



**education**

Department: Education

**GAUTENG PROVINCE**

# **MECHANICAL TECHNOLOGY**

**FITTING and MACHINING**

**GRADE 10**

**PRACTICAL ASSESSMENT TASKS**

**2024**

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## SECTION A: EDUCATOR GUIDELINES FOR PAT GRADE 10

### 1. INTRODUCTION / BACKGROUND

The 18 Curriculum and Assessment Policy Statements subjects which contain a practical component all include a practical assessment task (PAT). These subjects are:

- **AGRICULTURE:** Agricultural Management Practices, Agricultural Technology
- **ARTS:** Dance Studies, Design, Dramatic Arts, Music, Visual Arts
- **SCIENCES:** Computer Applications Technology, Information Technology, Technical Sciences.
- **SERVICES:** Consumer Studies, Hospitality Studies, Tourism
- **TECHNOLOGY:** **MECHANICAL TECHNOLOGY**, Civil Technology, Electrical Technology, and Engineering Graphics and Design.
- **MATHEMATICS:** Technical Mathematics.

A practical assessment task (PAT) mark is a compulsory component of the final promotion mark for all candidates offering subjects that have a practical component and counts 25% (100 marks) of the end-of-year examination mark. The PAT is implemented across the first three terms of the school year. This is broken down into different phases or a series of smaller activities that make up the PAT. The PAT allows for candidate to be assessed on a regular basis during the school year and it also allows for the assessment of skills that cannot be assessed in a written format, e.g., test or examination. It is therefore important that schools ensure that all candidates complete the practical assessment tasks within the stipulated period to ensure that candidate are resulted at the end of the school year. The planning and execution of the PAT differs from subject to subject.

The PAT allows the teacher to directly and systematically observe applied competence. The PAT comprises the application/performance of the knowledge, skills and values particular to that subject and counts 25% of the total promotion/certification mark out of 400 for the subject.

The PAT is implemented across the first three terms of the school year.

Any profession requires of its members a thorough grounding in both theory and practice and mechanical technology is no exception. It is emphasized that the goal of the practical assessment task is to produce a skilled candidate in each specialisation field. A nation's true wealth is in its manpower and education that should aim to develop the talents of a candidate so that he/she can contribute to the well-being of the society by using and developing scientific and technological resources.

To prepare a candidate in mechanical technology specialisation fields, one must focus on the following:

- An attitude where the candidate can selectively use ideas, gather evidence and facts, to drawing logical conclusions to put them to good use creatively and with imagination;
- A capability to express ideas and information clearly by speech, writing, drawing and manufacturing and
- A willingness and capability to accept and exercise responsibility, to make decisions, and to learn by experience.

Attributes such as these cannot all be achieved in a classroom. A sound knowledge of engineering sciences is essential to equip the mechanical technology candidate with the necessary practical capabilities for the required processes. Practical training is the application of acquiring essential skills to bridge the gap between trade theory and practice.

Practical application in the workshop must therefore be made an interesting and challenging experience to develop the candidate's both physically and mentally. The candidates must show his/her initiative, curiosity and persistence in learning. In order to stimulate and develop self-confidence the granting of some degree of responsibility during the practical application is very important.

## **2. TEACHER GUIDELINES**

### **2.1 Administration of the PAT**

Teachers are requested to make copies of the different specialisation PAT documents. These documents need to be handed out to the candidates at the beginning of the year. The Practical Assessment Task for Grade 12 is externally set, internally assessed and externally moderated.

Teachers must attach due dates for the different facets of the PAT (refer to the CAPS document). In this manner, candidates can easily assess their progress. Instances where formal assessments take place, it is the responsibility of the teacher to administer assessment.

The PAT should be completed within the first three terms. The PAT should be completed under controlled conditions (refer to Mechanical Technology SPECIALISATION: CAPS Grade 10 –12).

Educators **MUST** build a prototype of the task in order to be able to demonstrate to the candidates how the final product will look like. It will guide the candidates with visual presentation. It provides the educator with insight into possible challenges regarding machines, equipment or material and what possible manufacturing procedures he/she need to follow in the workshop in order to complete the PAT.

### **2.2 Assessment of PAT**

Frequent and developmental feedback is needed to ensure necessary guidance and support to the candidates.

Both formal and informal assessment should be conducted to ensure that the embedded skills are developed. Informal assessment can be conducted only to monitor progress of the candidates. Formal assessment should always be conducted and recorded by the candidates.

On completion of each phase in each term, the marks for the completed phase need to be recorded onto the school administration system.

### **2.3 Moderation of PAT**

The tasks, projects, assessment criteria as well as the mark sheets must be presented to the moderator during moderation of the PAT.

The moderator should be able to call on a candidate to explain and demonstrate the functions, principles and skills during the moderation purposes.

On completion the moderator will, if necessary, adjust the marks of the group upwards or downwards depending on the decision reached as a result of moderation.

Task must be clearly marked with the correct initials and surname of each candidate.

## **2.4 Consequences of absence / non-submission of tasks.**

If a candidate's practical assessment task is incomplete or unavailable with valid reason, the candidate may be given three weeks before the commencement of the final end-of-year examination to submit the outstanding task. Should the candidate fail to fulfil the outstanding PAT requirement, such a candidate will be awarded a zero mark for that PAT component.

A candidate's results are regarded as incomplete if he/she does not offer any component of the PAT task. He / She will be given another opportunity based on the decision of the head of the assessment body. Should the candidate fail to fulfil the outstanding PAT requirement, the marks for these components will be omitted and the final mark for Mechanical Technology will be adjusted for promotion purposes in terms of the completed tasks. If any tasks are still outstanding, the candidate runs the risk of not being resulted at the end of the year.

