Skills for Employment Investment Program (SEIP)

ASSESSMENT TOOL

FOR

MECHANICAL FITTING

(LIGHT ENGINEERING SECTOR)

Finance Division, Ministry of Finance
Government of the People's Republic of Bangladesh

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PART A – THE ASSESSOR

Instructions to Assessor

Assessment is the process of identifying a candidate's skills and knowledge set against the industry established standards in the workplace. It requires the candidate to consistently and over time demonstrate skills, knowledge and attitude that enable confident completion of workplace tasks in a variety of situations.

In judging assessment evidence, the assessor must ensure that the evidence is:

- authentic (the candidate's own work)
- valid (directly related to the current version of the endorsed competency standard)
- reliable (show that the candidate consistently meets the endorsed unit of competency)
- current (reflects the candidate's current capacity to perform the aspect of work covered by the endorsed unit of competency)
- sufficient (covers the full range of elements in the relevant unit of competency)

There are a number of assessment methods that may be employed including but not limited to:

- written examination
- oral questioning
- practical demonstration

A single unit of competency may be assessed or a group of units of competency may be assessed, either in an actual workplace or a simulated workplace environment.

Conducting Assessment

Prior to commencement of assessment, candidates must have the tasks clearly explained to them. Also, the assessor should provide candidates with clear advice and information about the:

- date, time and place for assessment
- structure of assessment
- number of times performance must be demonstrated or observed
- amount or type of assistance candidates can expect
- assessment environment
- resources required for assessment
- performance standards or benchmarks relevant to the qualification

As well as informing the candidate of what they will be required to do during the assessment, the assessor will also need to explain what evidence they will need to provide in response to the various assessment tasks.

If a candidate is required to submit evidence, any explanation must include specific guidance on:

- what to include as evidence
- how to present the evidence
- how to submit the evidence and to whom

Assessing Competence

Competency-based assessment does not award grades, but simply identifies if the candidate has the skills, knowledge and attitudes to undertake the required task to the specified standard.

Therefore, when assessing competency an assessor has two possible results (assessment decisions) that can be awarded:

- Competent (C)
- Not Yet Competent (NYC)

Competent (C)

If the candidate is able to successfully answer and demonstrate what is required to the expected standard of the assessment criteria, they will be deemed as 'Competent'.

The assessor will award 'Competent' if they feel the candidate has the necessary skills, knowledge and attitudes in all assessment tasks for a given package.

Not Yet Competent (NYC)

If the candidate is unable to answer and demonstrate competency to the expected standard, they will be deemed to be 'Not Yet Competent'.

This does not mean the candidate will need to complete all the assessment tasks again. When applying for reassessment, the focus will be on the specific assessment tasks that were not performed to the required standard.

The candidate may be required to:

(a) undertake further training or instruction

(b) undertake the specific assessment task again until they are deemed to be competent

Recording Assessment Information

When all assessment tasks are concluded, the evidence summary sheet should be completed, signed by all parties, and any outstanding activities or issues actioned.

The assessor should ensure that all appropriate forms are completed and signed by all parties.

CHECKLIST FOR ASSESSOR		
Prior to the assessment I have:	**Tick (✓)**	**Remarks**
Ensured the candidate is informed about the venue and schedule of assessment.		
Received current copies of the assessment criteria to be assessed, assessment plan and evidence plan.		
Reviewed the assessment criteria and evidence plan to ensure I clearly understood the instructions and the requirements of the assessment process.		
Identified and accommodated any special needs of the candidate.		
Checked the set-up and resources for the assessment.		
During the assessment I have:		
Introduced myself and confirmed identities of candidates.		
Collected the admission slips.		
Put candidates at ease by being friendly and helpful.		
Checked completed self-assessment guide.		
Explained to candidates the purpose, context and benefits of the assessment.		
Ensured candidates understood the assessment process and the assessment procedure.		
Provided candidates with an overview of the assessment criteria to be used.		
Gave specific and clear instructions to the candidates.		
Observed carefully the specified time limits provided in the assessment package.		
Stayed at the assessment area during the entire duration of the assessment activity.		
Ensured notes are made on unusual conditions or situations during the assessment and include these in the report.		
Did not provide any assistance during the assessment or indicated in any way whether the candidate is or is not performing the activity correctly (intervened		

only for health and safety reasons).		
Implemented the evidence gathering process and ensured its validity, reliability, fairness and flexibility.		
Collected appropriate evidence and matched relevance to the elements, performance criteria, range of variables and evidence guide in the relevant units of competency.		
Explained the results reporting procedure to the candidate.		
Encouraged candidates to seek clarifications if in doubt about the pre- and post-assessment activity procedures.		
Asked candidates for feedback on the assessment.		
Explained legal, health and safety, and ethical issues, if applicable.		
After the assessment I have:		
Provided feedback on the assessment decision. This includes the following: ▪ clear and constructive feedback on the assessment decision ▪ information on ways of addressing any identified gaps in competency revealed by the assessment ▪ opportunity to discuss the assessment process and outcome ▪ information on reassessment process (if necessary) ▪ information on appeal (if necessary)		
Prepared the necessary assessment reports. This includes the following: ▪ record the assessment decision using the prescribed rating sheet ▪ maintain records of the assessment procedures, evidence collected and assessment decision ▪ endorse assessment decision to BTEB ▪ prepare recommendations for the issuance of certificate		
Thanked candidate for participating in the assessment.		

Assessment Evidence Guide

The purpose of assessment is to confirm that an individual can perform to the standards expected by in the workplace, as expressed in the competency standards.

To attain the certificate of **Mechanical Fitting**, a candidate must demonstrate competent skill and knowledge in all the units of competency listed below. Upon successful completion of all assessment activities, a candidate shall be awarded with a certificate.

CODE	UNIT OF COMPETENCY
Generic Competencies	
SEIP-LE-MF-01-G	Use basic mathematical concepts
SEIP-LE-MF-02-G	Carry out workplace interaction
SEIP-LE-MF-03-G	Operate in a team environment
SEIP-LE-MF-04-G	Apply basic IT skills
Sector-specific Competencies	
SEIP-LE-MF-01-S	Apply occupational health and safety (OHS) practice in the workplace
SEIP-LE-MF-02-S	Read and interpret sketches and drawings
SEIP-LE-MF-03-S	Use hand and power tools
SEIP-LE-MF-04-S	Apply quality system
Occupation-specific Competencies	
SEIP-LE-MF-01-O	Perform basic workshop practice
SEIP-LE-MF-02-O	Perform gas cutting and welding works
SEIP-LE-MF-03-O	Fabricate simple mechanical components
SEIP-LE-MF-04-O	Carry out bearing and seal maintenance and servicing
SEIP-LE-MF-05-O	Carry out drive component maintenance and servicing

Assessment Evidence Plan

An assessment evidence plan is a document that assists in establishing what evidence needs to be collected by the assessor to ensure that the candidate meets all the appropriate requirements of the competency standard. It usually contains a record of:

- evidence requirements as set out in the competency standard
- who will collect the evidence
- time period needed to collect the evidence

Occupation:	Mechanical Fitting					
Unit Name:	Use basic mathematical concepts					
Unit Code:	SEIP-LE-MF-01-G					
Assessment Method:	**P**	**O**	**W**			
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*			
Element	**Performance Criteria**			**P**	**O**	**W**
1. Identify calculation requirements in the workplace	**1.1.** Calculation requirements are identified from workplace information.			√		√
	1.2. Mathematical problems are constructed from workplace.			√		
2. Select appropriate mathematical methods/concepts for the calculation	**2.1.** Appropriate method is selected to carry out calculation requirements.			√		√
	2.2. Constructed mathematical problems are solved with appropriate method.			√		√
3. Use tools and instrument to perform calculations	**3.1.** Tools and instruments required for computation are identified.			√		√
	3.2. Calculation is performed using appropriate tools and equipment accurately.			√		√

Occupation:	Mechanical Fitting					
Unit Name:	Carry out workplace interaction					
Unit Code:	SEIP-LE-MF-01-G					
Assessment Method:	**P**	**O**	**W**			
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*			
Element	**Performance Criteria**			**P**	**O**	**W**
1. Interpret workplace communication and	**1.1.** Workplace codes of conduct are interpreted as per organisational guidelines.				√	

etiquette	**1.2.** Appropriate lines of communication are maintained with supervisors and colleagues.	√		
	1.3. Workplace interactions are conducted in a courteous manner to gather and convey information.	√	√	
	1.4. Workplace procedures and matters are comprehended.	√		
2. Read and understand workplace documents	**2.1.** Workplace documents are interpreted correctly.	√		
	2.2. Visual information/symbols/signage are understood correctly and followed.	√		
	2.3. Specific and relevant information are accessed from appropriate sources.	√		
	2.4. Appropriate medium is used to transfer information and ideas.	√		
3. Participate in workplace meetings and discussions	**3.1.** Team meetings are attended on time.		√	
	3.2. Meeting procedures and etiquette are followed.		√	
	3.3. Active participation is ensured, opinions are expressed and heard.	√		
	3.4. Inputs are provided and interpreted in line with the meeting purpose.	√		
4. Practice professional ethics at work	**4.1.** Responsibilities as a team member are performed.	√		
	4.2. Tasks are performed in accordance with workplace procedures.	√		
	4.3. Confidentiality is maintained.	√		
	4.4. Inappropriate and conflicting situations are avoided.		√	

Occupation:	Mechanical Fitting				
Unit Name:	Operate in a team environment				
Unit Code:	SEIP-LE- MF -03-G				
Assessment Method:	**P**	**O**	**W**		
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*		
Element	**Performance Criteria**			**P**	**O**	**W**
1. Identify team goals and work processes	**1.1.** Roles and objectives of the team are identified and interpreted.				√	
	1.2. Roles and responsibilities of team members are					√

	identified and interpreted.			
2. Identify own role and responsibilities within team	**2.1.** Personal role and responsibilities are identified within the team environment.	√		
	2.2. Reporting relationships are interpreted within team and external to team.		√	
3. Communicate and co-operate with team members	**3.1.** Other teammates' tasks are identified and support provided when requested.	√		
	3.2. The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	√		
	3.3. Views and opinions of other team members are interpreted and respected.	√	√	
4. Practice problem solving within the team	**4.1.** Problems faced at the individual and team level are identified and showed insight into the root-causes of the problems.			√
	4.2. A range of solutions and courses of action are identified together with benefits, costs, and risks associated with each.			√
	4.3. The good ideas of others to help develop solutions are recognised and advice sought from those who have solved similar problems.			√
	4.4. It is looked beyond the obvious and not stopped at the first answers.		√	

Occupation:	Mechanical Fitting		
Unit Name:	Apply basic IT skills		
Unit Code:	SEIP-LE-MF-04-G		
Assessment Method:	**P**	**O**	**W**
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*

Element	**Performance Criteria**	**P**	**O**	**W**
1. Identify and use most commonly used IT tools	**1.1.** History of information technology (IT) is identified and summarised.		√	√
	1.2. Commonly used IT tools are identified and described.		√	
2. Understand use of computer	**2.1.** Basic parts of a computer are identified.		√	
	2.2. Turning on and off technique of a computer is performed.	√		
	2.3. Working environment, functions and features of operating system is interpreted.		√	

	2.4. Simple trouble-shooting techniques are applied.	√		
3. Work with word processing application	**3.1.** Word processing application appropriate to perform activity is operated.		√	
	3.2. Basic typing technique to document is applied.			√
	3.3. Word processing techniques to document are employed.		√	
	3.4. Personal CV writing using suitable word processing techniques is practiced.			√
	3.5. Saving and retrieving technique of a document is used.		√	
4. Work with spreadsheets	**4.1.** Spreadsheet working environment, functions and features are identified and interpreted.		√	
	4.2. Data entry on spreadsheet appropriate to perform activity is performed.		√	
	4.3. Data manipulation techniques to spreadsheet document are applied.			√
	4.4. Spreadsheet document is created and saved.		√	
5. Access email and search the internet	**5.1.** Use of email account in online environment is explained.		√	
	5.2. Writing and sending of workplace emails is completed.			√
	5.3. Different browsers to work online are identified and selected.		√	
	5.4. Browse different web portals and apply proper search techniques.		√	

Occupation:	Mechanical Fitting		
Unit Name:	Apply occupational health and safety (OHS) practice in the workplace		
Unit Code:	SEIP-LE-MF-01-S		
Assessment Method:	**P**	**O**	**W**
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*

Element	**Performance Criteria**	**P**	**O**	**W**
1. Identify OHS policies and procedures	**1.1.** OHS policies and safe operating procedures are interpreted.			√
	1.2. Safety signs and symbols are identified and followed.	√	√	
	1.3. Response, evacuation procedures and other contingency measures are interpreted correctly.		√	

2. Apply personal health and safety practices	**2.1.** OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	√		
	2.2. Common health issues are recognised.		√	
	2.3. Common safety issues are identified.	√		
3. Report hazards and risks	**3.1.** Hazards and risks are identified.	√		
	3.2. Hazards and risks assessment and controls are interpreted.	√		
4. Respond to emergencies	**4.1.** Respond to alarms and warning devices.		√	
	4.2. Emergency response plans and procedures are responded to.		√	
	4.3. First aid procedures during emergency situations are identified.		√	

Occupation:	Mechanical Fitting				
Unit Name:	Read and interpret sketches and drawings				
Unit Code:	SEIP-LE-MF-02-S				
Assessment Method:	**P**	**O**	**W**		
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*		
Element	**Performance Criteria**			**P**	**O**	**W**
1. Interpret information and specifications	**1.1.** Appropriate manuals for work activity are identified and collected.			√		
	1.2. Information and specifications in the manuals is interpreted and applied.			√		
2. Read and interpret sketches and drawings	**2.1.** Relevant sketches and drawings are identified for job requirement.			√		
	2.2. Key terms and abbreviations are identified and interpreted.			√		
	2.3. Signs and symbols are identified and interpreted.			√	√	
	2.4. Schedules, dimensions, sketches, drawings and specifications are correctly read and interpreted.			√		

Occupation:	Mechanical Fitting
Unit Name:	Use hand and power tools
Unit Code:	SEIP-LE-MF-03-S

Assessment Method:	P	O	W
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*

Element	Performance Criteria	P	O	W
1. Identify and inspect hand and power tools	**1.1.** Appropriate hand and power tools are identified.	√		
	1.2. Application of hand and power tools is recognised.		√	
	1.3. Usability of hand and power tools is checked and verified.	√		
2. Use hand tools properly and safely	**2.1.** Appropriate hand tools are selected.	√		
	2.2. Safety precautions are ensured before using hand tools.	√		
	2.3. Unsafe or faulty hand tools are identified and marked for repair.	√		
	2.4. Measuring tools are checked and calibrated before use.	√		
	2.5. Use hand tools properly and safely to perform work activity.	√		
3. Operate power tools properly and safely	**3.1.** Appropriate power tools are selected.	√		
	3.2. Power supply outlet and electrical cord are inspected and confirmed safe for use in accordance with established workplace safety requirements.	√		
	3.3. Safety precautions are ensured before using power tools in accordance with manufacturer's operating specification.	√		
	3.4. Proper sequence of operation applied for using power tools.	√		
	3.5. Unsafe or faulty power tools are identified and marked for repair.	√		
	3.6. Operate power tools properly and safely to perform work activity.	√		
4. Clean and maintain hand and power tools	**4.1.** Dust and foreign matter is removed from hand and power tools in accordance to workplace standards.	√		
	4.2. Condition of hand and power tools is checked after use and reported.	√		
	4.3. Appropriate lubricant is applied after use and prior to storage.	√		

	4.4. Measuring tools are checked and calibrated after use.	√		
	4.5. Defective hand and power tools are inspected and repaired or replaced.	√		
	4.6. Hand and power tools are stored and secured in accordance with workplace requirements.	√		

