



# **basic education**

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Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **MECHANICAL TECHNOLOGY (FITTING AND MACHINING)**

### **GUIDELINES FOR PRACTICAL ASSESSMENT TASKS**

**GRADE 12**

**2020**

**These guidelines consist of 20 pages.**

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## 1. INTRODUCTION/BACKGROUND

The 17 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

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 learners 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 learners complete the practical assessment tasks within the stipulated period to ensure that learners 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 learner in each specialisation field. A nation's true wealth is in its manpower and education that should aim to develop the talents of a learner so that he/she can contribute to the well-being of the society by using and developing scientific and technological resources.

To prepare a learner in MECHANICAL TECHNOLOGY'S specialisation fields, one must focus on the following:

- An attitude where the learner 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 learner with the necessary practical capabilities for the required processes. Practical training is the application of acquiring essential skills to bridge between trade theory and practice.

Practical application in the workshop must therefore be made an interesting and challenging experience to develop the learner physically and mentally. The learner 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 learners 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, learners 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).

### **2.2 Assessment of PAT**

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

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 learner. Formal assessment should always be conducted and recorded by the teacher.

### **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 learner 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 up or downwards depending on the decision reached as a result of moderation.

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

If a learners' practical assessment task is incomplete or unavailable with valid reason, the learner may be given three weeks before the commencement of the final end-of-year examination to submit the outstanding task. Should the learner fail to fulfill the outstanding PAT requirement, such a learner will be awarded a zero mark 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 fulfill the outstanding PAT requirement, the marks for these components will be omitted and the final mark for Mechanical Technology

**2.5 Declaration of Authenticity**

NAME OF THE SCHOOL:

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NAME OF LEARNER:

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(FULL NAME(S) AND SURNAME)

NAME OF TEACHER:

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

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SIGNATURE OF CANDIDATE

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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.

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SIGNATURE OF TEACHER

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DATE

SCHOOL STAMP

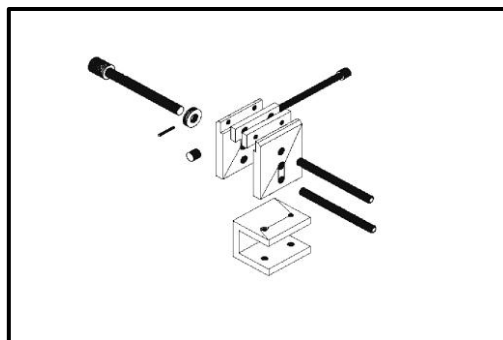
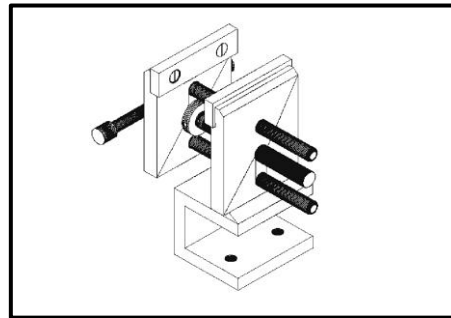
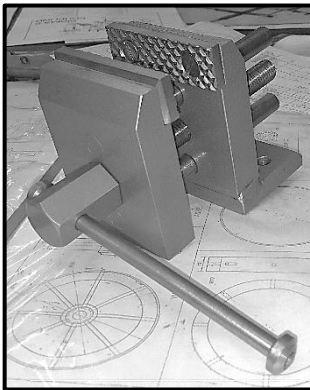
### 3. LEARNER GUIDELINES

#### Instructions to the learner

- The practical assessment task (PAT) consists of a specialisation task in **Fitting and Machining**. The practical work is spread over three terms, as set out in this document. (See CAPS document.)
- All tasks must be completed according to the time frames set out in each of the tasks.
- Learners are requested to actively engage in all practical assessment tasks.
- Learners who are uncooperative will receive demerits or a zero mark for that particular section of the work.
- Learners who act unsafely in the workshop and place other learners in danger, will be given additional corrective tasks to improve their safety awareness.

**4. FITTING AND MACHINING (SPECIFIC)**

**TASK: BENCH VICE**



**Term: 1 to 3**

**Start date: January 2020**

**Completion date: August 2020**

**The following standards must be achieved:**

- All sizes must be within the given tolerance.
- There must be no damage to tools and equipment.
- All appropriate safety procedures must be adhered to.
- The project must be well presented.