### 3. ADMINISTRATION OF THE PAT

The educator should aim to complete all phases of the PAT **in the first three terms**. The PAT must be administered under controlled conditions.

*Educators must attach their own due dates* for the different phases of the PAT (Refer: Mechanical Technology CAPS Gr10 – 12 Document).

In this manner, Learners can easily assess their progress. Instances where formal assessments take place, it is the responsibility of the Educator to administer the assessment.

Educators are requested to make copies of **Section B** and distribute to Learners at the beginning of the year. Learners should receive the assessment criteria of the PAT at the beginning of the year when the PAT is handed out and this must be mediated with the Learners.

#### STRUCTURE OF THE PAT

PROCESS OF THE PAT		TOPIC	MARKS
<b>TERM 1</b>	Phase 1 Task	Terminology/ Manufacturing	<b>50</b>
	<i>Phase 4 Task</i>	<i>Teacher to Prepare (material and equipment)</i>	
<b>TERM 2</b>	Phase 2 Task	Terminology / Lathe machines	<b>50</b>
	<i>Phase 4 Task</i>	<i>Under construction</i>	
<b>TERM 3</b>	Phase 3 Task	Terminology / Manufacturing	<b>50</b>
	<i>Phase 4 Task</i>	Terminology / Lathe machines / <i>Complete Task</i>	<b>100</b>
		<b>TOTAL MARKS</b>	<b>250</b> <b>Convert to 100</b>

*Educators must attend to the following in their preparation:*

The planning process;  
 The knowledge and skills to be achieved;  
 The safety and environmental aspects to be considered;  
 The applicable calculations, sketches and/ or diagrams;  
 The starting time and ending time – how long it took to complete from start to finish;  
 Bill of materials;  
 List of tools needed; and  
 Any other information that is relevant to the project.

#### 4. Assessment and moderation of the Practical Assessment Task

To ensure national standardization the PAT's for Grade 12 are externally set and moderated, but internally assessed. The PAT's for Grade 10 and 11 have to follow a similar standardization process but this is done provincially and thus are set by allocated people and moderated by the Subject Advisers for Mechanical Technology.

##### 4.1 Assessment

Frequent developmental feedback by the Educator is needed to guide and give support to the Learner to ensure that the Learner is progressing as envisaged.

Both *formal and informal assessment* should be conducted on the different phases that constitute the PAT. Informal assessment can be conducted by the Learners themselves, by a peer group of Learners, or by the Educator. Formal assessment should always be conducted by the Educator and must be recorded on the working mark sheets distributed by the Subject Advisers, these also constitute the final mark sheet for the subject and must always be available in printed format in the Educators File. These mark sheets must be updated and printed after each formal assessment. Note that the School and District structures may require results to be transferred to other documents/ systems like SASAMS, in this instance ALL results must correspond on all systems. Any differences must be brought to the attention of the Subject Advisor so that the error can be rectified.

##### 4.2 Moderation

During moderation of the PAT, the project/ skills tasks will be presented to the moderator with the assessment criteria and marks obtained on the **facets mark sheet** and the **combined Excel working** mark sheet.

Where required, the moderator should be able to call on the Learner to explain the function, principles of operation and also request the Learner to exhibit the skills acquired through the capability tasks for moderation purposes.

##### 4.3 Time planning:

- Phase 1: Complete at the end of first term – **March**.
- Phase 2: Complete at the end of second term – **June**.
- Phase 3: Complete during third term - End of **September**.
- Phase 4: Plan and start task during the first term and complete at the end of **September**.



## SECTION B: THE PRACTICAL ASSESSMENT TASK GRADE 10

### **FITTING AND MACHINING**

The Practical Assessment Task (PAT) consists of FOUR Phases, one per term over term 1 to 3, with the **Phase 4 Task** to be started in the **First Term** and **completed in the Third Term** – Thus spanning all three terms. Term 4 is reserved for the final theoretical content and revision.