Occupation:	Mechanical Fitting		
Unit Name:	Apply quality system		
Unit Code:	SEIP-LE-MF-04-S		
Assessment Method:	**P**	**O**	**W**
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*

Element	**Performance Criteria**	**P**	**O**	**W**
1. Work within a quality system	**1.1.** Instructions and procedures are strictly followed in accordance with quality improvement system.	√		
	1.2. Duties are performed in accordance with demand of quality improvement system.	√		
	1.3. Defects are detected and reported according to standard operating procedures.	√		
	1.4. Quality service is ensured and delivered to customer in providing a product or service.	√		
2. Apply and monitor quality system improvement	**2.1.** Performance measurement systems are identified.	√		
	2.2. Specifications and standard operating procedure are identified and established.	√		
	2.3. Performance is assessed at regular intervals.	√		
	2.4. Defects are detected and reported to authority according to standard operating procedure.	√		
	2.5. Process improvement procedures are contributed to and implemented.	√		
	2.6. Improvement of internal/external customer and supplier relationships is contributed to.	√		
	2.7. Performance of operation or quality of product or service is monitored to ensure customer satisfaction.	√		
3. Apply standard procedures for each job	**3.1.** Concept of supplying product or service to meet the customer's requirements is understood and applied accordingly.	√		
	3.2. Responsibility is taken for quality of own work.	√		

	3.3. Quality system procedures for each job are followed.	√		
	3.4. Conformance to specification is ensured in every case at all situations.	√		

Occupation:	Mechanical Fitting					
Unit Name:	Perform basic workshop practice					
Unit Code:	SEIP-LE-MF-01-O					
Assessment Method:	**P**	**O**	**W**			
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*			
Element	**Performance Criteria**			**P**	**O**	**W**
1. Prepare for work	**1.1.** Specifications and instructions are read and interpreted.			√		
	1.2. Appropriate personal protective equipment (PPE) are identified and selected.			√		
	1.3. Job specific tools and equipment are identified and selected.			√		
2. Perform bench work	**2.1.** Bench working materials are collected in accordance with workplace specification			√		
	2.2. Bench working operations are performed in accordance with job specifications.			√		
	2.3. Work area, tools, equipment and materials are maintained and stored in accordance with standard operating procedure.			√		
3. Perform lathe machine operations	**3.1.** Lathe tools and equipment are selected and checked for functionality and working condition.			√		
	3.2. Work piece and lathe setting is carried out in accordance with job specifications			√		
	3.3. Lathe machine operations are carried out in accordance with job specifications and standard operating procedure.			√		
	3.4. Work area, tools, equipment and materials are maintained and stored in accordance with standard operating procedure.			√		
4. Apply heat treatment	**4.1.** Principles of heat treatment processes are identified and explained			√		
	4.2. Heat treatment tools and equipment are selected and checked for functionality and working condition			√		
	4.3. Heat treatment materials are prepared in accordance with job specifications			√		

	4.4. Heat treatment process is carried out in accordance with job requirements and standard operating procedure	√		
	4.5. Work area, tools, equipment and materials are maintained and stored in accordance with standard operating procedure.	√		

Occupation:	Mechanical Fitting				
Unit Name:	Perform gas cutting and welding works				
Unit Code:	SEIP-LE-MF-02-O				
Assessment Method:	**P**	**O**	**W**		
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*		
1. Prepare for work	**1.1.** Specifications and instructions are read and interpreted.			√	
	1.2. Appropriate personal protective equipment (PPE) are identified and selected.			√	
	1.3. Job specific tools and equipment are identified and selected.			√	
2. Carry out arc welding	**2.1.** Job specifications are interpreted in accordance with given welding plan/drawing.			√	
	2.2. Welding tools and equipment are selected as per job requirements.			√	
	2.3. Welding materials and electrodes are selected as per job requirements.			√	
	2.4. Welding joint, welding position and process are identified as per job requirement			√	
	2.5. Welding is performed in accordance with job specifications and standard operating procedure.			√	
3. Carry out gas cutting and welding	**3.1.** Gas cutting and welding tools, equipment are selected as per job requirements.			√	
	3.2. Gas cutting and welding materials are identified and prepared in accordance with job requirements			√	
	3.3. Fusion gas welding is performed in accordance with job specifications and standard operating procedure.			√	
	3.4. Welds are cleaned, checked for quality and weld defects are identified.			√	
	3.5. Gas cutting procedure is performed in accordance with job requirements and standard operating procedure.			√	
	3.6. Cutting defects are identified and corrective action			√	

	is taken in accordance with workplace procedure.			
	3.7. Cleaning and removing of slag on cut ends of material is performed.	√		
4. Perform brazing	**4.1.** Appropriate flame is set on the welding torch in accordance with required brazing application.	√		
	4.2. Suitable materials are brazed in accordance with job requirements.	√		
	4.3. Joints are brazed in accordance with job requirement	√		
	4.4. Appropriate brazing flux and brazing filler rods are used for brazing work.	√		√
	4.5. Brazed surface is cleaned, checked for quality and defects identified.	√		
5. Perform soldering	**5.1.** Soldering tools and equipment are selected as per requirements.	√		
	5.2. Soldering materials are identified and prepared.	√		
	5.3. Soldering process is carried out in accordance with job requirements and standard operating procedure.	√		
	5.4. Soldered surface is cleaned, checked for quality and defects rectified.	√		
6. Clean and maintain tools, equipment and machinery	**6.1.** Tools, equipment and machinery are cleaned and maintained.	√		
	6.2. Workplace is cleaned.	√		
	6.3. Waste materials are disposed of correctly.	√		
	6.4. Tools, equipment and machinery are stored safely pursuant to workplace guidelines.	√		

Occupation:	Mechanical Fitting		
Unit Name:	Fabricate simple mechanical components		
Unit Code:	SEIP-LE-MF-03-O		
Assessment Method:	**P**	**O**	**W**
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*

Element	**Performance Criteria**	**P**	**O**	**W**
1. Prepare for work	**1.1.** Specifications and instructions are read and interpreted.	√		
	1.2. Appropriate personal protective equipment (PPE) are identified and selected.	√		

	1.3. Job specific tools and equipment are identified and selected.	√		
2. Fabricate items	**2.1.** Materials as per job specifications and drawing are measured and marked.	√		
	2.2. Materials following standard operating procedure as per job requirement are cut/bent/rolled/grinded.	√		
	2.3. Fabricated items safely and securely as per job requirement are stored.	√		
3. Fix fabricated items	**3.1.** Work surface for fixing item as per job requirement are prepared	√		
	3.2. Work to repair/fix fabricated item as per job requirement are performed	√		
	3.3. Visual inspection of completed job, if necessary are carried out	√		
4. Clean and maintain tools, equipment and machinery	**4.1.** Tools, equipment and machinery are cleaned and maintained.	√		
	4.2. Workplace is cleaned.	√		
	4.3. Waste materials are disposed of correctly.	√		
	4.4. Tools, equipment and machinery are stored safely pursuant to workplace guidelines.	√		

Occupation:	Mechanical Fitting				
Unit Name:	Carry out bearing and seal maintenance and servicing				
Unit Code:	SEIP-LE-MF-04-O				
Assessment Method:	**P**	**O**	**W**		
	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*		
Element	**Performance Criteria**			**P**	**O**	**W**
1. Prepare for work	**1.1.** Specifications and instructions are read and interpreted.			√		
	1.2. Appropriate personal protective equipment (PPE) are identified and selected.			√		
	1.3. Job specific tools and equipment are identified and selected.			√		
2. Perform troubleshooting	**2.1.** Bearing classification and types of bearings are identified.			√		
	2.2. Properties and application of plain bearings are described.					√
	2.3. Properties and application of different types of					√

	roller bearings is explained.			
	2.4. Types of load experienced by bearings are identified and described.		√	
	2.5. Bearing load analysis is applied on bearing mounting.	√		
	2.6. Common bearing faults are identified.	√		
3. Maintain and service bearings	**3.1.** Tools, equipment and materials (bearing maintenance) are identified.	√		
	3.2. Bearing removal and mounting is carried out as per job requirement.	√		
	3.3. Bearing plays and clearances are applied during mounting as per job requirement and manufacturer's specification.	√		
	3.4. Lubricant is applied on bearings during mounting as per job requirement and manufacturer's specification.	√		
4. Maintain and service seals	**4.1.** Seal classification and types of seals are identified.	√		
	4.2. Common seal faults are identified.	√		
	4.3. Tools, equipment and materials (for seal maintenance) are identified and prepared.	√		
	4.4. Gasket and seals removal and installation is carried out as per job requirement.	√		
	4.5. Lubricant is applied on seals during mounting as per job requirement and manufacturer's specification.	√		
5. Maintain and service seals	**5.1.** Bearings are tested for correct operation as per job requirement and manufacturer's specification.	√		
	5.2. Seals are tested for proper as per job requirement and manufacturer's specification.	√		
6. Clean and maintain tools, equipment and machinery	**6.1.** Tools, equipment and machinery are cleaned and maintained.	√		
	6.2. Workplace is cleaned.	√		
	6.3. Waste materials are disposed of correctly.	√		
	6.4. Tools, equipment and machinery are stored safely pursuant to workplace guidelines.	√		

Occupation:	Mechanical Fitting		
Unit Name:	Carry out drive component maintenance and servicing		
Unit Code:	SEIP-LE-MF-05-O		
Assessment Method:		**O**	**W**

	Performance *(including demonstration and observation)*	Oral questioning	Written examination *(including short-answer, multiple choice, and true or false questions)*

Element	Performance Criteria	P	O	W
1. Prepare for work	**1.1.** Specifications and instructions are read and interpreted.	√		
	1.2. Appropriate personal protective equipment (PPE) are identified and selected.	√		
	1.3. Job specific tools and equipment are identified and selected.	√		
2. Perform troubleshooting	**2.1.** Operating principles of mechanical machines and their drive components are explained.	√		
	2.2. Types of mechanical drive are identified and described.	√		
	2.3. Types of machine motion transmission are identified and described.	√		
	2.4. Operational problems of mechanical drive components are identified and explained.			√
	2.5. Common faults of drive components are identified.	√		
3. Maintain and service drive components	**3.1.** Tools, equipment and materials are selected and checked for function and working condition.	√		
	3.2. Operating condition of drive components are checked as per manufacturer's specifications.	√		
	3.3. Installation of drive components is performed.	√		
	3.4. Alignment of drive components is checked and non-conformities rectified.	√		
	3.5. Level of drive is checked and non-conformities are rectified as per manufacturer's specifications.	√		
	3.6. Component replacement is carried out as per manufacturer's specifications.	√		
	3.7. Preventive maintenance is carried out as per manufacturer's specifications.	√		
4. Test drive components	**4.1.** Drive components are tested for correct operation.	√		
	4.2. Adjustments, if necessary, are carried out as per job requirements and manufacturer's specifications.	√		
5. Clean and maintain tools, equipment and machinery	**5.1.** Tools, equipment and machinery are cleaned and maintained.	√		
	5.2. Workplace is cleaned.	√		
	5.3. Waste materials are disposed of correctly.	√		

	5.4. Tools, equipment and machinery are stored safely pursuant to workplace guidelines.	√		

PART B – THE CANDIDATE

Instructions to Candidate

To be assessed as competent, you must provide evidence which demonstrates that you can perform to the necessary standard the various elements of this unit of competency that comprise of the Certificate in Mechanical Fitting. Assessment of competency requires you to consistently demonstrate skill, knowledge and aptitude (through a variety of assessment tools such as multiple choice, short-answer questions, oral questioning, workplace observation, and practical demonstration) that enables confident completion of workplace tasks in a variety of situations.

In judging the evidence, your assessor must ensure that the evidence is:

- authentic (your own work)
- valid (directly related to the current version of the units of competency)
- reliable (consistently demonstrates of your knowledge and skill)
- current (shows your current capacity to perform the work)
- sufficient (covers the full range of elements comprised within the units of competency)

Furthermore, the assessment process must:

- provide for valid, reliable, flexible and fair assessment
- provide for judgment to be made on the basis of sufficient evidence
- offer valid, authentic and current evidence
- include workplace requirements

There are two types of assessment:

1. Knowledge Assessment - is designed to enable assessment against the various *elements* contained within the units of competency through a variety of activities such as multiple choice, short-answer questions, oral questioning. It is essentially examining your theoretical knowledge.

   This provides the assessor with substantial evidence of your knowledge and aptitude to perform the work relating to the specific unit of competency, in conjunction with other assessment tools such as workplace observation.

   You should complete the knowledge assessment as directed by the assessor and follow all instructions as and when given. If you are unable to complete the knowledge assessment, please speak to the assessor about alternative assessment solutions.

2. Skill Assessment - is designed to enable assessment against the various *performance criteria* contained within the units of competency through, for example, demonstration of skill in a simulated or actual work environment. In essence, it is an examination of your practical ability.

   This provides the assessor with substantial evidence of your ability to perform the work relating to the specific unit of competency to the standard expected by industry (the benchmark).

   You should complete the skill assessment as directed by the assessor and follow all instructions as and when given, ensuring your own health and safety.

Once you have been assessed as competent against all of the units of competency comprising of the qualification being undertaken, you will be awarded your certificate.

You assessor will discuss in more detail the requirements for assessment for each unit of competency at the appropriate time.

And please do not panic if you are not assessed as competent on any part of your qualification at your first attempt. Your assessor will discuss with you any identified skill and knowledge gaps, work through those with you and assist you as much as possible in attaining competency.

Self-Assessment Guide

Before undertaking any assessment, you should review the list of skills, knowledge and aptitudes relating to the assessment (drawn from the units of competency, its various elements and performance criteria) to determine whether you have current competency in these areas.

If you believe you can demonstrate the skills and knowledge required and can successfully complete the various assessment activities, you should then proceed to discuss your assessment with the assessor and complete Assessment Agreement.

However, should you not believe, for whatever reason, that you are not able to successfully complete the various assessment activities, then speak with the assessor. The assessor will assist you in identifying any skill and knowledge gaps, work through those with you and assist you as much as possible in attaining competency.

Please complete the self-assessment checklist below and discuss with the assessor.

