quality required and fabrication members; • Electrode is arranged matching the given specification.		
Related technical knowledge	• Welding accessories and its importance; • Types of welding accessories and its use; • Electrodes, its types and uses.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron); • Avoid using broken, loosen, mushroom head, and dull welding accessories.		
Tools, equipment and materials	• DC/AC welding machine, electrode holder, earthing clamp; • Chipping hammer, wire brush, tongs, steel hammer; • Scriber, welding electrode, electrode oven.		

Task number:	49.		
Task statement:	**Arrange welding accessories for TIG welding**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • TIG welding quality; • Specification of Tungsten electrodes and filler rod; • List of accessories. **Task:** Arrange welding accessories for TIG welding. **Time:** 10 minutes /arrangement. **Standard/Criteria:** • All accessories (ceramic nozzle, torch, earth clamp, brass connector, gas regulator, wire brush, magnetic holder, c-clamp, mitre vice, hand vice) are arranged as per given list of accessories. • Welding machine is arranged matching the given welding quality required and fabrication members. • Tungsten electrode is arranged matching the given specification; • Shielding gas is arranged to get the given required TIG welding quality.		
Related technical knowledge	• Meaning of TIG welding accessories and its importance; • Types of TIG welding accessories and its use; • Tungsten electrodes, its types and uses. • Meaning, importance and types of shielding gas, Tig torch and filler rod.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron); • Avoid using broken, loosen, mushroom head, and dull welding accessories; • Handle Torch Back up safely.		
Tools, equipment and materials	• DC/AC TIG welding machine, TIG welding torch, filler rod, earthing clamp; • Wire brush, tongs, scriber, tungsten electrode, welding helmet; • Leather glove, leather apron, angle grinder.		

Task number:	50.		
Task statement:	**Arrange welding accessories for MIG/MAG welding**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • MIG/MAG welding quality; • Specification of filler wire; • List of accessories; • Fabrication member. **Task:** Arrange welding accessories for MIG/MAG welding. **Time:** 10 minutes /arrangement. **Standard/Criteria:** • All accessories (MIG welding gun, earth clamp, gas regulator, wire brush, magnetic holder, c-clamp, mitre vice, hand vice) are arranged as per given list of accessories; • Welding machine is arranged matching the given MIG/MAG welding quality required and fabrication members; • Filler wire is arranged matching the given specification; • Shielding gas is arranged to get the given required MIG/MAG welding quality; • Nozzle of welding torch/gun is free from chips and fusion.		
Related technical knowledge	• Meaning of MIG/MAG welding accessories and its importance; • Types of MIG/MAG welding accessories and its use; • Filler wire, its types and uses; • Shielding gas, its types and use.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron); • Take care when loading filler wire spool in machine; • Use filler wire safely without exposing to the oxygen. • Make sure nozzle is free from the fusion wire.		
Tools, equipment and materials	• DC/AC welding machine; MIG torch/gun; earthing clamp; wire brush; tongs; • Steel hammer; scriber; filler wire in spool; wire cutter; welding helmet; • Leather glove; leather apron.		

Task number:	51.		
Task statement:	**Arrange accessories for Oxy-fuel gas cutting**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • MS sheet; • Fabrication drawing; • List of accessories. **Task:** Arrange accessories for Oxy-fuel gas cutting. **Time:** 30 minutes /arrangement **Standard/Criteria:** • All accessories (gas regulator, c-clamp, cutting torch, hose pipe for LPG (red) and for oxygen (blue), and gas lighter) are arranged as per given list of accessories; • Oxy-gas cutting device is arranged matching the given cutting quality required and fabrication members; • LPG and oxygen gas is arranged to get the given required cutting quality.		
Related technical knowledge	• Meaning of Oxy-fuel gas cutting and its importance; • Oxygen, LPG and acetylene gas in cutting; • Cutting torch and holing devices for cutting.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron, safety goggles); • Avoid using shredded cutting hose. • Maintain position of the cutting materials.		
Tools, equipment and materials	• Oxygen gas with regulator; LPG gas with regulator; acetylene gas with regulator • Cutting hose, cutting torch, tongs, steel hammer, gas lighter, welding helmet; • Leather glove; leather apron		