### **PHASE ONE: TASK: Basic Hand skills**

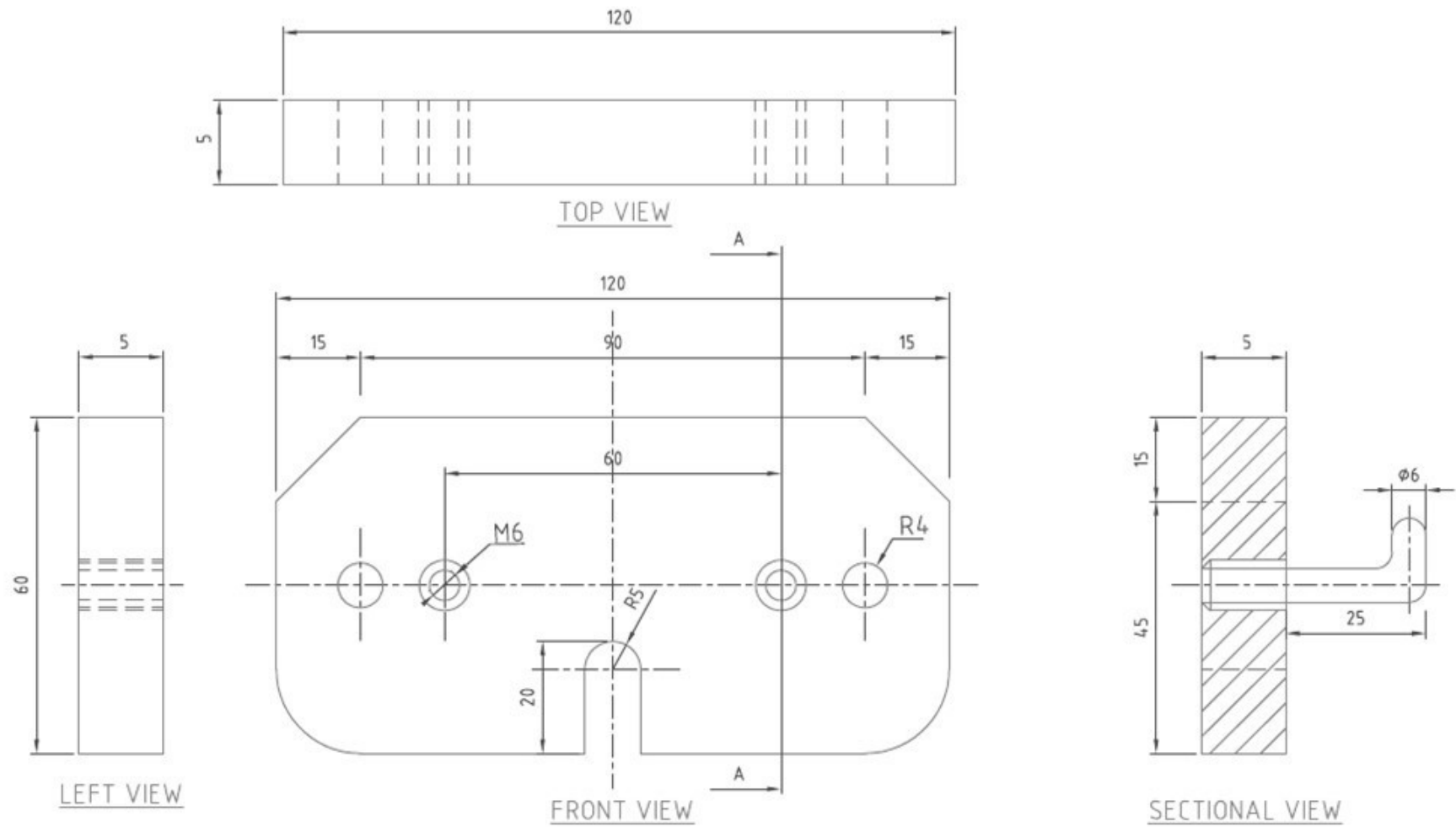
#### **Resources Required:**

- Mild steel flat bar 120 x 60x 5mm (the school may opt to use between 5-6mm) (if flat plate is used, ensure that two sides are parallel to each other).
- Appropriate metal hand files.
- Vernier and other measuring equipment (callipers, steel rule etc).
- Marking medium (Engineers blue, Koki pen, chalk etc.)
- Marking off instruments (Square, combination square, scribe etc.)
- Centre punch.
- Hammer- ball peen /cross peen
- Hacksaw.
- Files, smooth- bastard flat- square- triangle- round and half round
- Stocks and dies
- *Appropriately sized* Twist Drill bits to enable M6
- Cut the radii with a hacksaw and then smoothen with hand file
- Press drilling machine.

#### **Instructions:**

- 1) Apply marking blue or any other medium onto the workpiece and mark out the dimensions according to the drawing
- 2) Use a steel rule to check / ensure that the material can be cut / filed to 120mm in length i.e., if pre-cut pieces are used the starting length should be about 120mm.
- 3) Use engineers square on either of the 120mm ends of the material to plan a square line.
- 4) Use a scribe to scribe this straight square line about 5mm from the rough edge.
- 5) Use the square and scribe on the opposite end of the material to scribe a straight, square line so that the material between the lines is 120mm in length (ensure lines are parallel).
- 6) ***Request an informal assessment on the marked lines before proceeding.***
- 7) Cut with a hacksaw about 1-2mm on the waste side of the above lines (Do NOT cut on the line).
- 8) ***Request a formal assessment on your ability to cut straight before proceeding.***
- 9) First use a rough-cut bastard file to file both ends, use the engineers square regularly to check for squareness.
- 10) ***Request a formal assessment on your ability to file all sides square and to size, before proceeding.***
- 11) Then using a smooth double cut file, complete the filing process.
- 12) ***Request formal assessment on ability to file square to tolerance.***

- 13) Use the centre punch to mark the holes for drilling.
- 14) *Request informal assessment on your ability to mark and punch this centre point, before proceeding (5).***
- 15) Measure and mark a point 15mm from each end on the 120mm length.
- 16) Scribe a line across the width of the material at the 15mm marks, parallel to the middle line scribed earlier.
- 17) Along one 15mm line, measure and mark from both sides 15mm inwards and centre punch these TWO marks in preparation for drilling.
- 18) Use this punch mark to scribe the two 15mm radii on the two corners
- 19) Along the other 15mm line, measure and mark from each side 15mm inwards and centre punch these TWO marks in preparation for drilling.
- 20) Cut 1-2mm away from the line using a hacksaw, then use a smooth finish to complete a neat curve.
- 21) *Request formal assessment on your ability to mark and punch these centre points accurately and the grinding of the radii, before proceeding.***
- 22) Use a press drill machine to drill two 4mm holes. (Ensure the hole is perpendicular, using large engineers square if hand drill is used!)
- 23) *Request an informal assessment / guidance on attempt and required skill to drill the other holes perpendicular to the surface, before proceeding.***
- 24) Use a press drill machine to drill two holes on the centre punched holes positioned on the on the plate, suitable to cut a M6 thread. (Ensure holes are perpendicular, use large engineers square if hand drill is used!)
- 25) *Hand task in for formal assessment on your ability to drill perpendicular holes.***
- 26) Use the taps in the correct order to 2 x M6 thread. (Taper, tap, second tap and plug tap)
- 27) Cut a 40mmx Ø6 mm round bar for the key hook.
- 28) Taper one end to ensure an easy start for cutting the external M6 thread.
- 29) Secure the rod in the vice and cut the threads for a length of 5mm.
- 30) Secure the rod in the bench vice to form a hook (approximately 8-10mm) The hook can be at 90° or greater than as an option.
- 31) Screw the hook onto the backing plate.
- 32) Hand the task in for formal assessment on your ability to cut square / perpendicular thread in different sized holes.
- 33) Clean any burs, roughness and dirt caused by the drilling, cutting and manufacturing process.
- 34) Hand the task in for **formal final assessment** on your **ability to clean your project.**