Qualification:	**Mechanical Fitting**
Units of competency:	**Generic units:** Use basic mathematical concepts Carry out workplace interaction Operate in a team environment Apply basic IT skills **Sector-specific units:** Apply occupational health and safety (OHS) practice in the workplace Read and interpret sketches and drawings Use hand and power tools Apply quality system **Occupation-specific units:** Perform basic workshop practice Perform gas cutting and welding works Fabricate simple mechanical components Carry out bearing and seal maintenance and servicing Carry out drive component maintenance and servicing

Instructions:

- Read each of the questions in the left-hand column of the chart
- Place a tick (√) in the appropriate box opposite each question to indicate your answer

Can I?	**YES**	**NO**
▪ Identify calculation requirements from workplace information		
▪ Construct mathematical problems from workplace		
▪ Select appropriate method to carry out calculation requirement		

▪ Solve constructed mathematical problems with appropriate method		
▪ Identify tools and instruments required for computation		
▪ Perform calculation using appropriate tools and equipment		
▪ Interpret workplace codes of conduct as per organizational guidelines		
▪ Maintain appropriate lines of communication with supervisors and colleagues.		
▪ Conduct workplace interactions in a courteous manner to gather and convey information		
▪ Comprehend workplace procedures and matters		
▪ Interpret correctly workplace documents		
▪ Understand correctly and follow visual information/symbol/signage		
▪ Access specific and relevant information from appropriate sources		
▪ Use appropriate medium to transfer information and ideas		
▪ Attend team meetings on time to ensure active participation		
▪ Follow meeting procedures and etiquette		
▪ Ensure active participation, express and hear opinions		
▪ Respect opinions and ideas of others and their importance in the development of relationships		
▪ Provide and interpret inputs in line with the meeting purpose		
▪ Perform responsibilities as a team member		
▪ Perform tasks in accordance with workplace procedures		
▪ Maintain confidentiality		
▪ Avoid inappropriate and conflicting situations		
▪ Interpret roles and objectives of the team		
▪ Interpret roles and responsibilities of the team members		
▪ Identify personal role and responsibilities within the team environment		
▪ Interpret reporting relationships within team and external to team		
▪ Identify and provide support to other teammates' tasks		
▪ Encourage the team through sharing information or expertise, working together to solve problems putting team success first		
▪ Interpret and respect views and opinions of other team members		
▪ Identify problems faced at the individual and team level and shows insight into the root-causes of the problems		
▪ Identify a range of solutions and courses of action together with benefits, costs, and risks associated with each		
▪ Recognise the good ideas of others to help develop solutions and seek advice from those who've solved similar problems		
▪ Look beyond the obvious and not stop at the first answers		
▪ Identify and summarise history of information technology (IT)		

Identify and describe commonly used IT tools		
▪ Identify basic parts of a computer		
▪ Perform turning on and off technique of a computer		
▪ Interpret working environment, functions and features of operating system		
▪ Apply simple trouble-shooting techniques		
▪ Operate word processing application appropriate to perform activity		
▪ Apply basic typing technique to document		
▪ Employ word processing techniques to document		
▪ Practice personal CV writing using suitable word processing techniques		
▪ Use saving and retrieving techniques of a document		
▪ Explain use of email account in online environment		
▪ Complete writing and sending of workplace emails		
▪ Identify different browsers to work online		
▪ Browse different web portals and apply proper search techniques		
▪ Interpret OHS policies and safe operating procedures		
▪ Identify and follow safety signs and symbols		
▪ Interpret response, evacuation procedures and other contingency measures correctly		
▪ Apply OHS policies and procedures in the workplace including personal protective equipment (PPE)		
▪ Recognise common health issues		
▪ Identify common safety issues		
▪ Identify hazards and risks		
▪ Interpret hazards and risks assessment		
▪ Respond to alarms and warning devices		
▪ Respond to emergency response plans and procedures		
▪ Identify first aid procedures during emergency situations		
▪ Identify and collect appropriate manuals for work activity		
▪ Interpret and apply information and specifications in the manuals		
▪ Identify relevant sketches and drawings for job requirement		
▪ Identify and interpret key terms and abbreviations		
▪ Identify and interpret key terms and techniques		
▪ Read and interpret schedules, dimensions, sketches, drawings and specification correctly		
▪ Identify appropriate hand and power tools		
▪ Recognise application of hand and power tools		

▪ Read and interpret specifications and instructions		
▪ Identify and select appropriate personal protective equipment		
▪ Identify and select job specific tools and equipment.		
▪ Perform bench work		
▪ Select and check for functionality and working condition lathe tools and equipment are		
▪ Perform lathe machine operations		
▪ Identify and explain the principles of heat treatment processes		
▪ Select and check for functionality and working condition heat treatment tools and equipment		
▪ Prepared heat treatment materials in accordance with job specifications		
▪ Carried out heat treatment process in accordance with job requirements and standard operating procedure		
▪ Interpret Job specifications in accordance with given welding plan/drawing		
▪ Select welding tools and equipment as per job requirements		
▪ Select welding materials and electrodes as per job requirements		
▪ Identify welding joint, welding position and process as per job requirement		
▪ Perform welding in accordance with job specifications and standard operating procedure		
▪ Select gas cutting and welding tools, equipment as per job requirements		
▪ Identify gas cutting and welding materials and prepared in accordance with job requirements		
▪ Perform fusion gas welding in accordance with job specifications and standard operating procedure		
▪ Identify gas cutting defects and corrective action is taken in accordance with workplace procedure		
▪ Set appropriate flame on the welding torch in accordance with required brazing application		
▪ Brazed suitable materials in accordance with job requirements		
▪ Use appropriate brazing flux and brazing filler rods for brazing work		
▪ Select soldering tools and equipment as per requirements		
▪ Identify soldering materials and prepared		
▪ Carry out Soldering process in accordance with job requirements and standard operating procedure		
▪ Measure and mark materials as per job specifications and drawing		
▪ Cut/bend/roll/grind materials following standard operating procedure as per job requirement		
▪ Prepare work surface for fixing item as per job requirement		

▪ Perform work to repair/fix fabricated item as per job requirement		
▪ Carry out visual inspection of completed job, if necessary		
▪ Identify bearing classification and types of bearings		
▪ Explain properties and application of different types of plain and roller bearings		
▪ Identify and describe types of load experienced by bearings		
▪ Identify common bearing faults		
▪ Maintain and service bearings and seals		
▪ Test bearings for correct operation as per job requirement and manufacturer's specification		
▪ Test seals for proper as per job requirement and manufacturer's specification		
▪ Explain operating principles of mechanical machines and their drive components		
▪ Identify and describe types of mechanical drive		
▪ Identify and describe types of machine motion transmission		
▪ Identify and describe operational problems of mechanical drive components		
▪ Identify common faults of drive components		
▪ Maintain and service drive components		

I agree to undertake assessment in the knowledge that the information gathered will only be used for educational and professional development purposes and can only be accessed by concerned assessment personnel and my manager/supervisor.

Candidate's signature:		**Date:**	

PART C – THE ASSESSMENT

Assessment Agreement – Mechanical Fitting

The purpose of assessment is to confirm that you can perform to the standards expected in the workplace of an occupation, as expressed in the competency standards (after completion of self-assessment and in agreement with assessor).

To help achieve this, an assessment agreement is required to navigate both you and the assessor through the assessment process.

The assessment agreement is designed to provide a clear understanding of what and how you will be assessed and to nominate the tools that may be used to collect the assessment evidence.

You, the assessor and/or workplace supervisor should agree on the assessment requirements, dates and deadlines.

Therefore, to attain the Certificate of Mechanical Fitting, you must demonstrate competence in the following units, as established in the assessment agreement:

After successful completion of learning and assessment, you shall be awarded with a certificate.

CODE	UNIT OF COMPETENCY
Generic Competencies	
SEIP-LE-FM-01-G	Use basic mathematical concepts
SEIP-LE-FM-02-G	Carry out workplace interaction
SEIP-LE-FM-03-G	Operate in a team environment
SEIP-LE-FM-04-G	Apply basic IT skills
Sector-specific Competencies	
SEIP-LE-FM-01-S	Apply occupational health and safety (OHS) practice in the workplace
SEIP-LE-FM-02-S	Read and interpret sketches and drawings
SEIP-LE-FM-03-S	Use hand and power tools
SEIP-LE-FM-04-S	Apply quality system
Occupation-specific Competencies	
SEIP-LE-FM-01-O	Perform basic workshop practice
SEIP-LE-FM-02-O	Perform gas cutting and welding works
SEIP-LE-FM-03-O	Fabricate simple mechanical components
SEIP-LE-FM-04-O	Carry out bearing and seal maintenance and servicing
SEIP-LE-FM-05-O	Carry out drive component maintenance and servicing

After successful completion of learning and assessment, you shall be awarded with a certificate.

Assessment Agreement	
Occupation:	Mechanical Fitting
Assessment Centre:	
Candidate Name:	
Assessor Name:	
Unit of Competency	
Generic Competencies	
SEIP-LE-FM-01-G	Use basic mathematical concepts
SEIP-LE-FM-02-G	Carry out workplace interaction
SEIP-LE-FM-03-G	Operate in a team environment
SEIP-LE-FM-04-G	Apply basic IT skills
Sector-specific Competencies	
SEIP-LE-FM-01-S	Apply occupational health and safety (OHS) practice in the workplace
SEIP-LE-FM-02-S	Read and interpret sketches and drawings
SEIP-LE-FM-03-S	Use hand and power tools
SEIP-LE-FM-04-S	Apply quality system
Occupation-specific Competencies	
SEIP-LE-FM-01-O	Perform basic workshop practice
SEIP-LE-FM-02-O	Perform gas cutting and welding works
SEIP-LE-FM-03-O	Fabricate simple mechanical components
SEIP-LE-FM-04-O	Carry out bearing and seal maintenance and servicing
SEIP-LE-FM-05-O	Carry out drive component maintenance and servicing

Resources Required for Assessment

Candidates must have access to the following:

- copies of activities, questions, projects nominated by the assessor
- relevant organisational policies, protocols and procedural documents (if required)
- devices or tools to record answers
- appropriate actual or simulated workplace
- all necessary tools and equipment used in performance of the work-based task
- any other resources normally used in the workplace

Assessment Instructions

Candidates should respond to the formative and summative assessments either verbally or in writing as agreed with the assessor. Written responses can be recorded in the spaces provided (if more space is required attach additional pages) or submitted in a word-processed document.

If candidates answer verbally, the assessor should record their answers in detail.

Candidates should also undertake observable tasks that provide evidence of performance. The assessor must provide instruction to candidates on what is expected during observation and arrange a suitable time and location for demonstration of these skills.

Candidates must fully understand what they are required to do to complete these assessment tasks successfully, then sign the declaration.

Performance Standards
To receive a **satisfactory** result for the assessments, candidates must complete all activities, questions, projects, and tasks nominated by the assessor, to the required standard. Completion of all tasks for a unit of competency, to a satisfactory level, will contribute to an assessment of competence for that specific individual unit (or units if holistic assessment approach is taken). Successful completion of all the units of competency that comprise of the qualification Mechanical Fitting, will result in the candidate being issued with the relevant, nationally recognised certificate. Assessors must clearly explain the required performance standards.
Declaration
I declare that: ▪ the assessment requirements have been clearly explained to me ▪ all the work completed towards assessment will be my own ▪ cheating and plagiarism are unacceptable

Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

PART D – ASSESSMENT TOOLS

Specific Instructions to Assessor

Please read carefully and prepare as necessary:

1. The assessor shall (practical demonstration assessment activities):

   - provide the candidate with the necessary tools, equipment, machinery and materials for completion of one (1) set of the following practical demonstration activities:

     - Set A:

       - Make hexagonal nut and bolt using lathe machine
       - Perform arc welding for butt joint
       - Perform gas cutting, brazing and soldering
       - Maintain and service gear box and drive component

     Set B:

       - Make hexagonal nut and bolt using lathe machine
       - Perform arc welding for lap joint
       - Perform gas cutting, brazing and soldering
       - Maintain and service gear box and drive component

     - Set C:

       - Make hexagonal nut and bolt using lathe machine
       - Perform arc welding for tee joint
       - Perform gas cutting, brazing and soldering
       - Maintain and service gear box and drive component

   - provide the candidate with the copy of the specific instruction to candidate
   - allow each practical demonstration to be performed within two (2) hours including preparation of the materials
   - ensure that the candidate **FULLY** understands the instructions before proceeding to the performance of the assessment activity
   - allow fifteen (15) minutes for the candidate to familiarise themselves with the resources to be used during the practical demonstrations
   - ensure that the candidate is wearing appropriate personal protective equipment (PPE) before allowing them to proceed with the assessment activity

2. Assessment shall be based on the performance criteria in each of the units of competency. The evidence gathering method shall be comprised of:

   (a) Written Test (1 hour) – **knowledge evidence**

   (b) Practical Demonstration (8 hours) – **performance evidence**

   The practical demonstration activities will be divided into four (4) tasks (contained in one set):

   (i) Practical Demonstration 1 (2 hours)
   (ii) Practical Demonstration 2 (2 hours)
   (iii) Practical Demonstration 3 (2 hours)
   (iv) Practical Demonstration 4 (2 hours)

3. Final assessment is your responsibility as the accredited/certified assessor.

4. At the conclusion of each assessment activity, you will provide feedback to the candidate of the assessment result. The feedback will indicate whether the candidate is:

❑ **COMPETENT**

❑ **NOT YET COMPETENT**

5. The list of tools, equipment, machinery and materials to be provided for completion of the practical demonstration assessment activities can be found at:

Specific Instructions to Candidate

You should respond to the assessment either in writing or verbally as agreed with the assessor. Written responses can be recorded in the spaces provided; if more space is required attach additional pages) or submit a word-processed document.

If you answer verbally, the assessor should record your answers in detail. Please check your recorded answers carefully and thoroughly to ensure that they are accurate.

You may also be undertaking observable activities (i.e. practical demonstration) that provide evidence of performance. The assessor must provide you with clear instructions on what is expected during this type of assessment and arrange a suitable time and location for demonstration of these skills.

To receive a satisfactory result for the assessments, you must complete all of the assessment activities; including questions, projects and tasks nominated by the assessor, to the required standard.

This assessment is based upon the units of competency in Mechanical Fitting. Using the performance criteria as a benchmark, evidence will be gathered through:

1. Written Test (1 hour) – a variety of multiple-choice, true of false and short answer theory questions to support your competence with regard to the required knowledge (**knowledge evidence**).

2. Practical Demonstration (8 hours) – observable tasks outlined in the elements and performance criteria of the units of competency, completed to support a judgement of satisfactory performance to the required standard (**performance evidence**).

   There will be one (1) set of practical demonstration activities to complete. The assessor will direct you as to which 'set' you will be required to complete out of the following:

   - Set A:
     - Make hexagonal nut and bolt using lathe machine (2 hours)
     - Perform arc welding for butt joint (2 hours)
     - Perform gas cutting, brazing and soldering (2 hours)
     - Maintain and service gear box and drive component (2 hours)
   - Set B:
     - Make hexagonal nut and bolt using lathe machine (2 hours)
     - Perform arc welding for lap joint (2 hours)
     - Perform gas cutting, brazing and soldering (2 hours)
     - Maintain and service gear box and drive component (2 hours)
   - Set C:
     - Make hexagonal nut and bolt using lathe machine (2 hours)
     - Perform arc welding for tee joint (2 hours)
     - Perform gas cutting, brazing and soldering (2 hours)
     - Maintain and service gear box and drive component (2 hours)

3. The assessor will provide all necessary tools, equipment, machinery and materials required to complete each assessment activity.