**RESOURCES REQUIRED FOR PAT:**

Consumable materials required per learner					
Part	Material	Dimensions	Quantity per learner	No. of learner	Total quantity
Fixed jaw	Mild steel 70 x 12 flat bar	86 x 70 x 12	1		
Moving jaw	Mild steel 70 x 12 flat bar	86 x 70 x 12	1		
Jaw linings	Mild steel 20 x 8 flat bar	74 x 20 x 8	2		
Guide pins	Bright mild steel 12 mm round bar	120 x 12	2		
Screw	Bright mild steel 20 mm round bar	145 x 20	1		
Handle	Bright mild steel 12 mm round bar	120 x 12	1		
Base	Mild steel 70 x 12 flat bar	± 100 x 70	1		

**NOTE:** This material list is NOT a cutting list. The teacher must determine and create the cutting list.

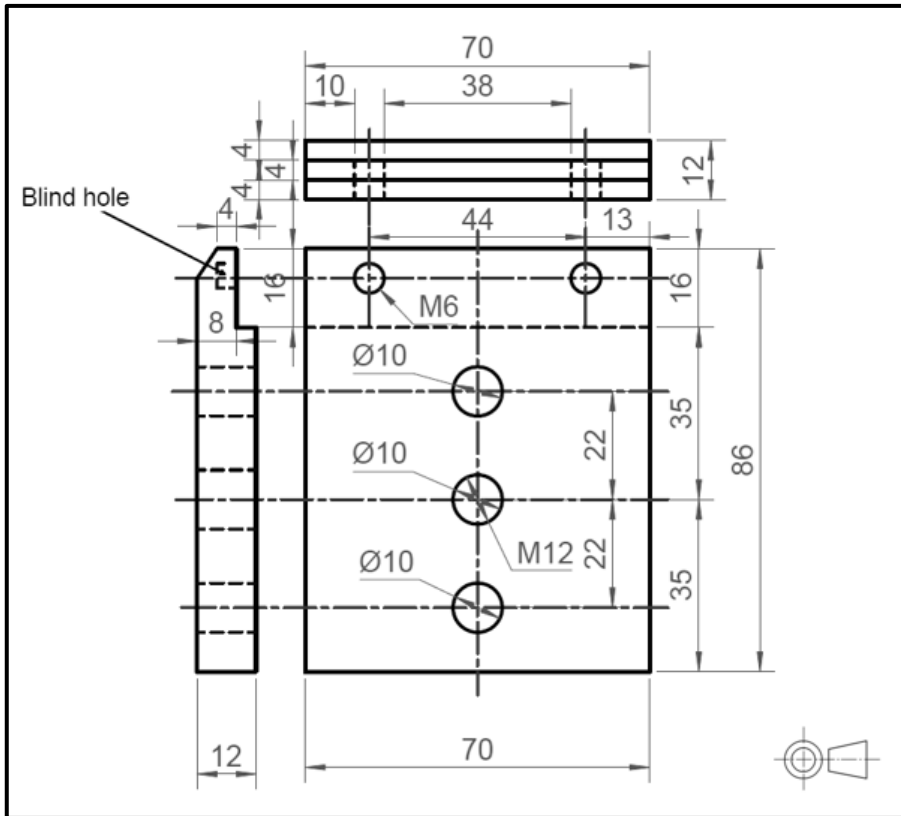


FIGURE 1: FIXED JAW

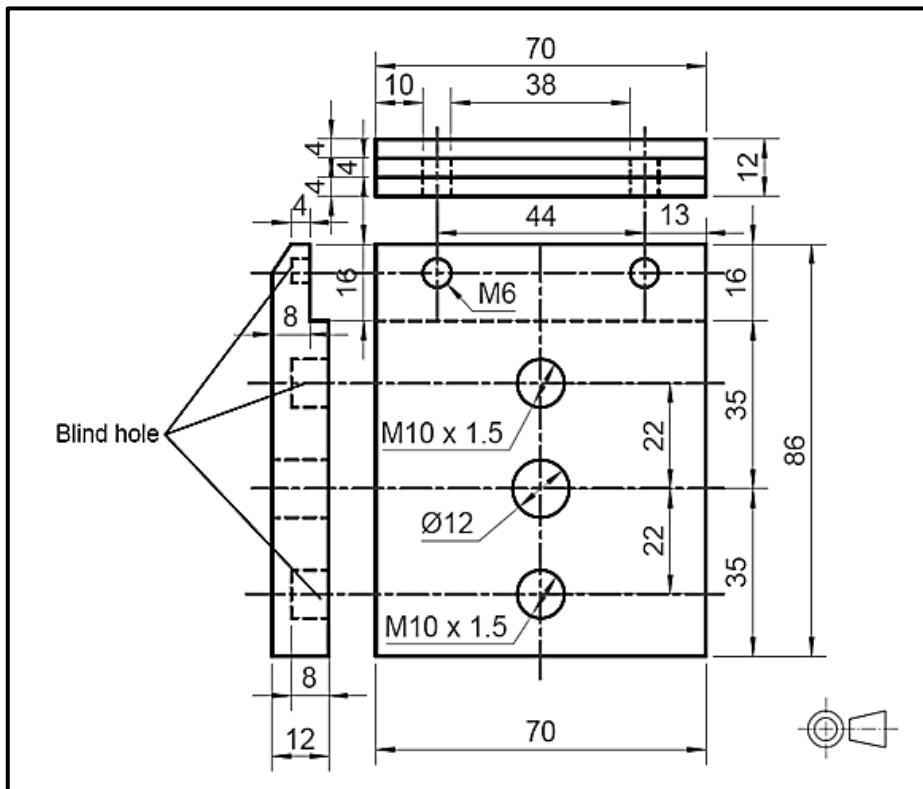
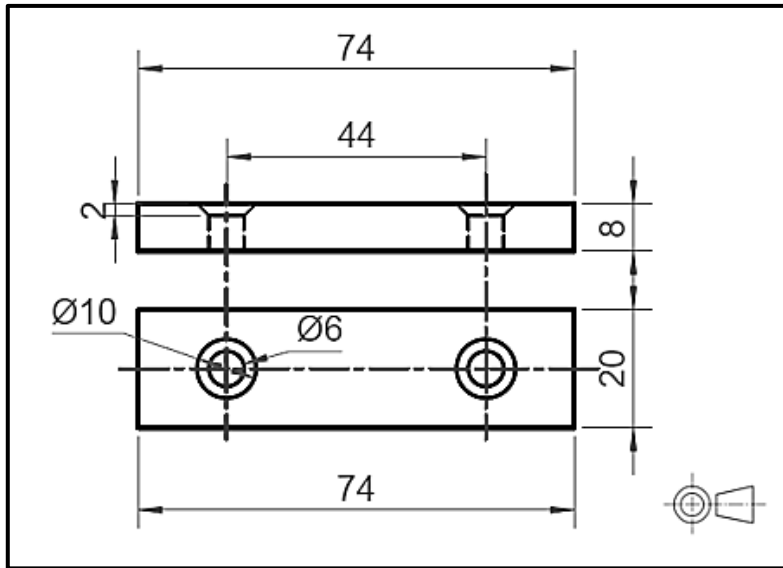
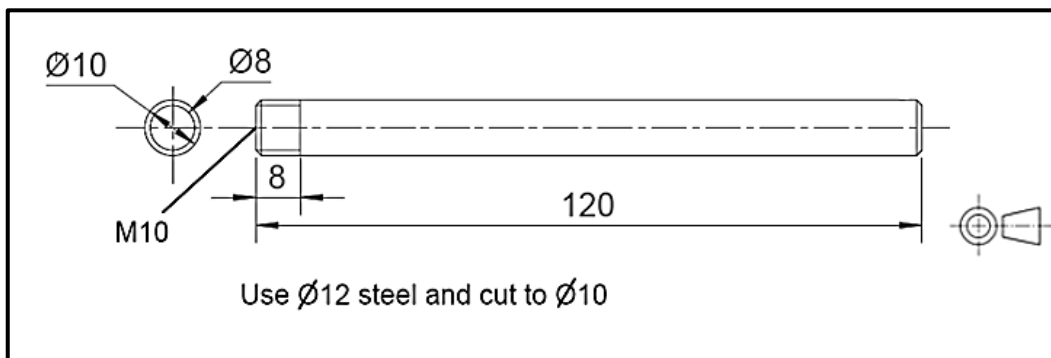