Examn Number

CENTRE NUMBER

DATE

**MARKING RUBRICS FOR FITTING AND TURNING****DRILLING AND TAPPING****NOTE:**

Use the Rubric A below for assessment for all holes to be drilled.

<b>RUBRIC A - DRILLING OF HOLES</b>	
<b>Assessment facet</b>	<b>Mark</b>
Drilling of correct diameter of hole	1
Depth correctly drilled	1
Hole clean and without burrs	1
Hole perpendicular to workpiece	1
Hole drilled to correct position on workpiece	1
<b>Sub-total:</b>	<b>5</b>

**NOTE:**

Use the Rubric B below for assessment for all internal and external screw threads to be tapped.

<b>RUBRIC B – TAPPING OF SCREW THREADS</b>	
<b>Assessment facet</b>	<b>Mark</b>
Cut correct screw thread	1
Screw thread perpendicular to workpiece	1
Screw thread has no burs on outside	1
Depth/length to be tapped correctly	1
No defects (e.g., Cross thread)	1
<b>Sub-total:</b>	<b>5</b>

**TOLERANCE RANGES FOR LENGTH AND DIAMETERS****NOTE:**

On all the lengths and diameters candidates will lose 1 mark for every 0,1 mm deviation from the basic size. Use rubric C for assessment on all lengths and diameters.

<b>RUBRIC C - LENGTHS AND DIAMETERS</b>	
<b>DEVIATION</b>	<b>MARK DEDUCTIONS</b>
0–0,1	-0
0,1–0,2	-1
0,2–0,3	-2
0,3–0,4	-3
0,4–0,5	-4
0,5 and more	-5

**Safety (5)**

- Less 1 mark: Repetitive disregard for the use of PPE while working in the workshop.
- Less 1 mark: Another negative mark for continuing to have a disregard for the use of PPE while working in the workshop.
- Less 1 mark: Quality versus Time – “rush” job vs inefficient time to complete a good job
- Less 1 mark: Not cleaning machine after work session.
- Less 5 marks: Dangerous and fooling around in workshop, machines and equipment.

**Finishing (5)**

- Less 1 mark for vice (jaw) damage - clamping marks for overtightening or loose slip.
- Less 1 mark for lack of overall manufacturing competency in finishing / “look” of completed task related to surface finish and edges.
- Less 1 mark for lack of overall manufacturing competency in squareness of project.
- Less 1 mark for lack of overall manufacturing competency in centrality, etc.

**ABSENCE / NON-SUBMISSION OF TASKS**

If a learner's practical assessment task is incomplete or unavailable for a valid reason, the learner will be given three weeks before the commencement of the final end-of-year examinations to submit the outstanding task. Should a learner fail to fulfil the outstanding PAT requirement such a learner will be awarded a zero (0) for that PAT component.

A learner's results are regarded as incomplete if he/she does not offer any component of the PAT task. He/she will be given another opportunity based on the decision of the Head of the Assessment Body.

Should the learner fail to fulfil the outstanding PAT requirement, the marks for these components will be omitted and the final mark for Mechanical Technology will be adjusted for promotion purposes in terms of the completed tasks.

**MARKING RUBRICS FOR FITTING AND TURNING**

GRADE: 10		YEAR: 2024		SCHOOL:									
DATE STARTED:				DATE COMPLETED:									
SUBJECT: Mechanical Technology – Fitting & Machining				EDUCATOR:									
PROJECT: TERM ONE - PHASE ONE				NUMBER OF LEARNERS:									
PAGE ____ of ____				Tools: Hand skills Task									
ASSESSMENT		FACETS	Measuring and marking	cutting with the hacksaw	Squareness of ALL sides	Filing of angles	Cutting the recess.	Filing the radii	Drilling of 4 x 10mm holes.	Thread cutting x 2(M6)	Finishing	SUB-TOTAL	
			10	10	5	10	10	10	20	20	5	100	50
1	Learner – Self-Assessment												
	Date of self-assessment:												
2	Teacher Assessment												
	Comment:												
3	Internal Moderation												
	Comment:												
4	Provincial Moderation												
	Comment:												
5	External Moderation												
	Comment:												
<b>General Feedback:</b>													
SIGNATURE EDUCATOR													
SIGNATURE HEAD OF DEPARTMENT													
SIGNATURE SUBJECT ADVISOR													
SIGNATURE PRINCIPAL													

**PHASE TWO:**

**TERMINOLOGY - TURNING TASK**

**Procedure:**

The following task is to let the learners get to know how to work with the lathe machine. Choice of material to be used is Aluminium or Nylon / Teflon.