4. These assessments cover all units of competency for Mechanical Fitting.

5. The assessor will provide you with feedback of your performance after completion of each assessment activity. This feedback shall indicate whether you are:

   ❑ **COMPETENT**

   ❑ **NOT YET COMPETENT**

6. Complete of all assessment activities, to a satisfactory level, will contribute to a final assessment of competence.

Written Test

WRITTEN TEST - INSTRUCTIONS	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Unit of Competency	
Generic Competencies	
SEIP-LE-MF-01-G	Use basic mathematical concepts
SEIP-LE-MF-02-G	Carry out workplace interaction
SEIP-LE-MF-03-G	Operate in a team environment
SEIP-LE-MF-04-G	Apply basic IT skills
Sector-specific Competencies	
SEIP-LE-MF-01-S	Apply occupational health and safety (OHS) practice in the workplace
SEIP-LE-MF-02-S	Read and interpret sketches and drawings
SEIP-LE-MF-03-S	Use hand and power tools
SEIP-LE-MF-04-S	Apply quality system
Occupation-specific Competencies	
SEIP-LE-MF-01-O	Perform basic workshop practice
SEIP-LE-MF-02-O	Perform gas cutting and welding works
SEIP-LE-MF-03-O	Fabricate simple mechanical components
SEIP-LE-MF-04-O	Carry out bearing and seal maintenance and servicing
SEIP-LE-MF-05-O	Carry out drive component maintenance and servicing
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	
Instructions:	
Read and understand the directions carefully: ▪ this written examination is based on the performance criteria from all the units of competency in Mechanical Fitting ▪ this assessment activity will be used to measure your underpinning knowledge ▪ write your answers on the paper provided ▪ answer all the questions as best as possible ▪ you have 1 (one) hour to complete this test	

WRITTEN TEST		
Multiple Choice		
This is a **multiple-choice** of test. Choose the appropriate answer and circle the letter that corresponds with your answer.		
1.	What is the appropriate wrench to use when it is an easy application over the fastener in a tight situation?	a. Open b. Box c. Adjustable d. Pipe
2.	What is a tool commonly found on the work bench, which is usually longer than 12 inches?	a. Scraper b. Bench ruler c. Architect ruler d. Hand drill
3.	Which of the following lathe operations requires the cutting edge of a tool bit to be placed exactly on the work centreline?	a. Boring b. Drilling c. Facing d. Turning
4.	How many grams of raw materials do you have in 25,000 kilograms?	a. 250,000,000 b. 250,000 c. 2,500,000 d. 25,000,000
5.	An adjustable metal device used for holding metal for forming or cutting is called a?	a. Sawhorse b. Chalk line c. Steel file d. Metal vise
6.	The distance from the centre of an arc to the tip of an electrode is called?	a. Distance b. Length c. Crater d. Depth
7.	What do you call the load of bearing carried by direct surface-to-surface contact?	a. Full film condition b. Boundary condition c. Dry condition d. None of the above
8.	Heat supplied to a workpiece in oxyfuel gas welding is _____ concentrated than that supplied in the electric arc welding.	a. Less b. Equally c. More d. None of the above
9.	Scribes and punches _____ alter the surface of the workpiece.	a. Chemically b. Physically c. Temporarily d. Atomically
10.	Hydrostatic bearings usually use _____ as lubricant.	a. Oil b. Grease c. Nothing d. Any of the above
True or False Quiz		

Tick (√) the box corresponding to the correct answer.		
11.	Polite words should be utilized when conducting official communication through email.	True ☐ False ☐
12.	Samira knows that she has a meeting by 9:00 in the morning. It is part of professional ethics to come to the meeting even if she is late by 1 hour. She has not turned up an hour and a half after the meeting was to commence. The team members will wait for her.	True ☐ False ☐
13.	Wearing PPE inside the production area for protects the worker and the production process.	True ☐ False ☐
Fill in the Missing Blanks		
Write the word or group of words needed to complete the following sentences.		
14.	Hydrostatic bearings usually use _____ as lubricant.	
15.	_____ is the appropriate thickness of metal sheet when it is used as a raw material for sheet metal operations.	
Short Answer		
Write a short answer in the space provided (not to exceed more than approximately twenty-five (25) words).		
16.	What surface temperature can most brazing alloys withstand?	
17.	What is the function of a gas welding torch?	
18.	Will a stainless-steel bearing protect against rust?	
19.	How can you determine if a bearing is failing?	
20.	Why are centrifugal pumps started with the discharge valve closed?	

Feedback to candidate:			
Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**			
Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Written Test - Answers

Answers are highlighted in **bold** and *italics*.

Multiple Choice		
1.	What is the appropriate wrench to use when it is an easy application over the fastener in a tight situation?	a. ***Open*** b. Box c. Adjustable d. Pipe
2.	What is a tool commonly found on the work bench, which is usually longer than 12 inches?	a. Scraper b. ***Bench ruler*** c. Architect ruler d. Hand drill
3.	Which of the following lathe operations requires the cutting edge of a tool bit to be placed exactly on the work centreline?	a. Boring b. Drilling c. ***Facing*** d. Turning
4.	How many grams of raw materials do you have in 25,000 kilograms?	a. 250,000,000 b. 250,000 c. 2,500,000 d. ***25,000,000***
5.	An adjustable metal device used for holding metal for forming or cutting is called a?	a. Sawhorse b. Chalk line c. Steel file d. ***Metal vise***
6.	The distance from the centre of an arc to the tip of an electrode is called?	a. Distance b. ***Length*** c. Crater d. Depth
7.	What do you call the load of bearing carried by direct surface-to-surface contact?	a. Full film condition b. Boundary condition c. ***Dry condition*** d. None of the above
8.	Heat supplied to a workpiece in oxyfuel gas welding is _____ concentrated than that supplied in the electric arc welding.	a. ***Less*** b. Equally c. More d. None of the above
9.	Scribes and punches _____ alter the surface of the workpiece.	a. Chemically b. ***Physically*** c. Temporarily d. Atomically
10.	Hydrostatic bearings usually use _____ as lubricant.	a. ***Oil*** b. Grease c. Nothing d. Any of the above

True of False Quiz		
11.	Polite words should be utilized when conducting official communication through email.	***True*** √ False ☐
12.	Samira knows that she has a meeting by 9:00 in the morning. It is part of professional ethics to come to the meeting even if she is late by 1 hour. She has not turned up an hour and a half after the meeting was to commence. The team members will wait for her.	*True* ☐ ***False*** √
13.	Wearing PPE inside the production area for protects the worker and the production process.	***True*** √ False ☐
Fill in the Missing Blanks		
14.	Hydrostatic bearings usually use ***oil*** as lubricant	
15.	***0.4 mm to 6 mm*** is the appropriate thickness of sheet metal when it is used as a raw material for sheet metal operations.	
Short Answer		
16.	What surface temperature can most brazing alloys withstand?	**The melting range for a brazing alloy is defined by the minimum temperature at which the alloy will start to melt ("solidus") and the temperature at which the alloy is 100% liquid ("liquidus"). For most purposes, the actual brazing temperature is 50°F to 200°F (30°C to 110°C) above the liquidus.**
17.	What is the function of a gas welding torch?	**In gas welding, a welding torch is mainly used for mixing oxygen and acetylene in the desired proportions. It is also used for burning the mixture at the end of the tip, and also provides a mean for moving and directing the flame front. Welding torch can be of high-pressure type or low-pressure type.**
18.	Will a stainless-steel bearing protect against rust?	**Not to the extent. Stainless steel is not rust proof. It is corrosion resistant and will rust in corrosive environments over time, but at a much slower rate than chrome alloy steel.**
19.	How can you determine if a bearing is failing?	**Three main indicators – excessive noise, heat, and/or vibration. If these are present more than expected, you can be certain that a bearing is failing.**
20.	Why are centrifugal pumps started with the discharge valve closed?	**A closed discharge valve at start up or shut down also prevents backflow from any static discharge head. Pumps that require less shut-off power and torque than at normal flow conditions are usually started**

		against a closed discharge valve.

Set A: Practical Demonstration 1

PRACTICAL DEMONSTRATION 1	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Make hexagonal nut and bolt using lathe machine
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have two (2) hours to complete this demonstration

Procedure:

- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time

Job Specification Information:

The minimum specification is:

(a) diameter of 50mm

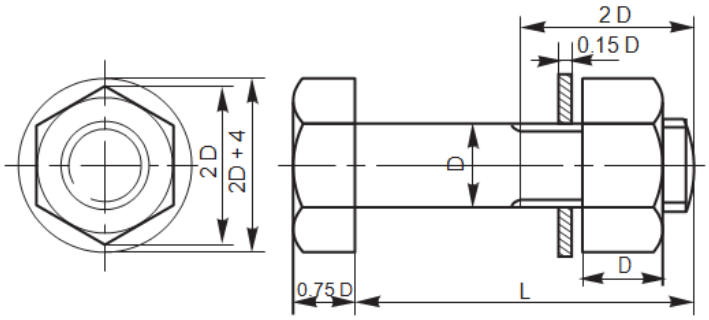
(b) length of 200mm

You will need to:

1. Identify, read and interpret job specifications, drawings and other workplace documents.
2. Identify and collect required tools, equipment and materials for task.
3. Inspect worksite for hazards and implement appropriate controls (if necessary).
4. Identify and collect appropriate PPE.
5. Calculate quantity of materials required as per job specification.
6. Perform measurements and calculations as per job specifications.
7. Inspect and check tools and equipment.
8. Inspect and check materials.
9. Identify quality/performance standard of work to be performed.
10. Set up work area and bench in accordance with job specifications.
11. Establish nominal nut size (use the Table for the Standard of Hex Thick Slotted Nuts).
12. Identify and calculate dimensions of nut.
13. Submit a sketch drawing of manufacturing specifications.
14. Request appropriate stock as per manufacturing specifications.

15. Cut length equivalent to 125% to 150% of nominal size.
16. File piece to proper size (height of the nut plus some more for finish up work).
17. Use blue dye and scribe to draw a hexagon on one end of the work piece.
18. File sides to create hexagon shaped nut.
19. Drill centre of nut and use tap to create a through hole thread.
20. Cut 50mm from smaller diameter rod.
21. Deburr it and use die set to create related bolt.
22. Apply appropriate heat treatment (if required).
23. Inspect tools and equipment for defects and faults
24. Record and report defects and faults as per standard operating procedure.
25. Repair or replace defective tools and equipment (if possible).
26. Clean, maintain and store tools and equipment.
27. Clean workplace and dispose of waste materials.

Drawing, Plan, Diagram or Sketch:



A hexagonal headed bolt with a nut and a washer in position

All dimensions are in mm [D=50 mm and L=200 mm]
Threads: UNC, 8UN, UNF, Metric Coarse & Fine Series

Resources Required:

Tools:	Single point tool File Clamp Die and tab Power drill (including drill bits) Calculator Work bench
Equipment:	N/A
Machinery:	Lathe machine
Materials:	Mild steel (AISI 1040 steel) Blue dye
PPE:	Apron Mask Gloves Safety shoes

Set A: Practical Demonstration 1 – Observation Checklist

PRACTICAL DEMONSTRATION 1 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Make hexagonal nut and bolt using lathe machine
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Selected appropriate type of lathe machine for the lathe operation.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Selected tool holding devices according to job requirements.	☐	☐
Calculated amount of materials required.	☐	☐
Selected and collected job materials in accordance with job requirements.	☐	☐

Read and interpreted drawings and job specifications.	☐	☐
Determined application of tools to job requirements.	☐	☐
Bench working operations are performed in accordance with job specifications.	☐	☐
Selected and use lathe accessories in accordance with the job requirements.	☐	☐
Selected cutting speed and feed rate in accordance with job specification.	☐	☐
Calculated RPM, cutting speed, feed rate and depth of cut in accordance with job requirement.	☐	☐
Checked machine performance in conformance with standard operating procedure.	☐	☐
Applied coolant to prevent over heating of work piece and cutting tool.	☐	☐
Performed basic lathe operations to produce component.	☐	☐
Performed corrective measures and/or adjustments.	☐	☐
Heat treatment process is carried out in accordance with job requirements and standard operating procedure.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐
Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐

Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		
Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**		
Candidate Signature:		**Date:**
Assessor Signature:		**Date:**

Set A: Practical Demonstration 2

PRACTICAL DEMONSTRATION 2	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform arc welding for butt joint
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have two (2) hours to complete this demonstration

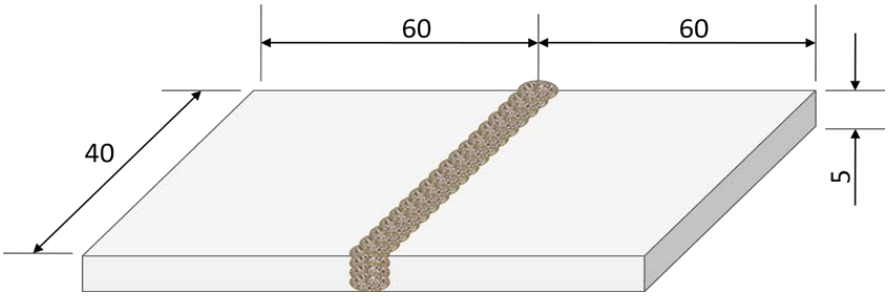
Procedure:

- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time

Job Specification Information:

1. Identify, read and interpret job specifications, drawings and other workplace documents.
2. Identify and collect required tools, equipment and materials for the task.
3. Inspect worksite for hazards and implement appropriate controls (if necessary).
4. Identify and collect appropriate PPE.
5. Inspect and check tools and equipment.
6. Calculate quantity of materials required as per job specification.
7. Inspect and check materials as per job specification.
8. Identify and confirm quality requirements.
9. Clean mild steel flats to be joined by wire brush.
10. Arrange flat pieces providing gap for full penetration for butt joint (gap ½ thickness of flats).
11. Set welding current and voltage.
12. Strike the arc and make tacks at the both ends to hold the metal pieces together.
13. Lay beads along joint maintaining proper speed and arc length (speed 100-150 mm/min).
14. Carry out welding as per job specifications.
15. Clean welded zone.
16. Clean, maintain and store tools and equipment.
17. Clean workplace and dispose of waste materials.

Drawing, Plan, Diagram or Sketch:



Resources Required:	
Tools:	Wire brush Tongs
Equipment:	Welding unit Protecting gas
Machinery:	N/A
Materials:	Mild steel (AISI 1040 steel) Mild steel wire Mild steel flats (140 x 25 x 5 mm)
PPE:	Apron Mask Gloves Safety shoes Safety goggles

Set A: Practical Demonstration 2 – Observation Checklist

PRACTICAL DEMONSTRATION 2 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform arc welding for butt join
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Calculated amount of materials required.	☐	☐
Selected and collected job materials in accordance with job requirements.	☐	☐
Read and interpreted drawings and job specifications.	☐	☐
Determined application of tools to job requirements.	☐	☐
Identified welding joint, position and process as per job	☐	☐

requirement.		
Set welding current and voltage.	☐	☐
Maintained correct gap between flat pieces.	☐	☐
Maintained proper arc speed and length.	☐	☐
Carried out welding as per standard operating procedure.	☐	☐
Performed butt joint weld as per job specifications.	☐	☐
Cleaned and checked weld for quality and identified defects.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐
Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐
Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		

Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**			
Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Set A: Practical Demonstration 3

PRACTICAL DEMONSTRATION 3	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform gas cutting, brazing and soldering
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have one (2) hours to complete this demonstration

Procedure:

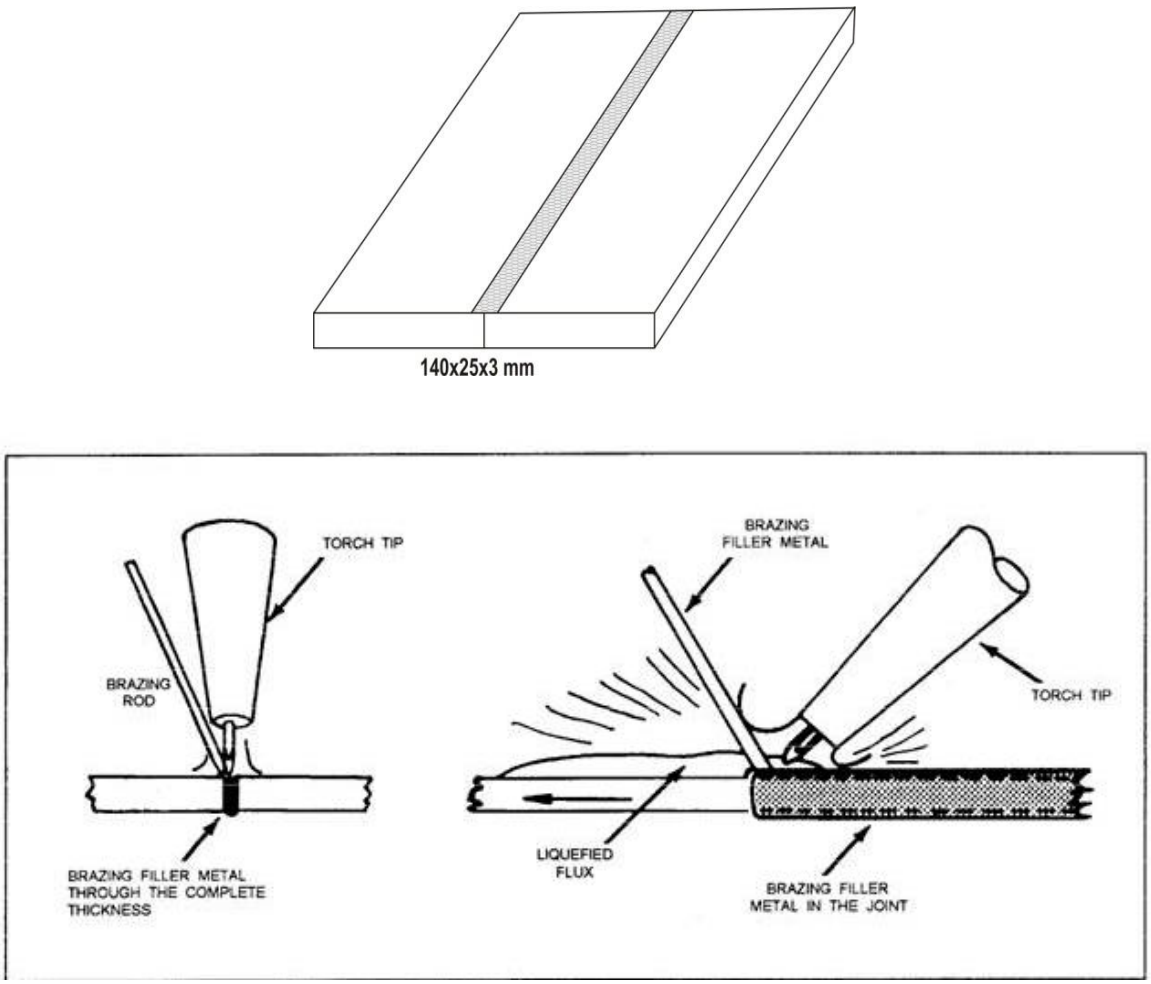
- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time