Task number:	52.		
Task statement:	**Perform arc welding**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Welding machine with accessories; • Fabrication drawing or sketch; • Fabrication material; **Task:** Perform arc welding. **Time:** 15 minutes /arc welding (depends on size and quantity of fabrication member). **Standard/Criteria:** • Width, height and waves of the welding bead is uniform; • Penetration is matched with the given symbol in the drawing; • The weld beat is free of cracks, undercut, holes and incomplete penetration; • The finished product is free from distortion and satisfies the design dimensions; • Spatters are cleaned from the side of the welding bead.		
Related technical knowledge	• Meaning of arc welding and its importance; • Welding defects, its effect and remedies; • Electrode selection; • Procedure of arc welding.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron, safety shoes); • Follow safety precaution of arc welding.		
Tools, equipment and materials	• Welding fixtures, welding gauge; • Measuring tape, welding helmet; • Leather glove, leather apron.		

Task number:	53.		
Task statement:	**Perform TIG welding**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Welding machine with accessories; • Fabrication drawing or sketch; • Fabrication material. **Task:** Perform TIG welding. **Time:** 15 minutes /TIG welding (depends on the thickness, size, length and material). **Standard/Criteria:** • Width, height and waves of the welding bead is uniform; • Penetration is done as per given symbol in the drawing; • The weld beat is free of cracks, undercut, holes and incomplete penetration; • The finished product is free from distortion and satisfies the design dimensions;		
Related technical knowledge	• Meaning of TIG welding and its importance; • Welding defects, its effect and remedies; • Selection of filler rod; • Procedure of TIG welding.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron, safety shoes); • Follow safety precaution of TIG welding.		
Tools, equipment and materials	• Welding fixtures • Welding gauge; • Measuring tape; • Welding helmet; • Leather glove; • Leather apron.		

Task number:	54.		
Task statement:	**Perform MIG/MAG welding**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Welding machine with accessories; • Fabrication drawing or sketch; • Fabrication material. **Task:** Perform MIG welding. **Time:** 15 minutes /MIG welding (depends on the thickness, size, length and material). **Standard/Criteria:** • Width, height and waves of the welding bead is uniform; • Penetration is done as per given symbol in the drawing; • The weld beat is free of cracks, undercut, holes and incomplete penetration; • The finished product is free from distortion and satisfies the design dimensions; • MIG/MAG welding is done nonstop for entire length.		
Related technical knowledge	• Meaning of MIG/MAG welding and its importance; • Welding defects, its effect and remedies; • Selection of filler wire; • Procedure of MIG welding.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron, safety shoes); • Follow safety precaution of MIG/MAG welding.		
Tools, equipment and materials	• Welding fixtures, • Welding gauge, • Measuring tape; • Welding helmet, • Leather glove; • Leather apron.		

Task number:	55.		
Task statement:	**Perform oxy-fuel gas cutting**		
Level of task:	Significance	Ease	Occurrence
	3	1	2
Terminal performance standard	**Given Condition:** • MS metal is ready for cut; • Fabrication drawing; • Arranged oxy-fuel gas cutting. **Task:** Perform oxy-fuel gas cutting. **Time:** 60 minutes /cut (depends on size and thickness of the material). **Standard/Criteria:** • Start cutting point is heated by LPG gas; • Cutting flame is maintained to melt the point by releasing flow of oxygen gas up to end of the cutting point; • Minimum slag adhesion is observed in the cutting area.		
Related technical knowledge	• Meaning and importance of oxy-fuel gas cutting; • Procedure of oxy-fuel gas cutting; • Maintaining oxy-fuel gas pressure.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron); • Avoid using shredded cutting hose; • Avoid exposure of cutting hose to welding torch.		
Tools, equipment and materials	• Oxy-fuel gas cutting set; • Welding fixtures; • Measuring tape; • Welding helmet; • Leather glove; • Leather apron, fabrication material.		