FIGURE 2: MOVING JAW

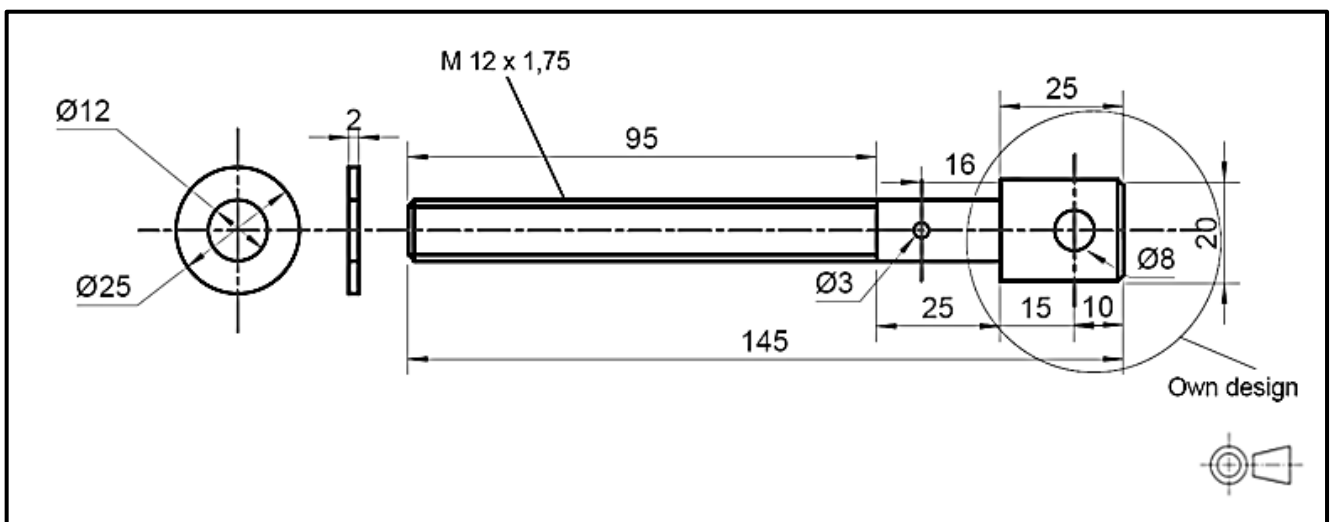




**FIGURE 3: JAW LININGS**



**FIGURE 4: GUIDE PINS**



**FIGURE 5: SCREW**

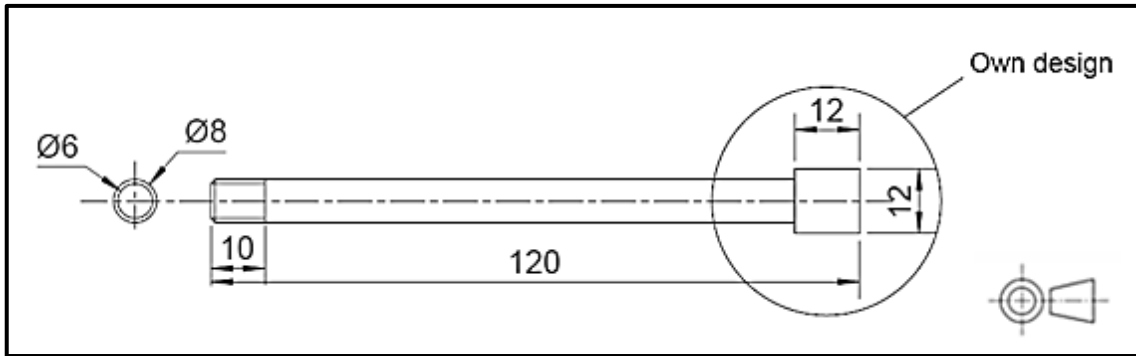


FIGURE 6: HANDLE

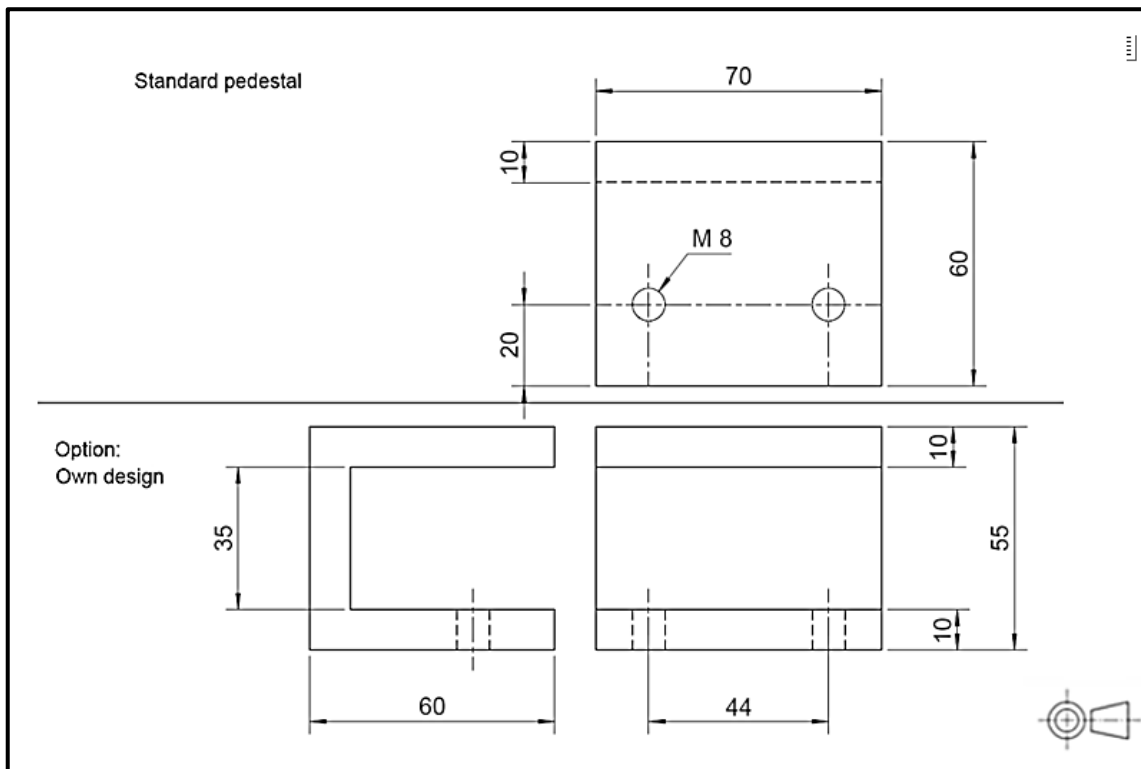


FIGURE 7: BASE

**NOTE:**

On all the diameters learners will lose 1 mark for every 0,1 mm deviation from the basic size and on all the lengths learners will lose 1 mark for every 0,5 mm deviation from the basic size. (See tables A and B)

**Marking DIAMETERS:**

DEVIATION	MARK DEDUCTIONS
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

TABLE A

**Marking LENGTHS:**

DEVIATION	MARK DEDUCTIONS
0–0,5	-0
0,5–1,0	-1
1,0–1,5	-2
1,5–2,0	-3
2,0–2,5	-4
3,0 and more	-5

TABLE B

<b>MECHANICAL TECHNOLOGY</b>															
<b>FITTING AND MACHINING</b>															
<b>MARK SHEET – FIXED JAW (FIGURE 1)</b>															
<b>GRADE</b>		<b>12</b>			<b>DATE</b>										
<b>PROJECT</b>		<b>BENCH VICE</b>													
		<b>LEARNERS</b>													
<b>FACETS</b>	<b>M A R K S</b>														
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
86 length	5														
16 x 4 step	10														
M6 tapping	10														