Job Specification Information:

1. Identify, read and interpret job specifications, drawings and other workplace documents.
2. Identify and collect required tools, equipment and materials for the task.
3. Inspect worksite for hazards and implement appropriate controls (if necessary).
4. Identify and collect appropriate PPE.
5. Inspect and check tools and equipment.
6. Calculate quantity of materials required as per job specification.
7. Inspect and check materials as per job specification.
8. Identify and confirm quality requirements.
9. Clean mild steel strip removing the oxide layer and flatten it.
10. Carry out gas cutting of mild steel strip as per job specifications.
11. Identify cutting defects and take corrective action (if needed).
12. Clean and remove slag on cut ends.
13. Keep the metal strip in butt position.
14. Tack at the two ends.
15. Lay brazing metal at joint maintaining proper speed and feed.
16. Carry out brazing as per job requirements.
17. Perform soldering as per standard operating procedure.
18. Clean and check joint for quality and defects.
19. Rectify any identified defects.

20. Clean, maintain and store tools and equipment.
21. Clean workplace and dispose of waste materials.

Drawing, Plan, Diagram or Sketch:



Resources Required:

Tools:	Wire brush Tongs
Equipment:	Gas welding set Soldering set
Machinery:	N/A
Materials:	Mild steel strips (140 x 25 x 3 mm) Brazing wire Fluxes Filler rods
PPE:	Apron Mask Gloves Safety shoes Safety goggles

Set A: Practical Demonstration 3 – Observation Checklist

PRACTICAL DEMONSTRATION 3 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform gas cutting, brazing and soldering
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Calculated amount of materials required.	☐	☐
Selected and collected job materials in accordance with job requirements.	☐	☐
Determined application of tools to job requirements.	☐	☐
Identified welding joint, position and process as per job requirement.	☐	☐

Carried out gas cutting as per standard operating procedure.	☐	☐
Identified cutting defects and took corrective action.	☐	☐
Clean and removed slag from cut ends.	☐	☐
Set flame on welding torch as per brazing requirements.	☐	☐
Used appropriate brazing flux and filler rods.	☐	☐
Performed brazing as per job specifications.	☐	☐
Cleaned and checked brazed surface for quality and identified defects.	☐	☐
Carried out soldering as per standard operating procedure.	☐	☐
Cleaned and checked soldered surface for quality and identified defects.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐
Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐
Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		

Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**			
Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Set A: Practical Demonstration 4

PRACTICAL DEMONSTRATION 4	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Maintain and service gear box and drive component
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have two (2) hours to complete this demonstration

Procedure:

- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time
- observe and follow all health and safety (OHS) requirements at all times

Job Specification Information:

To maximize the operating life of your industrial gearboxes and drive components, regular inspections and maintenance are an essential aspect.

1. Rating: Check the gearbox to ensure it is operating within its manufacture specification of both mechanical and thermal ratings. On many occasions, gearboxes are put into an application beyond their design specification and are being driven by increased input power than the maximum recommended, which will cause a breakdown, eventually.
2. Housekeeping: Often times, gearboxes operate in dirty environments. While this is typically unavoidable, it's important to minimize the effects of the workplace environment. This could result in an increased operating temperature of the gearbox or even possible contamination into the gearbox. Therefore, industrial gearboxes should be regularly cleaned.
3. Shaft Seals: Check for oil leaks at the input and output shaft of your gearbox. Leaks indicate the seals have failed, which can allow the ingestion of dust, debris and water from the environment, causing a loss of lubrication. This is catastrophic where your gearbox is concerned.
4. Breather: Water, dust and debris should not be permitted to be ingested into the gearbox through the breather. They should be of the correct type and style and kept clean at all times allowing the gearbox to breathe with ease.
5. Lubrication: Lubrication should be followed to the gearbox manufactures specification for type, grade and quantity. Regular maintenance should be carried out to the gearbox manufacturer's recommendations with special attention to lubrication.
6. Temperature Check: Look for signs of overheating, discoloured or burnt exterior paint or dark oil in

the sight glass. Monitor the gearbox temperature on a regular basis observing for any sudden changes in temperature using an infrared temperature gun. If you don't have this capability, find a gearbox repair specialist that does – ASAP!

7. Gear Wear/Contacts: Inspect the internal gears by removing the inspection covers or with the aid of an endoscope. Look for signs of wear and tear in the form of pitting and spalling (material from the surface of gear tooth flanks being removed). Be sure and check the contacts between gear teeth for misalignment, which could be indicative of wear with the bearings or bearing housings.
8. Backlash and Shaft End-play: Check for any increase in backlash between the mesh of the gears as well as any increase in the end-play or lift at the input and output shafts. An increase in backlash could be an indication of wear in gear teeth, which is not always visible to the naked eye. An increase in shaft end play or lift would indicate wear within the rolling elements of the bearings or even wear in the bearing housings.
9. Vibration Analysis: Many gearboxes operate in a noisy environment and on occasion, variation or increase in noise from a gearbox cannot always be recorded. Regular Vibration Analysis of the internal bearings and gears will confirm any significant changes in the condition of the internals of the gearbox and help prevent any unplanned loss of production.

Drawing, Plan, Diagram or Sketch:

Resources Required:

Tools:	Combination wrenches Socket wrenches Open-ended wrenches Adjustable wrench Screwdrivers Ball peen hammer Rubber/plastic hammer Rubber mallet Mechanical pliers Vice grip Bearing sleeves Drift punch Bearing puller Seal puller Spirit level Piano wire
Equipment:	Bearing heater Mandrel

	Hydraulic press Drill press Portable grinder Oxy-acetylene welding outfit Pneumatic torque wrench Bench
Machinery:	Pumps
Materials:	Bearings Seals Welding rod O-rings Lubricating oil Grease Cotton rag Cleaning solvent
PPE:	Apron Mask Gloves Safety shoes

Set A: Practical Demonstration 4 – Observation Checklist

PRACTICAL DEMONSTRATION 4 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Maintain and service gear box and drive component
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Identified types and classifications of bearings and seals.	☐	☐
Applied bearing load analysis on bearing mounting.	☐	☐
Identified common bearing and seal faults.	☐	☐
Carried out bearing removal and mounting as per job requirement.	☐	☐
Applied bearing plays and clearances during mounting as per	☐	☐

job requirement and manufacturer's specification.		
Applied lubricant on bearings and seals during mounting as per job requirement and manufacturer's specification.	☐	☐
Carried out removal and installation of gaskets and seals as per job requirement.	☐	☐
Tested bearings and seals for correct operation as per job requirement and manufacturer's specification.	☐	☐
Identified operating principles of mechanical machines and their drive components.	☐	☐
Identified types of mechanical drive and machine motion transmission.	☐	☐
Established operational problems of mechanical drive components.	☐	☐
Checked operating condition of drive components and identified common faults.	☐	☐
Installed drive components as per job requirements.	☐	☐
Carried out alignment of drive components and checked level of drive.	☐	☐
Replaced components as per manufacturer's specifications.	☐	☐
Carried out preventive maintenance.	☐	☐
Tested drive components for correct operation.	☐	☐
Performed any necessary adjustments as per job requirements.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐

Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐
Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐

Feedback to candidate:

Assessment decision for this assessment activity:

☐ **Competent** ☐ **Not Yet Competent**

Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Set B: Practical Demonstration 1

PRACTICAL DEMONSTRATION 1	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Make hexagonal nut and bolt using lathe machine
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have two (2) hours to complete this demonstration

Procedure:

- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time

Job Specification Information:

The minimum specification is:

(a) diameter of 50mm

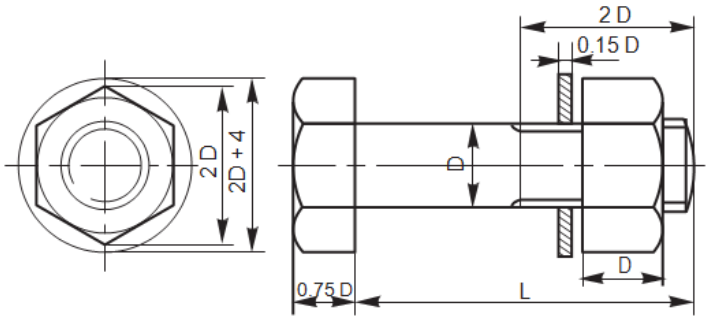
(b) length of 200mm

You will need to:

1. Identify, read and interpret job specifications, drawings and other workplace documents.
2. Identify and collect required tools, equipment and materials for task.
3. Inspect worksite for hazards and implement appropriate controls (if necessary).
4. Identify and collect appropriate PPE.
5. Calculate quantity of materials required as per job specification.
6. Perform measurements and calculations as per job specifications.
7. Inspect and check tools and equipment.
8. Inspect and check materials.
9. Identify quality/performance standard of work to be performed.
10. Set up work area and bench in accordance with job specifications.
11. Establish nominal nut size (use the Table for the Standard of Hex Thick Slotted Nuts).
12. Identify and calculate dimensions of nut.
13. Submit a sketch drawing of manufacturing specifications.
14. Request appropriate stock as per manufacturing specifications.

15. Cut length equivalent to 125% to 150% of nominal size.
16. File piece to proper size (height of the nut plus some more for finish up work).
17. Use blue dye and scribe to draw a hexagon on one end of the work piece.
18. File sides to create hexagon shaped nut.
19. Drill centre of nut and use tap to create a through hole thread.
20. Cut 60mm from smaller diameter rod.
21. Deburr it and use die set to create related bolt.
22. Apply appropriate heat treatment (if required).
23. Inspect tools and equipment for defects and faults
24. Record and report defects and faults as per standard operating procedure.
25. Repair or replace defective tools and equipment (if possible).
26. Clean, maintain and store tools and equipment.
27. Clean workplace and dispose of waste materials.

Drawing, Plan, Diagram or Sketch:



A hexagonal headed bolt with a nut and a washer in position

All dimensions are in mm [D=60 mm and L=250 mm]
Threads: UNC, 8UN, UNF, Metric Coarse & Fine Series

Resources Required:

Tools:	Single point tool File Clamp Die and tab Power drill (including drill bits) Calculator Work bench
Equipment:	N/A
Machinery:	Lathe machine
Materials:	Mild steel (AISI 1040 steel) Blue dye
PPE:	Apron Mask Gloves Safety shoes

Set B: Practical Demonstration 1 – Observation Checklist

PRACTICAL DEMONSTRATION 1 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Make hexagonal nut and bolt using lathe machine
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Selected appropriate type of lathe machine for the lathe operation.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Selected tool holding devices according to job requirements.	☐	☐
Calculated amount of materials required.	☐	☐
Selected and collected job materials in accordance with job requirements.	☐	☐

Read and interpreted drawings and job specifications.	☐	☐
Determined application of tools to job requirements.	☐	☐
Bench working operations are performed in accordance with job specifications.	☐	☐
Selected and use lathe accessories in accordance with the job requirements.	☐	☐
Selected cutting speed and feed rate in accordance with job specification.	☐	☐
Calculated RPM, cutting speed, feed rate and depth of cut in accordance with job requirement.	☐	☐
Checked machine performance in conformance with standard operating procedure.	☐	☐
Applied coolant to prevent over heating of work piece and cutting tool.	☐	☐
Performed basic lathe operations to produce component.	☐	☐
Performed corrective measures and/or adjustments.	☐	☐
Heat treatment process is carried out in accordance with job requirements and standard operating procedure.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐
Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐

Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		
Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**		
Candidate Signature:		**Date:**
Assessor Signature:		**Date:**

Set B: Practical Demonstration 2

PRACTICAL DEMONSTRATION 2	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform arc welding for lap joint
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have two (2) hours to complete this demonstration

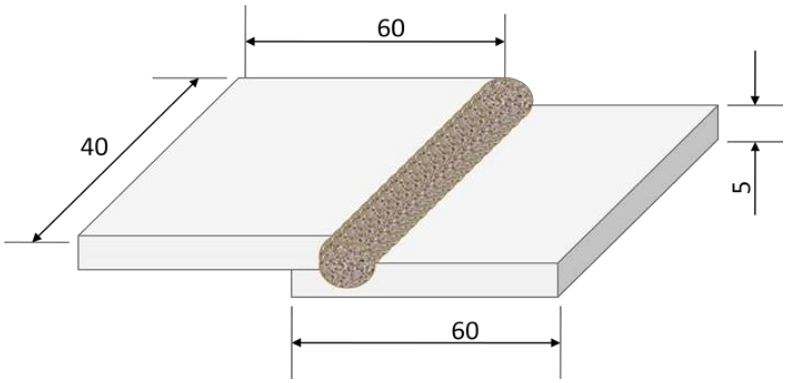
Procedure:

- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time

Job Specification Information:

1. Identify, read and interpret job specifications, drawings and other workplace documents.
2. Identify and collect required tools, equipment and materials for the task.
3. Inspect worksite for hazards and implement appropriate controls (if necessary).
4. Identify and collect appropriate PPE.
5. Inspect and check tools and equipment.
6. Calculate quantity of materials required as per job specification.
7. Inspect and check materials as per job specification.
8. Identify and confirm quality requirements.
9. Clean mild steel flats to be joined by wire brush.
10. Arrange flat pieces providing gap for full penetration for lap joint (gap ½ thickness of flats).
11. Set welding current and voltage.
12. Strike the arc and make tacks at the both ends to hold the metal pieces together.
13. Lay beads along joint maintaining proper speed and arc length (speed 100-150 mm/min).
14. Carry out welding as per job specifications.
15. Clean welded zone.
16. Clean, maintain and store tools and equipment.
17. Clean workplace and dispose of waste materials.