Task number:	56.		
Task statement:	**Weld lap joint**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Fabrication member ready to weld; • Fabrication drawing; • Welding position. **Task:** Weld lap joint. **Time:** 30 minutes /joint. **Standard/Criteria:** • Lap joint of the fabrication member is welded matching the given size and design in fabrication drawing; • Lap joint of the fabrication member is welded in the given position.		
Related technical knowledge	• Joints in welding; • Types of welding joints; • Meaning of lap joint and its use; • Welding position and its types; • Procedure of welding lap joints in different positions.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron, leather sleeve, safety shoes); • Follow safety rules of welding lap joint.		
Tools, equipment and materials	• Welding accessories; • Welding fixtures; • Welding gauge; • Measuring tape; • Welding helmet; • Leather glove; • Leather apron.		

Task number:	57.		
Task statement:	**Weld butt joint**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Fabrication member ready to weld; • Fabrication drawing; • Welding position. **Task:** Weld butt joint. **Time:** 30 minutes /joint. **Standard/Criteria:** • Butt joint of the fabrication member is welded matching the given size and design in fabrication drawing; • Butt joint of the fabrication member is welded in the given position.		
Related technical knowledge	• Meaning of butt joint and its use; • Welding positions in butt joint; • Procedure of welding butt joints in different positions.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron, leather sleeve, safety shoes); • Follow safety rules of welding butt joint.		
Tools, equipment and materials	• Welding accessories; • Welding fixtures; • Welding gauge; • Measuring tape; • Welding helmet; • Leather glove and leather apron.		

Task number:	58.		
Task statement:	**Weld 'T' Joint**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Fabrication member ready to weld; • Fabrication drawing; • Welding position. **Task:** Weld 'T' Joint. **Time:** 30 minutes /joint. **Standard/Criteria:** • "T" joint of the fabrication member is welded matching with the given size and design in fabrication drawing; • "T" joint of the fabrication member is welded in the given position.		
Related technical knowledge	• Meaning of "T" joint and its use; • Welding positions in "T" joint; • Procedure of welding "T" joints in different positions.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron, leather sleeve, safety shoes); • Follow safety rules of welding "T" joint.		
Tools, equipment and materials	• Welding accessories; • Welding fixtures; • Welding gauge; • Measuring tape; • Welding helmet; • Leather glove; • Leather apron.		

Task number:	59.		
Task statement:	**Prepare corner Joint**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Fabrication member ready to weld; • Fabrication drawing; • Welding position. **Task:** Prepare corner Joint. **Time:** 30 minutes /joint. **Standard/Criteria:** • Corner joint of the fabrication member is welded matching the given size and design in fabrication drawing; • Corner joint of the fabrication member is welded in the given position (except overhead position).		
Related technical knowledge	• Meaning of corner joint and its use; • Welding positions in corner joint; • Procedure of welding corner joints in different positions.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron, leather sleeve, safety shoes); • Follow safety rules of welding.		
Tools, equipment and materials	• Welding accessories; • Welding fixtures; • Welding gauge; • Measuring tape; • Welding helmet; • Leather glove; • Leather apron.		

Task number:	60.		
Task statement:	**Prepare edge joint**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Fabrication member ready to weld; • Fabrication drawing; • Position. **Task:** Prepare edge joint. **Time:** 30 minutes /joint. **Standard/Criteria:** • Edge joint of the fabrication member is welded matching the given size and design in fabrication drawing; • Edge joint of the fabrication member is welded in the given position.		
Related technical knowledge	• Meaning of edge joint and its use; • Welding positions in edge joint; • Procedure of welding edge joints in different positions.		
Safety/precaution	• Apply PPE (welding helmet, leather glove, leather apron, leather sleeve, safety shoes); • Follow safety rules of welding.		
Tools, equipment and materials	• Welding accessories; • Welding fixtures; • Welding gauge; • Measuring tape; • Welding helmet; • Leather glove and leather apron.		