**READ ALL THE INSTRUCTIONS FIRST - THEN PROCEED  
FOLLOW ASSESSMENT INSTRUCTIONS - AS INDICATED**

**Resources Required:**

- Aluminium or Nylon/ Teflon Ø30mm rough cut at 150mm long.
- Centre lathe with related attachments and tools.
- Lathe cutting tools for facing, parallel turning, taper cutting and parting off.
- Vernier and other measuring equipment (callipers, steel rule etc).
- Marking medium (Engineers blue, Koki pen, chalk etc.)
- Marking off instruments (Square, scribe etc.)
- Appropriate Personal Protection Equipment (PPE).

**ASSESSMENT TASK 2 - Grade 10  
PRACTICAL SKILLS TASK - Lathe Turning**

**Activity Outcome**

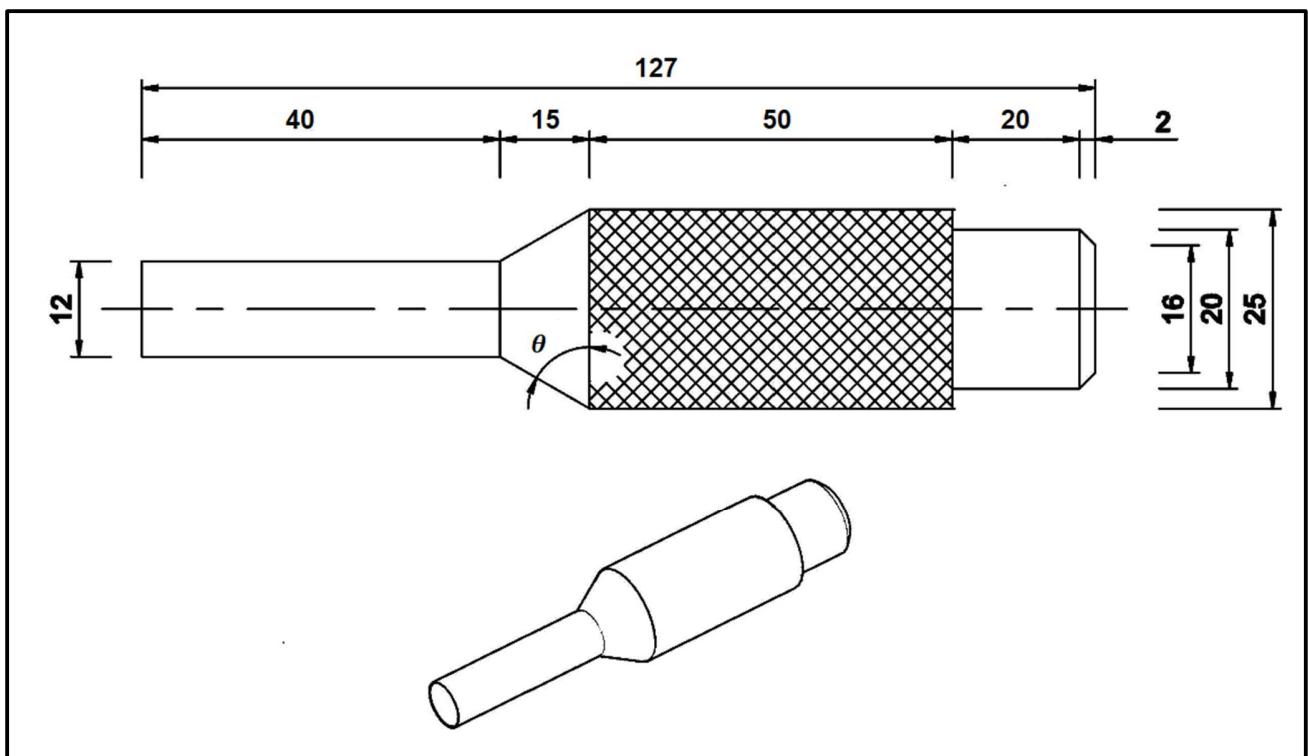
- Learners familiarize themselves with the use of tools and machines.
- Learners apply theoretical knowledge in practice to make the **PIN PUNCH**.

**Requirements:/Tools:**

- Lathe machine
- Tool bit holder and key
- Tool facing and cutting parallel surfaces
- Chuck and Tailstock centre
- Two tool bits
- Vernier calliper

**PROCEDURE:****Check the following safety measures:**

- All automatic feeds are disengaged.
- No persons to be cleaning, oiling or repairing machine while working.
- Work piece clamped safely and securely in chuck.
- Chuck key removed from chuck.
- Cutting tool correctly ground.
- Check and set correct cutting speed.

**FIGURE 2.1 – Pin Punch**



**PROCEDURE IN MANUFACTURING THE PIN PUNCH.**

- Cut a piece of material with length of 150mm long and of a 30mm diameter.
- Place work piece in the lathe chuck and tighten.
- Set up a facing cutting tool to the correct centre height.
- Move cutting tool away from lathe and work piece.
- Check that no automatic feed is engaged.
- Check the selected speed and apply feed for the material to be cut, adjust if necessary.
- Stand clear and switch the machine on.
- Move the cutting tool closer and final adjust with the compound slide to take the first cut.
- Take a second cut if needed.
- Cut material down to a diameter of 25mm. Tolerance must be within  $\pm 0,01$
- Length must not be less than 127mm.
- Measure 40mm on one end and reduce to diameter 12mm.
- Calculate the correct angle the compound slide must be set to in order to cut a taper of a length of 15mm
- Set compound slide to the correct angle in order to cut the taper.
- Cut a taper to a length of 15 mm.
- Reduce on the 25mm side 20mm in length from back to a diameter of 20mm.
- Camphor 2mm at to a diameter of 16mm.
- Produce knurling on 50mm of the workpiece.
- **N.B. Use discretion for dimensions not given!**