Drawing, Plan, Diagram or Sketch:



All dimensions are in mm

Resources Required:	
Tools:	Wire brush Tongs
Equipment:	Welding unit Protecting gas
Machinery:	N/A
Materials:	Mild steel (AISI 1040 steel) Mild steel flats (140 x 25 x 5 mm) Consumable mild steel wire
PPE:	Apron Mask Gloves Safety shoes Safety goggles

Set B: Practical Demonstration 2 – Observation Checklist

PRACTICAL DEMONSTRATION 2 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform arc welding for lap joint
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Calculated amount of materials required.	☐	☐
Selected and collected job materials in accordance with job requirements.	☐	☐
Read and interpreted drawings and job specifications.	☐	☐
Determined application of tools to job requirements.	☐	☐
Identified welding joint, position and process as per job	☐	☐

requirement.		
Set welding current and voltage.	☐	☐
Maintained correct gap between flat pieces.	☐	☐
Maintained proper arc speed and length.	☐	☐
Carried out welding as per standard operating procedure.	☐	☐
Performed lap joint weld as per job specifications.	☐	☐
Cleaned and checked weld for quality and identified defects.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐
Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐
Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		

Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**			
Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Set B: Practical Demonstration 3

PRACTICAL DEMONSTRATION 3	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform gas cutting, brazing and soldering
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have one (2) hours to complete this demonstration

Procedure:

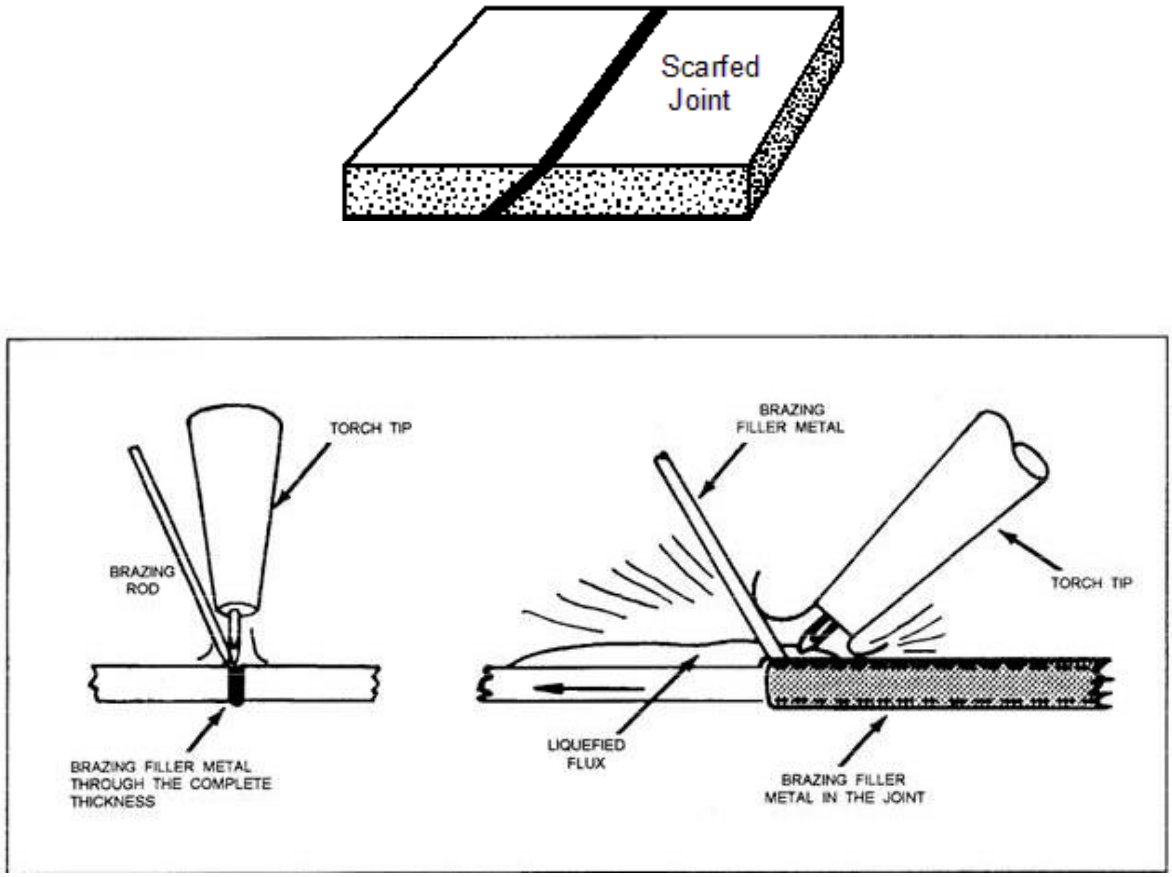
- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time

Job Specification Information:

1. Identify, read and interpret job specifications, drawings and other workplace documents.
2. Identify and collect required tools, equipment and materials for the task.
3. Inspect worksite for hazards and implement appropriate controls (if necessary).
4. Identify and collect appropriate PPE.
5. Inspect and check tools and equipment.
6. Calculate quantity of materials required as per job specification.
7. Inspect and check materials as per job specification.
8. Identify and confirm quality requirements.
9. Clean mild steel strip removing the oxide layer and flatten it.
10. Carry out gas cutting of mild steel strip as per job specifications.
11. Identify cutting defects and take corrective action (if needed).
12. Clean and remove slag on cut ends.
13. Keep the metal strip in butt position.
14. Tack at the two ends.
15. Lay brazing metal at joint maintaining proper speed and feed.
16. Carry out brazing as per job requirements.
17. Perform soldering as per standard operating procedure.
18. Clean and check joint for quality and defects.
19. Rectify any identified defects.

20. Clean, maintain and store tools and equipment.
21. Clean workplace and dispose of waste materials.

Drawing, Plan, Diagram or Sketch:



Resources Required:

Tools:	Wire brush Tongs
Equipment:	Gas welding set Soldering set
Machinery:	N/A
Materials:	Mild steel strips (140 x 25 x 3 mm) Brazing wire Fluxes Filler rods
PPE:	Apron Mask Gloves Safety shoes Safety goggles

Set B: Practical Demonstration 3 – Observation Checklist

PRACTICAL DEMONSTRATION 3 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform gas cutting, brazing and soldering
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Calculated amount of materials required.	☐	☐
Selected and collected job materials in accordance with job requirements.	☐	☐
Determined application of tools to job requirements.	☐	☐
Identified welding joint, position and process as per job requirement.	☐	☐

Carried out gas cutting as per standard operating procedure.	☐	☐
Identified cutting defects and took corrective action.	☐	☐
Clean and removed slag from cut ends.	☐	☐
Set flame on welding torch as per brazing requirements.	☐	☐
Used appropriate brazing flux and filler rods.	☐	☐
Performed brazing as per job specifications.	☐	☐
Cleaned and checked brazed surface for quality and identified defects.	☐	☐
Carried out soldering as per standard operating procedure.	☐	☐
Cleaned and checked soldered surface for quality and identified defects.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐
Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐
Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		

Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**			
Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Set B: Practical Demonstration 4

PRACTICAL DEMONSTRATION 4	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Maintain and service gear box and drive component
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have two (2) hours to complete this demonstration

Procedure:

- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time
- observe and follow all health and safety (OHS) requirements at all times

Job Specification Information:

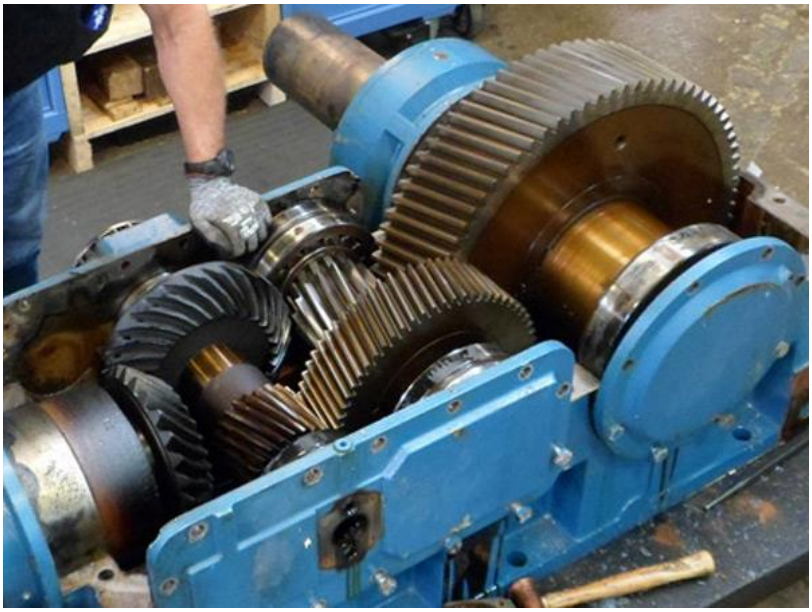
To maximize the operating life of your industrial gearboxes and drive components, regular inspections and maintenance are an essential aspect.

1. Rating: Check the gearbox to ensure it is operating within its manufacture specification of both mechanical and thermal ratings. On many occasions, gearboxes are put into an application beyond their design specification and are being driven by increased input power than the maximum recommended, which will cause a breakdown, eventually.
2. Housekeeping: Often times, gearboxes operate in dirty environments. While this is typically unavoidable, it's important to minimize the effects of the workplace environment. This could result in an increased operating temperature of the gearbox or even possible contamination into the gearbox. Therefore, industrial gearboxes should be regularly cleaned.
3. Shaft Seals: Check for oil leaks at the input and output shaft of your gearbox. Leaks indicate the seals have failed, which can allow the ingestion of dust, debris and water from the environment, causing a loss of lubrication. This is catastrophic where your gearbox is concerned.
4. Breather: Water, dust and debris should not be permitted to be ingested into the gearbox through the breather. They should be of the correct type and style and kept clean at all times allowing the gearbox to breathe with ease.
5. Lubrication: Lubrication should be followed to the gearbox manufactures specification for type, grade and quantity. Regular maintenance should be carried out to the gearbox manufacturer's recommendations with special attention to lubrication.
6. Temperature Check: Look for signs of overheating, discoloured or burnt exterior paint or dark oil in the sight glass. Monitor the gearbox temperature on a regular basis observing for any sudden

changes in temperature using an infrared temperature gun. If you don't have this capability, find a gearbox repair specialist that does – ASAP!

7. Gear Wear/Contacts: Inspect the internal gears by removing the inspection covers or with the aid of an endoscope. Look for signs of wear and tear in the form of pitting and spalling (material from the surface of gear tooth flanks being removed). Be sure and check the contacts between gear teeth for misalignment, which could be indicative of wear with the bearings or bearing housings.
8. Backlash and Shaft End-play: Check for any increase in backlash between the mesh of the gears as well as any increase in the end-play or lift at the input and output shafts. An increase in backlash could be an indication of wear in gear teeth, which is not always visible to the naked eye. An increase in shaft end play or lift would indicate wear within the rolling elements of the bearings or even wear in the bearing housings.
9. Vibration Analysis: Many gearboxes operate in a noisy environment and on occasion, variation or increase in noise from a gearbox cannot always be recorded. Regular Vibration Analysis of the internal bearings and gears will confirm any significant changes in the condition of the internals of the gearbox and help prevent any unplanned loss of production.

Drawing, Plan, Diagram or Sketch:



Resources Required:

Tools:	Combination wrenches Socket wrenches Open-ended wrenches Adjustable wrench Screwdrivers Ball peen hammer Rubber/plastic hammer Rubber mallet Mechanical pliers Vice grip Bearing sleeves Drift punch Bearing puller Seal puller Spirit level Piano wire

Equipment:	Bearing heater Mandrel Hydraulic press Drill press Portable grinder Oxy-acetylene welding outfit Pneumatic torque wrench Bench
Machinery:	Pumps
Materials:	Bearings Seals Welding rod O-rings Lubricating oil Grease Cotton rag Cleaning solvent
PPE:	Apron Mask Gloves Safety shoes

Set B: Practical Demonstration 4 – Observation Checklist

PRACTICAL DEMONSTRATION 4 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Maintain and service gear box and drive component
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Identified types and classifications of bearings and seals.	☐	☐
Applied bearing load analysis on bearing mounting.	☐	☐
Identified common bearing and seal faults.	☐	☐
Carried out bearing removal and mounting as per job requirement.	☐	☐
Applied bearing plays and clearances during mounting as per	☐	☐

job requirement and manufacturer's specification.		
Applied lubricant on bearings and seals during mounting as per job requirement and manufacturer's specification.	☐	☐
Carried out removal and installation of gaskets and seals as per job requirement.	☐	☐
Tested bearings and seals for correct operation as per job requirement and manufacturer's specification.	☐	☐
Identified operating principles of mechanical machines and their drive components.	☐	☐
Identified types of mechanical drive and machine motion transmission.	☐	☐
Established operational problems of mechanical drive components.	☐	☐
Checked operating condition of drive components and identified common faults.	☐	☐
Installed drive components as per job requirements.	☐	☐
Carried out alignment of drive components and checked level of drive.	☐	☐
Replaced components as per manufacturer's specifications.	☐	☐
Carried out preventive maintenance.	☐	☐
Tested drive components for correct operation.	☐	☐
Performed any necessary adjustments as per job requirements.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐

Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐
Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		
Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**		

Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Set C: Practical Demonstration 1

PRACTICAL DEMONSTRATION 1	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Make hexagonal nut and bolt using lathe machine
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have two (2) hours to complete this demonstration

Procedure:

- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time

Job Specification Information:

The minimum specification is:

(a) diameter of 50mm

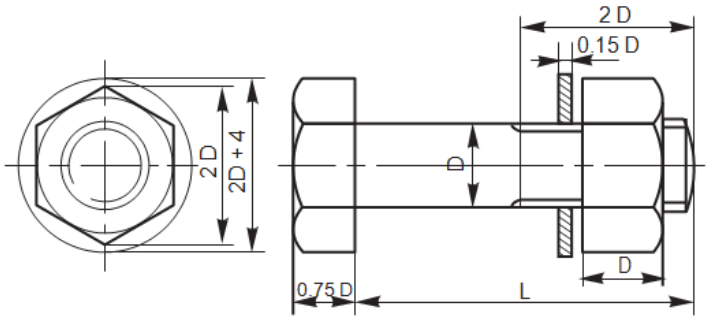
(b) length of 200mm

You will need to:

1. Identify, read and interpret job specifications, drawings and other workplace documents.
2. Identify and collect required tools, equipment and materials for task.
3. Inspect worksite for hazards and implement appropriate controls (if necessary).
4. Identify and collect appropriate PPE.
5. Calculate quantity of materials required as per job specification.
6. Perform measurements and calculations as per job specifications.
7. Inspect and check tools and equipment.
8. Inspect and check materials.
9. Identify quality/performance standard of work to be performed.
10. Set up work area and bench in accordance with job specifications.
11. Establish nominal nut size (use the Table for the Standard of Hex Thick Slotted Nuts).
12. Identify and calculate dimensions of nut.
13. Submit a sketch drawing of manufacturing specifications.
14. Request appropriate stock as per manufacturing specifications.

15. Cut length equivalent to 125% to 150% of nominal size.
16. File piece to proper size (height of the nut plus some more for finish up work).
17. Use blue dye and scribe to draw a hexagon on one end of the work piece.
18. File sides to create hexagon shaped nut.
19. Drill centre of nut and use tap to create a through hole thread.
20. Cut 70mm from smaller diameter rod.
21. Deburr it and use die set to create related bolt.
22. Apply appropriate heat treatment (if required).
23. Inspect tools and equipment for defects and faults
24. Record and report defects and faults as per standard operating procedure.
25. Repair or replace defective tools and equipment (if possible).
26. Clean, maintain and store tools and equipment.
27. Clean workplace and dispose of waste materials.