Task number:	61.		
Task statement:	**Make grill/railings**		
Level of task:	Significance	Ease	Occurrence
	3	2	2
Terminal performance standard	**Given Condition:** • Different members ready for fabrication; • Grill/railing detail drawing; • Costumer's requirement. **Task:** Make grill/railings. **Time:** 60 minutes /grill or railing (depends on size and volume of work). **Standard/Criteria:** • All members are assembled as per given shape and size in the drawing; • Members are joined with respective tack welding; • Welding joints are free from slags and spatters.		
Related technical knowledge	• Meaning of grill and railing; • Types of grill and railings; • Procedure of making grill and railing.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes); • Follow welding safety rules.		
Tools, equipment and materials	• Welding fixture; • Welding machine; • Hand shield; • Chipping hammer; • Wire brush • Extension cable; • Leather glove; • Safety goggles and leather apron.		

Task number:	62.		
Task statement:	**Fix rolling shutter**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Rolling shutter members; • Rolling shutter detail drawing; • Costumer's requirement. **Task:** Fix rolling shutter. **Time:** 2 days /shutter (depends on size and volume of work). **Standard/Criteria:** • Shutter strips are interlocked each other; • The whole shutter is rolled up and down smoothly; • Welding joints are free from slags and spatters; • All strips are inserted in the guide and greased.		
Related technical knowledge	• Meaning and importance of rolling shutter; • Types of rolling shutter; • Materials used for making rolling shutter; • Procedure of fixing rolling shutter.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes); • Use drilling and fitting tools safely.		
Tools, equipment and materials	• Welding machine with set of accessories; • Drill machine; • Hammer; • Anvil; • Drill bits; • Arc welding electrodes; • Hand shield; • Welding gloves.		

Task number:	63.		
Task statement:	**Fabricate spiral staircase**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Design and drawing; • Prepared staircase member; **Task:** Fabricate spiral staircase. **Time:** 1 day /staircase. **Standard/Criteria:** • Staircase is fitted vertically spiral on the main post by arc welding; • Riser of the spiral staircase is distributed equally; • Riser and treads of the spiral case are uniform; • Railing along stair step is rolled out smoothly; • The finished products satisfies the design shape and size; • Slags and spatters are cleaned.		
Related technical knowledge	• Meaning and importance of spiral staircase; • Materials used in spiral staircase; • Procedure of fabricating spiral staircase.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes);		
Tools, equipment and materials	• Welding machine, electrode; agrinder; • Bending die; • Chipping hammer; • Wire brush; shammer; • Extension cable; plumbob.		

Task number:	64.		
Task statement:	**Assemble main gate**		
Level of task:	Significance	Ease	Occurrence
	3	3	2
Terminal performance standard	**Given Condition:** • Design and drawing; • Customer requirement; • Main gate member; • Hardware's. **Task:** Assemble main gate. **Time:** 4 days /gate. **Standard/Criteria:** • Main gate is assembled as per customer requirement or given drawing; • Main gate is fitted and levelled; • Main gate frame is free from distortion; • Main gate is smoothly operated; • Spatters and slags are cleaned.		
Related technical knowledge	• Importance of main gate and its types; • Designs and materials used in assembling main gate; • Procedure of assembling main gate.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes); • Use drilling and fitting tools safely.		
Tools, equipment and materials	• Welding machine, electrode, angle grinder; • Bending die, chipping hammer • Wire brush, steel hammer • Rope; • Extension cable; • Plumbob; • Drill bit.		