**This worksheet MUST be evident in the learner's portfolio file and be presented for moderation**

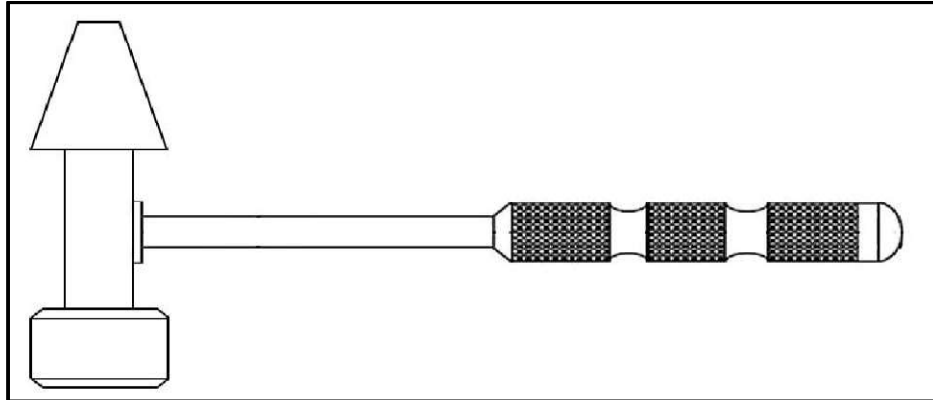
WORKSHEET 2.1			
<b>TRUE MEASUREMENTS.</b>			
Learner measure final diameter BEFORE attempt of calculations and setting of compound slide angle.			
2.1.1 True Measurement	Ø	5	
2.1.2 Calculations			
$\tan \frac{\theta}{2} = \frac{D - d}{2 \times l}$ <span style="margin-left: 20px;">(<math>l</math> = Taper length )</span>			
		5	

**MARKING RUBRIC – PHASE 2**

<b>GRADE 10</b>		<b>YEAR: 2024</b>				<b>SCHOOL:</b>										
<b>DATE STARTED:</b>		<b>DATE COMPLETED:</b>														
<b>TEACHER:</b>		<b>NUMBER OF LEARNERS:</b>														
<b>TASK: PHASE 2</b>  <b>Pin Punch</b>		<b>FACETS</b>														
		Facing / centre drill x 2	Ø 25 mm	Ø 20 mm	Ø 12 mm	Length 40mm of Ø 12	Length 50mm of Ø 25	Length 20 mm of Ø 20	Taper length 15 mm	True measurements of diameter	Taper Calculations – Worksheet 2.1	45° Chamfer 2 mm	Knurling	Finishing and Safety	Sub-Total	<b>Total</b>
<b>##</b>	<b>Name of learners</b>	<b>10</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>70</b>	<b>50</b>
<b>1</b>	Learner–Self-Assessment															
	Date of self-assessment:															
<b>2</b>	Teacher Assessment															
	Comment:															
<b>3</b>	Internal Moderation															
	Comment:															
<b>4</b>	Provincial Moderation															
	Comment:															
<b>5</b>	External Moderation															
	Comment:															
<b>General Feedback:</b>																
SIGNATURE OF EDUCATOR																
SIGNATURE OF DEPARTEMENTAL HEAD																
SIGNATURE OF PRINCIPAL																
SIGNATURE OF SUBJECT ADVISOR																

**PHASE THREE:****TERMINOLOGY – HAMMER**

**NOTE:** Phase 3 and Phase 4 will make out a complete project – a hammer. Phase 3 consist of the hammer head and Phase 4 the hammer handle.

**HAMMER**

**FIGURE 3.1 – Hammer**

**TERMINOLOGY AND JOINING METHODS – HAMMERHEAD****Procedure:**

Learners are to do the following Practical Assessment Task for drilling, tapping, cutting screw thread and joining two projects (Phase 3 and Phase 4) together.

**READ ALL THE INSTRUCTIONS FIRST THEN PROCEED  
FOLLOW ASSESSMENT INSTRUCTIONS AS INDICATED**

**Material needed:**

- One Ø50 mm x 200 mm Aluminium rod.

**Tools required:**

- Vernier caliper
- Micrometer
- Steel ruler
- Cutting tools for lathe turning and parting.
- Drills
- Taps and dies.