Drawing, Plan, Diagram or Sketch:



A hexagonal headed bolt with a nut and a washer in position

All dimensions are in mm [D=70 mm and L=300 mm]
Threads: UNC, 8UN, UNF, Metric Coarse & Fine Series

Resources Required:

Tools:	Single point tool File Clamp Die and tab Power drill (including drill bits) Calculator Work bench
Equipment:	N/A
Machinery:	Lathe machine
Materials:	Mild steel (AISI 1040 steel) Blue dye
PPE:	Apron Mask Gloves Safety shoes

Set C Practical Demonstration 1 – Observation Checklist

PRACTICAL DEMONSTRATION 1 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Make hexagonal nut and bolt using lathe machine
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Selected appropriate type of lathe machine for the lathe operation.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Selected tool holding devices according to job requirements.	☐	☐
Calculated amount of materials required.	☐	☐
Selected and collected job materials in accordance with job requirements.	☐	☐

Read and interpreted drawings and job specifications.	☐	☐
Determined application of tools to job requirements.	☐	☐
Bench working operations are performed in accordance with job specifications.	☐	☐
Selected and use lathe accessories in accordance with the job requirements.	☐	☐
Selected cutting speed and feed rate in accordance with job specification.	☐	☐
Calculated RPM, cutting speed, feed rate and depth of cut in accordance with job requirement.	☐	☐
Checked machine performance in conformance with standard operating procedure.	☐	☐
Applied coolant to prevent over heating of work piece and cutting tool.	☐	☐
Performed basic lathe operations to produce component.	☐	☐
Performed corrective measures and/or adjustments.	☐	☐
Heat treatment process is carried out in accordance with job requirements and standard operating procedure.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐
Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐

Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		
Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**		

Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Set C: Practical Demonstration 2

PRACTICAL DEMONSTRATION 2	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform arc welding for tee joint
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have two (2) hours to complete this demonstration

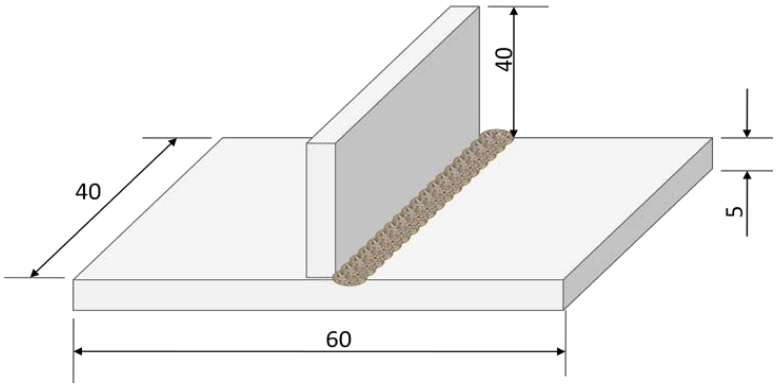
Procedure:

- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time

Job Specification Information:

1. Identify, read and interpret job specifications, drawings and other workplace documents.
2. Identify and collect required tools, equipment and materials for the task.
3. Inspect worksite for hazards and implement appropriate controls (if necessary).
4. Identify and collect appropriate PPE.
5. Inspect and check tools and equipment.
6. Calculate quantity of materials required as per job specification.
7. Inspect and check materials as per job specification.
8. Identify and confirm quality requirements.
9. Clean mild steel flats to be joined by wire brush.
10. Arrange flat pieces providing gap for full penetration for tee joint (gap ½ thickness of flats).
11. Set welding current and voltage.
12. Strike the arc and make tacks at the both ends to hold the metal pieces together.
13. Lay beads along joint maintaining proper speed and arc length (speed 100-150 mm/min).
14. Carry out welding as per job specifications.
15. Clean welded zone.
16. Clean, maintain and store tools and equipment.
17. Clean workplace and dispose of waste materials.

Drawing, Plan, Diagram or Sketch:



All dimensions are in mm

Resources Required:	
Tools:	Wire brush Tongs
Equipment:	Welding unit Protecting gas
Machinery:	N/A
Materials:	Mild steel (AISI 1040 steel) Mild steel flats (140 x 25 x 5 mm) Consumable mild steel wire
PPE:	Apron Mask Gloves Safety shoes Safety goggles

Set C: Practical Demonstration 2 – Observation Checklist

PRACTICAL DEMONSTRATION 2 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform arc welding for tee join
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Calculated amount of materials required.	☐	☐
Selected and collected job materials in accordance with job requirements.	☐	☐
Read and interpreted drawings and job specifications.	☐	☐
Determined application of tools to job requirements.	☐	☐
Identified welding joint, position and process as per job	☐	☐

requirement.		
Set welding current and voltage.	☐	☐
Maintained correct gap between flat pieces.	☐	☐
Maintained proper arc speed and length.	☐	☐
Carried out welding as per standard operating procedure.	☐	☐
Performed tee joint weld as per job specifications.	☐	☐
Cleaned and checked weld for quality and identified defects.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐
Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐
Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		

Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**			
Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Set C: Practical Demonstration 3

PRACTICAL DEMONSTRATION 3	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform gas cutting, brazing and soldering
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have one (2) hours to complete this demonstration

Procedure:

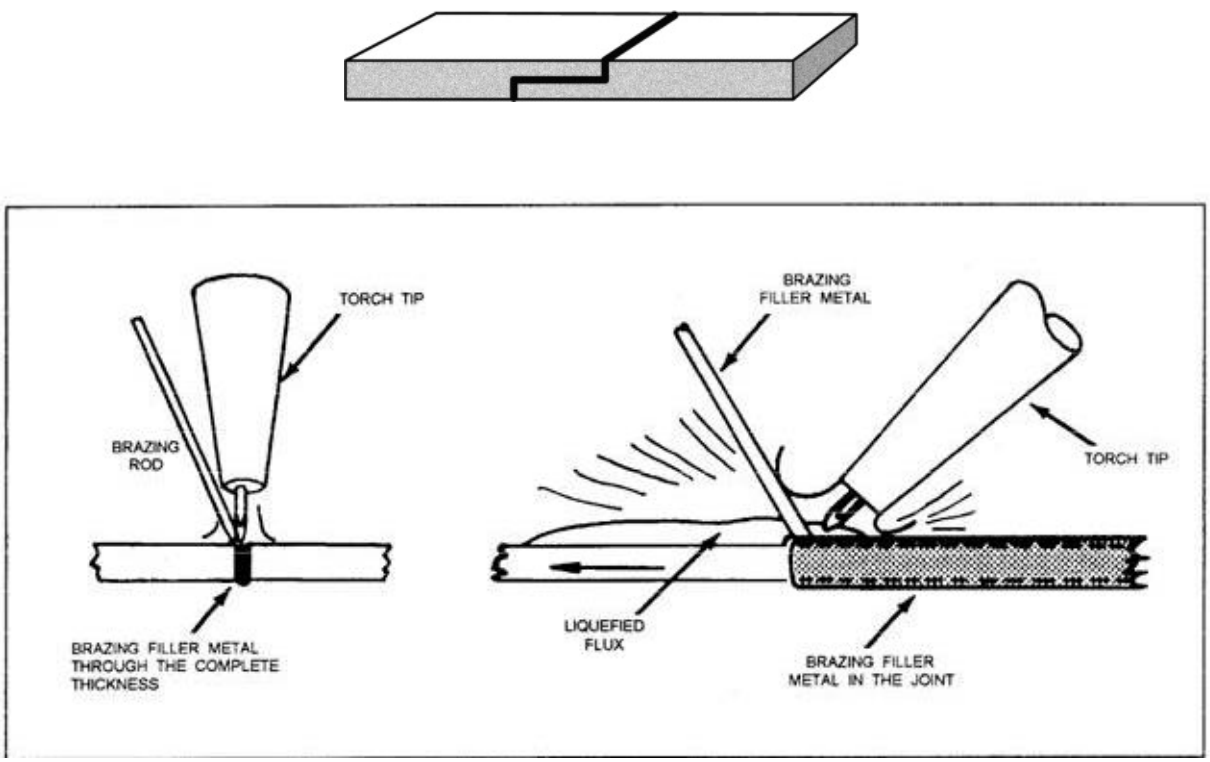
- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time

Job Specification Information:

1. Identify, read and interpret job specifications, drawings and other workplace documents.
2. Identify and collect required tools, equipment and materials for the task.
3. Inspect worksite for hazards and implement appropriate controls (if necessary).
4. Identify and collect appropriate PPE.
5. Inspect and check tools and equipment.
6. Calculate quantity of materials required as per job specification.
7. Inspect and check materials as per job specification.
8. Identify and confirm quality requirements.
9. Clean mild steel strip removing the oxide layer and flatten it.
10. Carry out gas cutting of mild steel strip as per job specifications.
11. Identify cutting defects and take corrective action (if needed).
12. Clean and remove slag on cut ends.
13. Keep the metal strip in butt position.
14. Tack at the two ends.
15. Lay brazing metal at joint maintaining proper speed and feed.
16. Carry out brazing as per job requirements.
17. Perform soldering as per standard operating procedure.
18. Clean and check joint for quality and defects.
19. Rectify any identified defects.

20. Clean, maintain and store tools and equipment.
21. Clean workplace and dispose of waste materials.

Drawing, Plan, Diagram or Sketch:



Resources Required:

Tools:	Wire brush Tongs
Equipment:	Gas welding set Soldering set
Machinery:	N/A
Materials:	Mild steel strips (140 x 25 x 3 mm) Brazing wire Fluxes Filler rods
PPE:	Apron Mask Gloves Safety shoes Safety goggles

Set C: Practical Demonstration 3 – Observation Checklist

PRACTICAL DEMONSTRATION 3 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Perform gas cutting, brazing and soldering
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Calculated amount of materials required.	☐	☐
Selected and collected job materials in accordance with job requirements.	☐	☐
Determined application of tools to job requirements.	☐	☐
Identified welding joint, position and process as per job requirement.	☐	☐

Carried out gas cutting as per standard operating procedure.	☐	☐
Identified cutting defects and took corrective action.	☐	☐
Clean and removed slag from cut ends.	☐	☐
Set flame on welding torch as per brazing requirements.	☐	☐
Used appropriate brazing flux and filler rods.	☐	☐
Performed brazing as per job specifications.	☐	☐
Cleaned and checked brazed surface for quality and identified defects.	☐	☐
Carried out soldering as per standard operating procedure.	☐	☐
Cleaned and checked soldered surface for quality and identified defects.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐
Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐
Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐
Feedback to candidate:		

Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**			
Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Set C: Practical Demonstration 4

PRACTICAL DEMONSTRATION 4	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Maintain and service gear box and drive component
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	

Instructions:

Read and understand the directions carefully:

- this practical demonstration is based on the performance criteria from all or some of the units of competency in Mechanical Fitting
- this assessment activity will be used to measure your underpinning skills
- you will have fifteen (15) minutes to familiarise yourself with the resources to be used
- you have two (2) hours to complete this demonstration

Procedure:

- observe and wear personal protective equipment (PPE) as required for the task to be performed
- read the specification information provided
- collect all materials needed to complete the task
- perform the task within the given time
- observe and follow all health and safety (OHS) requirements at all times

Job Specification Information:

To maximize the operating life of your industrial gearboxes and drive components, regular inspections and maintenance are an essential aspect.

1. Rating: Check the gearbox to ensure it is operating within its manufacture specification of both mechanical and thermal ratings. On many occasions, gearboxes are put into an application beyond their design specification and are being driven by increased input power than the maximum recommended, which will cause a breakdown, eventually.
2. Housekeeping: Often times, gearboxes operate in dirty environments. While this is typically unavoidable, it's important to minimize the effects of the workplace environment. This could result in an increased operating temperature of the gearbox or even possible contamination into the gearbox. Therefore, industrial gearboxes should be regularly cleaned.
3. Shaft Seals: Check for oil leaks at the input and output shaft of your gearbox. Leaks indicate the seals have failed, which can allow the ingestion of dust, debris and water from the environment, causing a loss of lubrication. This is catastrophic where your gearbox is concerned.
4. Breather: Water, dust and debris should not be permitted to be ingested into the gearbox through the breather. They should be of the correct type and style and kept clean at all times allowing the gearbox to breathe with ease.
5. Lubrication: Lubrication should be followed to the gearbox manufactures specification for type, grade and quantity. Regular maintenance should be carried out to the gearbox manufacturer's recommendations with special attention to lubrication.
6. Temperature Check: Look for signs of overheating, discoloured or burnt exterior paint or dark oil in the sight glass. Monitor the gearbox temperature on a regular basis observing for any sudden

changes in temperature using an infrared temperature gun. If you don't have this capability, find a gearbox repair specialist that does – ASAP!

7. Gear Wear/Contacts: Inspect the internal gears by removing the inspection covers or with the aid of an endoscope. Look for signs of wear and tear in the form of pitting and spalling (material from the surface of gear tooth flanks being removed). Be sure and check the contacts between gear teeth for misalignment, which could be indicative of wear with the bearings or bearing housings.
8. Backlash and Shaft End-play: Check for any increase in backlash between the mesh of the gears as well as any increase in the end-play or lift at the input and output shafts. An increase in backlash could be an indication of wear in gear teeth, which is not always visible to the naked eye. An increase in shaft end play or lift would indicate wear within the rolling elements of the bearings or even wear in the bearing housings.
9. Vibration Analysis: Many gearboxes operate in a noisy environment and on occasion, variation or increase in noise from a gearbox cannot always be recorded. Regular Vibration Analysis of the internal bearings and gears will confirm any significant changes in the condition of the internals of the gearbox and help prevent any unplanned loss of production.

Drawing, Plan, Diagram or Sketch:

Resources Required:

Tools:	Combination wrenches Socket wrenches Open-ended wrenches Adjustable wrench Screwdrivers Ball peen hammer Rubber/plastic hammer Rubber mallet Mechanical pliers Vice grip Bearing sleeves Drift punch Bearing puller Seal puller

	Spirit level Piano wire
Equipment:	Bearing heater Mandrel Hydraulic press Drill press Portable grinder Oxy-acetylene welding outfit Pneumatic torque wrench Bench
Machinery:	Pumps
Materials:	Bearings Seals Welding rod O-rings Lubricating oil Grease Cotton rag Cleaning solvent
PPE:	Apron Mask Gloves Safety shoes

Set C: Practical Demonstration 4 – Observation Checklist

PRACTICAL DEMONSTRATION 4 – OBSERVATION CHECKLIST	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Task:	Maintain and service gear box and drive component
Assessment Centre:	
Date of Assessment:	
Instructions:	The tasks listed on the observation checklist of the practical demonstration will provide performance evidence of the candidate. Performance can be observed in an actual workplace or in a simulated working environment. If performance of particular tasks cannot be observed, you may ask the candidate to explain a procedure or enter into a discussion on the subject. The assessment activity (practical demonstration) should: ▪ fit industry requirements in which the assessment will be conducted ▪ adhere, where possible, to reasonable adjustment practices ▪ ensure that suitable performance benchmarks are applied and explained to the candidate