Task number:	65.		
Task statement:	**Fabricate truss fitting**		
Level of task:	Significance	Ease	Occurrence
	3	2	2
Terminal performance standard	**Given Condition:** • Design and drawing; • Costumer requirement; • Truss structure member; • Site or location. • Hardwares. **Task:** Fabricate truss fitting. **Time:** N/A (depends upon size and quantity). **Standard/Criteria:** • Truss is fabricated as per customer requirement or given drawing; • Truss is fabricated and levelled; • Truss frame is free from distortion; • Spatters and slags are cleaned.		
Related technical knowledge	• Meaning and importance of truss and its types; • Designs and materials used in fabricating truss; • Procedure of fabrication of truss.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes); • Use drilling and fitting tools safely.		
Tools, equipment and materials	• Rope, plumbob, sprit level, extension cord; • Hammer, welding machine; • Electrode, grinder/cutting wheel, drill machine, drill bit; • Crane/chain pully, ladder;		

Task number:	66.		
Task statement:	**Fabricate channel gate.**		
Level of task:	Significance	Ease	Occurrence
	3	1	2
Terminal performance standard	**Given Condition:** • Design and drawing; • Customer requirement; • Canal gate member; • Hardwares. **Task:** Fabricate channel gate. **Time:** 4 days /fabrication (depends upon size and shape). **Standard/Criteria:** • Channel gate is assembled as per customer requirement or given drawing; • Channel gate is fitted and levelled; • Channel gate frame is free from distortion; • Channel gate is smoothly operated; • Spatters and slags are cleaned.		
Related technical knowledge	• Channel gate and its types; • Designs and materials used in assembling canal gate; • Procedure of assembling channel gate.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes); • Use drilling and fitting tools safely.		
Tools, equipment and materials	• Rope, plumbob, sprit level, extension cord, hammer; • Welding machine, grinder, drill machine, drill bit, crane/chain pulley.		

Task number:	67.		
Task statement:	**Fabricate modern building structure**		
Level of task:	Significance	Ease	Occurrence
	3	2	2
Terminal performance standard	**Given Condition:** • Design and drawing; • Costumer requirement; • Building structure members; • Site or location. • Hardwares. **Task:** Fabricate modern building structure. **Time:** N/A (depends upon size and quantity of structure members). **Standard/Criteria:** • Building structure is fabricated as per customer requirement or given drawing • Building structure is fabricated and levelled; • Column and beam structures are set at 90º degree corresponding to each other; • Welding joints are done following its standards and criteria; • Weld bead is free from cracks, undercut, blow holes and incomplete penetration; • Building structure is free from distortion; • Spatters and slags are cleaned.		
Related technical knowledge	• Building structure and its components; • Designs and materials used in fabricating building structures; • Standard criteria of welding joints and fabrication of building structures; • Procedure for fabricating building structures.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes, full body harness); • Use drilling and fitting tools safely.		
Tools, equipment and materials	• Rope, plumbob, sprit level, extension cord, hammer, welding machine; • Electrode, grinder/cutting wheel, drill machine, drill bit, crane/chain pulley; • Ladder, gas cutter.		

Task number:	68.		
Task statement:	**Fabricate outdoor/emergency staircase**		
Level of task:	Significance	Ease	Occurrence
	3	2	3
Terminal performance standard	**Given Condition:** • Design and drawing; • Costumer requirement; • Staircase structure member; • Site or location • Hardwares. **Task:** Fabricate modern outdoor/emergency staircase. **Time:** N/A (depends upon size and quantity); **Standard/Criteria:** • Outdoor/emergency staircase is fabricated as per customer requirement or given drawing; • Outdoor/emergency staircase is fabricated and levelled; • Column and beam structures are set at 90^{o} degree corresponding to each other; • Welding joints are done following its standards and criteria; • Weld bead is free from cracks, undercut, blow holes and incomplete penetration; • Outdoor/emergency staircase is free from distortion; • Spatters and slags are cleaned.		
Related technical knowledge	• Meaning and importance of outdoor/emergency staircase and its components; • Designs and materials used in fabricating outdoor/emergency staircase; • Standard criteria of welding joints and fabrication of outdoor/emergency staircase; • Procedure for fabricating outdoor/emergency staircase.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes, full body harness); • Use drilling and fitting tools safely.		
Tools, equipment and materials	• Rope, plumbob, sprit level, extension cord, hammer, welding machine; • Electrode, grinder/cutting wheel, drill machine, drill bit; chain pulley, ladder.		