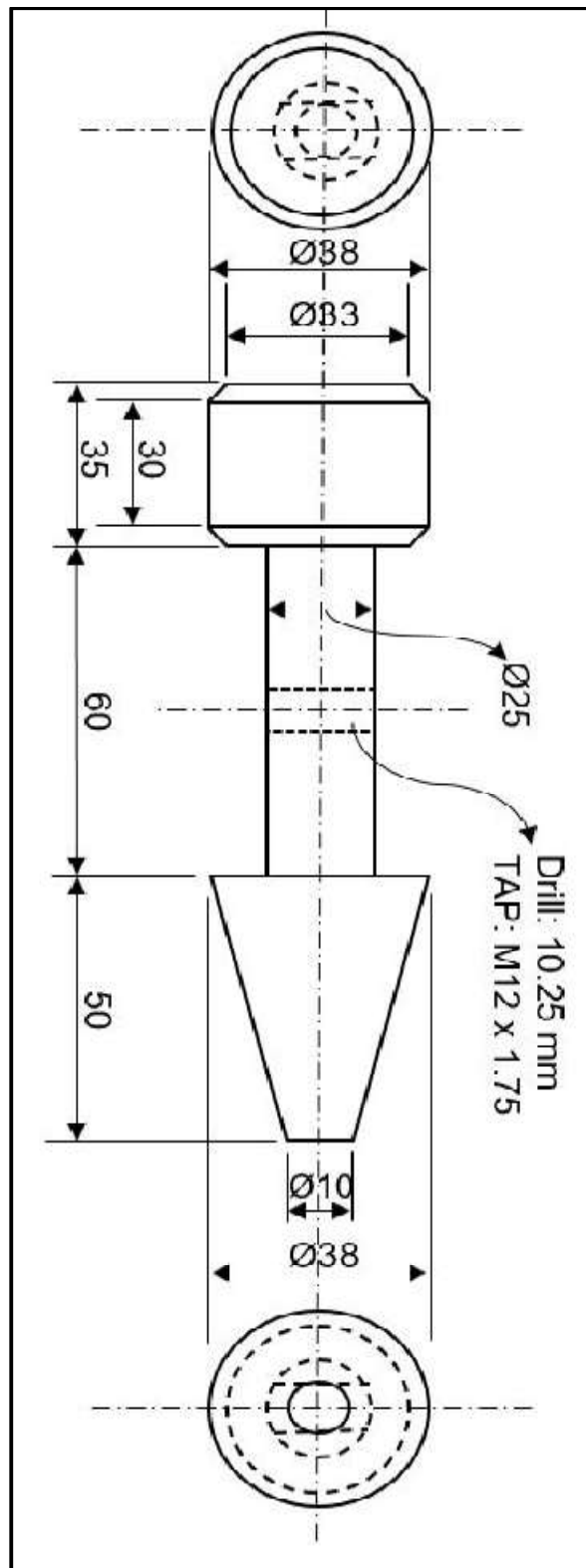


FIGURE 3.2 – Hammer Head

## Instructions:

- 1) Secure material in machine chuck.
- 2) Face both sides of material.
- 3) Drill centre hole on one side of work piece.
- 4) Clamp the material to leave you with about 120mm working length.
- 5) Machine the outside diameter to Ø38mm.
- 6) Start machining on the round side of the hammer by using a parting tool to cut a groove to the correct length (35mm) and depth of centre piece to Ø25mm. Keep in mind to add the length of the centre hole to the 35mm, it needs to be machined off at the end of the process.
- 7) Adjust the parting tool to cut another groove to the length of the 60mm and depth to Ø25mm.
- 8) Complete machining of centre piece (Ø25mm) by using left- and right-hand cutting tools or alternatively use your parting tool to do final cut.
- 9) Loosen work piece and clamp on centre piece in order to cut away the centre hole.
- 10) Set compound slide to 45 degrees and cut the two chamfers on round head of hammer.
- 11) Turn the work piece around and clamp on centre piece. (Ø25mm)
- 12) Do calculations in order for you to set your compound slide to the correct angle to cut the taper.
- 13) Set your compound slide to correct angle.
- 14) Cut the taper and finish off.

### **Marking Rubric – PAT Phase 3 – Hammer Head**

GRADE: 10			YEAR: 2024					SCHOOL:									
DATE STARTED:								DATE COMPLETED:									
MECHANICAL TECHNOLOGY – Fitting & Machining								EDUCATOR:									
PROJECT: PAT PHASE 3								NUMBER OF LEARNERS:									
Page 1 of ...																	
HAMMER HEAD																	
TASK: HAMMER HEAD		FACETS															
		Length						Diameter				True measurements of Taper Head	Taper Calculations – Worksheet 3.1	Finishing	Safety	Sub-Total	TOTAL
								Flat Head		Taper Head							
		Total Length – 145 mm	Flat Head – 35 mm	Between chamfers – 30 mm	Body Length – 60 mm	Taper Head Length – 50 mm	Centre of Hole for handle – 30 mm	Ø 38 mm	Ø 33 mm	Big Diameter - Ø 38 mm	Small Diameter - Ø 10 mm						
NAMES OF LEARNERS		5	5	5	5	5	5	5	5	5	5						
1	Learner – Self-Assessment																
	Date of self-assessment:																
2	Teacher Assessment																
	Comment:																
3	Internal Moderation																
	Comment:																
4	Provincial Moderation																
	Comment:																
5	External Moderation																
	Comment:																
General Feedback:																	
SIGNATURE OF EDUCATOR:																	
SIGNATURE OF HEAD OF DEPARTMENT:																	
SIGNATURE OF PRINCIPAL:																	
SIGNATURE OF SUBJECT ADVISOR:																	

**This worksheet MUST be evident in the learner's portfolio file and be presented for moderation**

WORKSHEET 3.1			
<b>TRUE MEASUREMENTS.</b>			
Learner measure final diameter BEFORE attempt of calculations and setting of compound slide angle.			
3.1.1 True Measurement	Ø	5	
3.1.2 Calculations			
$\tan \frac{\theta}{2} = \frac{D - d}{2 \times l} \quad (l = \text{Taper length})$			
		5	



## **FINAL PAT TASK- PHASE 4**

### **TERMINOLOGY AND JOINING METHODS – HAMMER HANDLE**

This task must be done during practical periods during Term 1 - 3.

Learners must adhere to safety rule and regulations during this task. Educator must demonstrate task to learners so that they can gain the confidence and necessary skills to complete this task.