OBSERVATION RECORD		
Performance Criteria	Place a ✓ to show if evidence has been demonstrated competently	
	Yes	**No**
Workplace documents are interpreted correctly.	☐	☐
Accessed specific and relevant information form appropriate sources.	☐	☐
OHS policies and procedures are applied in the workplace including personal protective equipment (PPE).	☐	☐
Common safety issues are identified.	☐	☐
Hazards and risks are identified.	☐	☐
Hazards and risks assessment and controls are interpreted.	☐	☐
Identified and followed safety signs and symbols.	☐	☐
Identified, selected and prepared hand and power tools.	☐	☐
Identified types and classifications of bearings and seals.	☐	☐
Applied bearing load analysis on bearing mounting.	☐	☐
Identified common bearing and seal faults.	☐	☐
Carried out bearing removal and mounting as per job requirement.	☐	☐
Applied bearing plays and clearances during mounting as per	☐	☐

job requirement and manufacturer's specification.		
Applied lubricant on bearings and seals during mounting as per job requirement and manufacturer's specification.	☐	☐
Carried out removal and installation of gaskets and seals as per job requirement.	☐	☐
Tested bearings and seals for correct operation as per job requirement and manufacturer's specification.	☐	☐
Identified operating principles of mechanical machines and their drive components.	☐	☐
Identified types of mechanical drive and machine motion transmission.	☐	☐
Established operational problems of mechanical drive components.	☐	☐
Checked operating condition of drive components and identified common faults.	☐	☐
Installed drive components as per job requirements.	☐	☐
Carried out alignment of drive components and checked level of drive.	☐	☐
Replaced components as per manufacturer's specifications.	☐	☐
Carried out preventive maintenance.	☐	☐
Tested drive components for correct operation.	☐	☐
Performed any necessary adjustments as per job requirements.	☐	☐
Used appropriate hand and power tools for the job.	☐	☐
Checked and measured work piece in conformance to job specification.	☐	☐
Tools and equipment are cleaned, maintained and stored.	☐	☐
Defects are detected and reported according to standard operating procedure.	☐	☐
Workplace is cleaned and waste material disposed of.	☐	☐
Instructions and procedures are strictly followed in accordance with quality improvement system.	☐	☐
Performance is assessed at regular intervals.	☐	☐
Responsibility is taken for quality of own work.	☐	☐
Conformance to specification is ensured in every case at all situations.	☐	☐
Appropriate lines of communication are maintained with supervisors and colleagues.	☐	☐
Workplace interactions are conducted in courteous manner to gather and convey information.	☐	☐
Used appropriate medium to transfer information and ideas.	☐	☐
Responsibilities as a team member are performed.	☐	☐
Tasks are performed in accordance with workplace procedures.	☐	☐
Other teammates' tasks are identified and provided support.	☐	☐

Active participation is ensured, opinions are expressed and heard.	☐	☐
Inputs are provided and interpreted in line with the meeting purpose.	☐	☐
Confidentiality is maintained.	☐	☐
Inappropriate and conflicting situations are avoided.	☐	☐
The team is encouraged through sharing information or expertise, working together to solve problems, and putting team success first.	☐	☐

Feedback to candidate:

Assessment decision for this assessment activity:

☐ **Competent** ☐ **Not Yet Competent**

Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Oral Questions (Optional)

ORAL QUESTIONS - INSTRUCTIONS	
Candidate Name:	
Assessor Name:	
Qualification:	Certificate in Mechanical Fitting
Unit of Competency	
Generic Competencies	
SEIP-LE-MF-01-G	Use basic mathematical concepts
SEIP-LE-MF-02-G	Carry out workplace interaction
SEIP-LE-MF-03-G	Operate in a team environment
SEIP-LE-MF-04-G	Apply basic IT skills
Sector-specific Competencies	
SEIP-LE-MF-01-S	Apply occupational health and safety (OHS) practice in the workplace
SEIP-LE-MF-02-S	Read and interpret sketches and drawings
SEIP-LE-MF-03-S	Use hand and power tools
SEIP-LE-MF-04-S	Apply quality system
Occupation-specific Competencies	
SEIP-LE-MF-01-O	Perform basic workshop practice
SEIP-LE-MF-02-O	Perform gas cutting and welding works
SEIP-LE-MF-03-O	Fabricate simple mechanical components
SEIP-LE-MF-04-O	Carry out bearing and seal maintenance and servicing
SEIP-LE-MF-05-O	Carry out drive component maintenance and servicing
Assessment Centre:	
Date of Assessment:	
Time of Assessment:	
Instructions:	
Read and understand the directions carefully: ▪ these oral questions are based on the performance criteria from all the units of competency in Mechanical Fitting ▪ oral questions are designed to enable additional assessment of your underpinning knowledge ▪ you should present your responses as directed by the assessor ▪ answer all the questions asked by the assessor as best as possible	

ORAL QUESTIONS			
Question		Place a ✓ in the appropriate box to show if evidence has been demonstrated competently	
		Yes	**No**
1.	Name of any five measuring instruments in bench work.	☐	☐
2.	What are principle parts of a lathe?	☐	☐
3.	State the various parts mounted on the carriage.	☐	☐
4.	What is the difference between AC and DC arc welding?	☐	☐
5.	Which are the functions of flux used in brazing?	☐	☐
6.	What is meant by bending allowance in sheet metal fabrication?	☐	☐
7.	What are precision sheet metal components?	☐	☐
8.	If you have a new bearing that has been used, but is dirty, what can you do to use it again?	☐	☐
9.	Can seals be used in place of shields on a ball bearing?	☐	☐
10.	What happens when too much flow is allowed through a pump?	☐	☐
11.	Give an example of a people-oriented team role.	☐	☐
12.	Developing a project plan is a task of who?	☐	☐
13.	Name the tool that clearly shows the reporting relationships within an organisation.	☐	☐
14	Why should a conflict be dealt with immediately?	☐	☐
15.	What is a file?	☐	☐
16.	Explain the use of the subject line in emails.	☐	☐
Feedback to candidate:			
Assessment decision for this assessment activity: ☐ **Competent** ☐ **Not Yet Competent**			
Candidate Signature:		**Date:**	
Assessor Signature:		**Date:**	

Oral Questioning Guideline

General Guidelines For Effective Questioning
▪ Keep questions short and focused on one key concept
▪ Ensure that questions are structured
▪ Test the questions to check that they are not ambiguous
▪ Use `open-ended questions such as `what if...?' and `why...?' questions, rather than closed questions
▪ Keep questions clear and straight forward and ask one at a time
▪ Use words that the candidate is able to understand
▪ Look at the candidate when asking questions
▪ Check to ensure that the candidate fully understands the questions
▪ Ask the candidate to clarify or re-phrase their answer if the assessor does not understand the initial response
▪ Confirm the candidate's response by repeating the answer back in his/her own words
▪ Encourage a conversational approach with the candidate when appropriate, to put him or her at ease
▪ Use questions or statements as prompts for keeping focused on the purpose of the questions and the kind of evidence being collected
▪ Use language at a suitable level for the candidate
▪ Listen carefully to the answers for opportunities to find unexpected evidence
▪ Follow up responses with further questions, if useful, to draw out more evidence or to make links between knowledge areas
▪ Compile a list of acceptable responses to ensure reliability of assessments

Oral Questions (Optional) - Answers

Answers are highlighted in **bold** and *italics*.

ORAL QUESTIONS		
Question		**Answer**
1.	Name of any five measuring instruments in bench work.	***Try square, vernier calliper, micrometre, divider, and inside calliper.***
2.	What are principle parts of a lathe?	***Bed, headstock, tailstock, carriage, cross slide, and tool post.***
3.	State the various parts mounted on the carriage.	***Saddle, compound rest, cross slide, and tool post.***
4.	What is the difference between AC and DC arc welding?	***The main difference between the two is with the recommended welding polarity. E6010 electrodes are intended for direct current (DC) only. While E6011 electrodes can be used on alternating current (AC), as well as DC.***
5.	Which are the functions of flux used in brazing?	***During brazing flux is also used which performs the following functions: Dissolve oxides from the surfaces to be joined. Reduce surface tension of molten filler metal i.e. increasing its wetting action. Protect the surface from oxidation during joining operation.***
6.	What is meant by bending allowance in sheet metal fabrication?	***Bend allowance comes from the fact that when sheet metal is bent, the inside surface of the bend is compressed, and the outer surface of the bend is stretched (elongated).***
7.	What are precision sheet metal components?	***Sheet metal components that are made using high precision dies with sheet of close tolerance in machines with high stability are generally called as precision sheet metal components. The precision of the component has to be decided based on the purpose that the components are going to serve.***
8.	If you have a new bearing that has been used, but is dirty, what can you do to use it again?	***Hand wash and try not to spin it. Never wash double shield bearings, only wipe them off then apply lubricant before wrapping and storing.***
9.	Can seals be used in place of shields on a ball bearing?	***A shield provides a clearance between the inner and outer race, whereas a seal is attached to the inner race and could cause problems rubbing on the inner race, depending on the speed, heat, and starting torque of the machine***.

10.	What happens when too much flow is allowed through a pump?	***Air entrainment occurs when air is allowed to enter the pump on the suction side and expands as it enters the impeller eye. This can often reduce the flow of the pump and cause vibration from disrupting the laminar flow stream through the pump Air entrainment can cause similar damage to bearings and seals.***
11.	Give an example of a people-oriented team role.	***Coordinator***
12.	Developing a project plan is a task of who?	***Project Manager***
13.	Name the tool that clearly shows the reporting relationships within an organisation.	***Organizational chart***
14	Why should a conflict be dealt with immediately?	***To avoid it escalating.***
15.	What is a file?	***A file is the common storage unit in a computer. All programs and data are contained in a file, and the computer reads and writes files.***
16.	Explain the use of the subject line in emails.	▪ ***The subject line provides an opportunity to inform the receiver of the purpose of the email.*** ▪ ***A subject line ideally should describe exactly what the email is about.*** ▪ ***An appropriate subject line will maximize the possibility of a message being read.***

Assessment Evidence Summary Sheet

EVIDENCE SUMMARY SHEET			
Candidate Name:			
Assessor Name:			
Qualification:	Certificate in Mechanical Fitting		
Assessment Centre:			
Date(s) of Assessment:			
The performance of the candidate in the following unit or units of competency and the methods engaged to assess performance are as follows:			
Unit of Competency	**Assessment Method**	**Competent**	**Not Yet Competent**
All units of competency comprising of the qualification	Written Test	☐	☐
	Practical Demonstration 1 (Set ....)	☐	☐
	Practical Demonstration 2 (Set ....)	☐	☐
	Practical Demonstration 3 (Set ....)	☐	☐
	Practical Demonstration 4 (Set ....)	☐	☐
	Oral Questioning (optional)	☐	☐
Note: Issuance of a certificate will only be given to a candidate who has successfully been assessed as competent for **ALL** units of competency.			

Recommendation		
❑ Issuance of Statement of Achievement *(indicate title of SOA, if full Certificate is not met)*	❑ Submission of additional documents Specify:	❑ Reassessment Specify:
Did the candidate overall performance meet the required evidence/standard?	☐ Yes ☐ No	
Overall Evaluation:	❑ **Competent** ❑ **Not Yet Competent**	
General Comments:		
Candidate Signature:		Date:
Assessor Signature:		Date:
Institution Manager Signature:		Date:

CANDIDATES COPY

(Please presents this form when you claim your Certificate)

ASSESSMENT RESULTS SUMMARY			
Qualification:	Certificate in Mechanical Fitting		
Name of Candidate:		**Date:**	
Name at Assessment Centre:		**Date:**	
Assessment Results:	❑ **Competent** ❑ **Not Yet Competent**		
Recommendation:	❑ Issuance of SOA *(indicate title of SOA, if full certificate is not met)*		
	❑ Submission of additional documents – specify:		
	❑ Reassessment - specify:		
Assessed by: (name and signature)		**Date:**	
Attested by: (name and signature):		**Date**	

Assessment Validation Map

This identifies how the assessment tools in this resource may assess:

- elements and performance criteria
- critical aspects of assessment
- skills and knowledge
- employability skills

Unit of Competency:	SEIP-LE-MF-01-G – Use basic mathematical concepts		
Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Identify calculation requirements in the workplace.	4	A1-4 B1-4 C1-4	2
2. Select appropriate mathematical methods/concepts for the calculation.	4	A1-4 B1-4 C1-4	2
3. Use tools and instruments to perform calculations.	4	A1-4 B1-4 C1-4	
Unit of Competency:	SEIP-LE-MF-02-G – Carry out workplace interaction		
Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Interpret workplace communication and etiquette.	11	A1-4 B1-4 C1-4	
2. Read and understand workplace documents.		A1-4 B1-4 C1-4	
3. Participate in workplace meetings and discussions.	12	A1-4 B1-4 C1-4	
4. Practice professional ethics at work.	12	A1-4 B1-4 C1-4	

Unit of Competency:	SEIP-LE-MF-03-G – Operate in a team environment		
Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Identify team goals and work processes.			11, 13
2. Identify own role and responsibilities within team.		A1-4 B1-4 C1-4	12
3. Communicate and co-operate with team members.		A1-4 B1-4 C1-4	
4. Practice problem solving within team.		A1-4 B1-4 C1-4	14

Unit of Competency:	SEIP-LE-MF-04-G – Apply basic IT skills		
Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Identify and use most commonly used IT tools.		A2, B2, C2	
2. Understand use of computer.		A2, B2, C2	
3. Work with word processing application.			15
4. Access email and search the internet.			16

Unit of Competency:	SEIP-LE-MF-01-S – Apply occupational health and safety (OHS) practice in the workplace		
Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Identify OHS Policies and procedures.	13	A1-4 B1-4 C1-4	
2. Apply personal health and safety practices.	13	A1-4 B1-4 C1-4	
3. Report hazards and risks.	13	A1-4	

		B1-4 C1-4	
4. Respond to emergencies.		A1-4 B1-4 C1-4	?

Unit of Competency:	SEIP-LE-MF-02-S – Read and interpret sketches and drawings

Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Interpret information and specifications.		A1-4 B1-4 C1-4	
2. Read and interpret sketches and drawings.		A1-4 B1-4 C1-4	

Unit of Competency:	SEIP-LE-MF-03-S – Use hand and power tools

Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Identify and inspect hand and power tools.	1, 2	A1-4 B1-4 C1-4	
2. Use hand tools properly and safely.		A1-4 B1-4 C1-4	
3. Operate power tools properly and safely.		A1-4 B1-4 C1-4	
4. Clean and maintain hand and power tools.		A1-4 B1-4 C1-4	

Unit of Competency:	SEIP-LE-MF-04-S – Apply quality system

Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Work within a quality system.		A1-4	

		B1-4 C1-4	
2. Apply and monitor a quality system.		A1-4 B1-4 C1-4	
3. Apply standard procedures for each job.		A1-4 B1-4 C1-4	

Unit of Competency:	SEIP-LE-MF-01-O – Perform basic workshop practice

Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Prepare for work.	1	A1 B1 C1	1
2. Perform bench work.	5	A1 B1 C1	
3. Perform lathe machine operations.	3	A1 B1 C1	2
4. Apply heat treatment.	3	A1 B1 C1	

Unit of Competency:	SEIP-LE-MF-02-O – Perform gas cutting and welding works

Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Prepare for work.	6, 7, 9	A2, A3, B2, B3, C2, C3	3, 4
2. Carry out arc welding.	6, 7, 9	A2, B2, C2	4
3. Carry out gas cutting and welding.	7, 8, 9, 17	A3, B3, C3	4
4. Perform brazing.	16	A3, B3, C3	5

5. Perform soldering.	9	A3, B3, C3	
6. Clean and maintain tools, equipment and machinery.		A1-4 B1-4 C1-4	

Unit of Competency:	SEIP-LE-MF-03-O – Fabricate simple mechanical components

Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Prepare for work.	15	A1-3 B1-3 C1-3	7
2. Fabricate items.	10	A1-3 B1-3 C1-3	6
3. Fix fabricated items.		A1-3 B1-3 C1-3	
4. Clean and maintain tools, equipment and machinery.		A1-3 B1-3 C1-3	

Unit of Competency:	SEIP-LE-MF-04-O – Carry out bearing and seal maintenance and servicing

Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Prepare for work.	14	A4, B4, C4	
2. Perform troubleshooting.	18, 19	A4, B4, C4	
3. Maintain and service bearings.		A4, B4, C4	8
4. Maintain and service seals.		A4, B4, C4	9
5. Test bearings and seals.		A4, B4, C4	
6. Clean and maintain tools, equipment and machinery.		A4, B4, C4	

Unit of Competency:	SEIP-LE-MF-05-O – Carry out drive component maintenance and servicing		
Element	**Assessment Method**		
	Written	**Practical**	**Oral**
1. Prepare for work.		A4, B4, C4	
2. Perform troubleshooting.	20	A4, B4, C4	10
3. Maintain and service drive components.		A4, B4, C4	
4. Test drive components.		A4, B4, C4	
5. Clean and maintain tools, equipment and machinery.		A4, B4, C4	