Task number:	69.		
Task statement:	**Repair cast iron body**		
Level of task:	Significance	Ease	Occurrence
	3	1	2
Terminal performance standard	**Given Condition:** • Broken/cracked/damaged cast iron body. **Task:** Repair cast iron body. **Time:** 2 hours **/**repair work. **Standard/Criteria:** • Edge of the joints and cracked zones are grooved and prepared using grinder; • Welding penetration is satisfied with the body thickness; • Repaired cast iron body satisfies the original shape and size and free from distortion.		
Related technical knowledge	• Meaning of cast iron body; • Edge preparation; • Welding procedure including heating of cast iron; • Do's and don'ts in repairing cast iron body.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes, full body harness); • Take care while heating of metal that could lead to jeopardy.		
Tools, equipment and materials	• Gas cutting equipment; • C-clamp; • Cast iron electrode; • Extension cord, hammer; • Welding machine, grinder/cutting wheel.		

Task number:	70.		
Task statement:	Repair defective welding		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Defective welded parts/components/joints. **Task:** Repair defective welding. **Time:** 15 minutes /repair work. **Standard/Criteria:** • Welding beads are cleaned by chipping and wire brushing; • Total cracks are removed by grinding; • Grooves on weld area are made to the total depth of the fabrication member; • Grooved area is heated by gas torch; • Heated member is tempered by sand; • The groove is re-weld with full penetration; • The finished products satisfies the original shape and size and free from distortion.		
Related technical knowledge	• Meaning and importance of groove welding bead; • Heat treatment and tempering process; • Do's and don'ts in repair of defective welding.		
Safety/precaution	• Apply PPE (hand shield, leather glove, leather apron, safety shoes, and full body harness).		
Tools, equipment and materials	• Hammer; • Oxy-fuel gas cutting equipment; • Chipping hammer; • Work holding device; • Chisel; • Grinder; • Wire brush; • Emery paper.		

Task number:	71.		
Task statement:	Replace carbon brush in power tools		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Notice the symptoms like burning smell, sparkling, reduced performance and inconsistent power. **Task**: Replace carbon brush in power tools. **Time:** 15 minutes /carbon brush replacement. **Standard/Criteria:** • Machine is run without burning smell and sparkling; • Machine started giving high performance and constant power.		
Related technical knowledge	• Meaning of power tools and its types; • Meaning and importance of carbon brush; • Symptoms of worn or broken carbon brush; • Process of carbon brush change; • Machine condition.		
Safety/precaution	• Remove the worn carbon brush from the power tool as soon as possible to prevent the armature from getting damage; • Apply PPE; • Handle the power tools safely; • Prevent from electrical shock and hazards.		
Tools, equipment and materials	• Carbon brush, emery paper of 300 grade; • Tester, screw driver, gloves, plast, file, carbon, stone/khaksi		