The material needed for this task:

- 200mm long, Ø25 mm Aluminium rod.
- Cooling liquid for machines
- Suitable cutting tools on lathe machine
- Safety glasses
- Proper safety equipment
- Lathe machines

The lathe must be set up accordingly to the required speed for Ø25mm Aluminium.

#### Process:

- 1) Secure material in machine chuck.
- 2) Face both sides of material.
- 3) Drill centre hole on one side of work piece.
- 4) Machine the outside diameter to Ø20mm and length of 210mm.
- 5) Machine 17mm length to Ø12mm and cut thread.
- 6) Use parting tool to cut groove on 20mm length, 4mm deep.
- 7) Machine Ø12mm to total length of 97mm.
- 8) Calculate angle and cut 6mm chamfer.
- 9) Knurl Ø20mm and cut grooves.
- 10) Turn work piece around, machine to length and finish off.

# HAMMER HANDLE

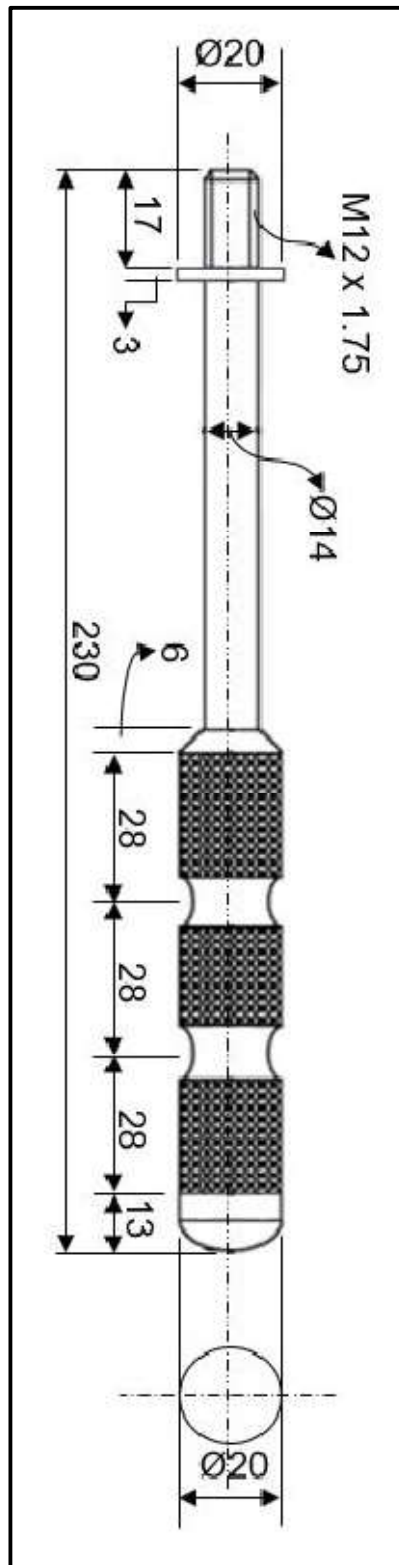


FIGURE 4.1 - HAMMER HANDLE

**FINAL PAT Task Phase 4 – Grade 10**

<b>GRADE: 10</b>		<b>YEAR: 2024</b>				<b>SCHOOL:</b>														
<b>DATE STARTED:</b>						<b>DATE COMPLETED:</b>														
<b>MECHANICAL TECHNOLOGY – Fitting &amp; Machining</b>						<b>EDUCATOR:</b>														
<b>PROJECT: FINAL PAT TASK – Turning and Screw Thread</b>						<b>NUMBER OF LEARNERS:</b> Page 1 of														
<b>TURNING TASK</b>																				
<b>FACETS</b>		Facing and centre drilling	Diameter				Length					Cutting of screw thread	Knurling	Finishing of handle	Safety	Handle fit in head	Handle square to head	Functionality	Aesthetic appearance	<b>TOTAL:</b>
			Ø 14 mm	Handle Ø 20 mm	Collar Ø 20 mm	2 x Recess on handle same size	Total length – 230 mm	Screw thread – 17 mm	Collar – 3 mm	Knurling distance – 84 mm	Taper – 6 mm									
<b>Names of Learners</b>		<b>10</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>100</b>
1	Learner – Self-Assessment																			
	Date of self-assessment:																			
2	Teacher Assessment																			
	Comment:																			
3	Internal Moderation																			
	Comment:																			
4	Provincial Moderation																			
	Comment:																			
5	External Moderation																			
	Comment:																			
<b>SIGNATURE OF EDUCATOR:</b>																				
<b>SIGNATURE OF HEAD OF DEPARTMENT:</b>																				
<b>SIGNATURE OF PRINCIPAL:</b>																				
<b>SIGNATURE OF SUBJECT ADVISOR:</b>																				

**GRADE 10**

**PRACTICAL ASSESSMENT TASKS**

**PHASES ONE, TWO, THREE and FOUR**

**ANNEXURE A**

**DECLARATION OF AUTHENTICITY**

NAME OF THE SCHOOL: .....

NAME OF LEARNER: .....

(FULL NAME(S) AND SURNAME)

EXAMINATION or I.D. NUMBER: .....

NAME OF TEACHER: .....

SCHOOL STAMP

I hereby declare that the project submitted for assessment is my own, original work and has not been previously submitted for moderation.

\_\_\_\_\_  
**SIGNATURE OF CANDIDATE**

\_\_\_\_\_  
**DATE**

As far as I know, the above declaration by the candidate is true and I accept that the work offered is his or her own.

\_\_\_\_\_  
**SIGNATURE OF TEACHER**

\_\_\_\_\_  
**DATE**