Task number:	72.		
Task statement:	**Change machine belt.**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Drive belt becomes oversize and machine started performing slow; • The drive belt was broken, causing the machine to stop; • Belt adjustment device and types of belt (fan belt, flat/V/cog belt). **Task:** Change machine belt**.** **Time:** 10 minutes /belt. **Standard/Criteria:** • A new drive belt is mounted according to the size of the machine pulley; • Changed machine belt is matched with the respective machine pulley and its specification; • Drive belt is adjusted tightly to set the machine pulley; • Power is transmitted to machine spindle and run without stopping; • Machine started producing high performance and constant power.		
Related technical knowledge	• Introduction and importance of machine belt; • Types, size and application of machine belt; • Machine condition related to machine belt transmitting load; • Specification of machine belt used; • Method and process of changing machine belt.		
Safety/precaution	• Apply PPE (safety goggles, safety gloves); • Disconnect power cable of the machine from the plug before changing belt; • Take care of your fingers, which can be trapped in between belt and pulley; • Take care and handle sharp edged cutting tool safely to prevent from severe injuries; • Handle and locate safety wheel guards safely; • Make sure tools, equipment is kept safely in store.		
Tools, equipment and materials	• Slide wrench, screw driver, drive belts, steel hammer, hook spanner.		

Task number:	73.		
Task statement:	**Repair power cables**		
Level of task:	Significance	Ease	Occurrence
	3	3	3
Terminal performance standard	**Given Condition:** • Power cable with cut insulation; • Power cable with visible scratch/fusen; • Spare power cable. **Task:** Repair power cables**.** **Time:** 10 minutes /repair work. **Standard/Criteria:** • Broken/burnt power cables are insulated; • Electrical power is supplied in the electric power machine; • Damaged power cable is replaced with new one; • The length of the power cable is matched with the required length.		
Related technical knowledge	• Meaning of power cable and its types; • Meaning of electricity/power supply, insulation; • Importance of safe power cable in electric power machine; • Procedure for changing the power cable in electric power machine.		
Safety/precaution	• Apply PPE. • Disconnect the power cable from the source before repairing it; • Connect the cables in the plug respectively; • Prevent from getting electric shock and hazards.		
Tools, equipment and materials	• Tester, universal plier, wire stripper; • Spare power cable, screw driver.		

Task number:	74.		
Task statement:	Prepare acetylene gas		
Level of task:	Significance	Ease	Occurrence
	2	3	1
Terminal performance standard	**Given Condition:** • Acetylene generator, calcium carbide and water; **Task:** Prepare acetylene gas. **Time:** 30 minutes /event. **Standard/Criteria:** • Calcium carbide is placed on its respective container of the generator; • water is filled up to the mark in the bucket of generator; • All filling parts are covered and tightened; • Formation of gas is observed in the indicator of regulator; • Prepared acetylene gas is ignited.		
Related technical knowledge	• Acetylene gas and its Importance; • Procedure of preparing acetylene gas from calcium carbide.		
Safety/precaution	• Apply PPE (safety gloves and face mask and goggles); • Take care of debris of calcium carbide and manage it carefully, to prevent from harmful effect to the environment and plants;		
Tools, equipment and materials	• Acetylene generator; • Calcium carbide; • Water; • Hammer; • Screw driver; • Slide wrench.		

Task number:	75.		
Task statement:	Change transformer oil in oil cooled arc welding machine		
Level of task:	Significance	Ease	Occurrence
	3	2	1
Terminal performance standard	**Given Condition:** • Transformer case is hot; • Low oil level in indicator; • The performance of machine is decreasing. **Task:** Change transformer oil in oil cooled arc welding machine. **Time:** 30 minutes /transformer. **Standard/Criteria:** • The coils and core are submerged in transformer oil; • The welding machine starts giving original performance.		
Related technical knowledge	• Meaning and importance of transformer oil; • Causes and effects of lowering and high viscosity in transformer oil; • Procedure for changing transformer oil.		
Safety/precaution	• Apply PPE (safety gloves, safety goggles, safety shoes); • Take care of dispose of transformer oil and manage it carefully, to prevent from harmful effect to the environment and plants; • Take care of spilling transformer oil to prevent from slippery floor surface.		
Tools, equipment and materials	• Transformer oil; • Slide wrench; • Oil level checking lever; • Screwdriver.		

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