10 mm holes	5														
M12 tapping	10														
45° milling	5														
Finish	5														
<b>TOTAL</b>	<b>50</b>														
<b>SIGNATURE OF TEACHER</b>															
<b>SIGNATURE OF SUBJECT HEAD</b>															

<b>MECHANICAL TECHNOLOGY</b>															
<b>FITTING AND MACHINING</b>															
<b>MARK SHEET – MOVING JAW (FIGURE 2)</b>															
<b>GRADE</b>		<b>12</b>			<b>DATE</b>										
<b>PROJECT</b>		<b>BENCH VICE</b>													
		<b>LEARNERS</b>													
<b>FACETS</b>	<b>M A R K S</b>														
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
86 length	5														
16 x 4 step	10														
M6 tapping	10														
M10 tapping	10														
12 mm hole	5														
45° milling	5														
Finish	5														
<b>TOTAL</b>	<b>50</b>														
<b>SIGNATURE OF TEACHER</b>															
<b>SIGNATURE OF SUBJECT HEAD</b>															

<b>MECHANICAL TECHNOLOGY</b>																	
<b>FITTING AND MACHINING</b>																	
<b>MARK SHEET – JAW LININGS (FIGURE 3)</b>																	
<b>GRADE</b>		<b>12</b>		<b>DATE</b>													
<b>PROJECT</b>		<b>BENCH VICE</b>															
		<b>LEARNERS</b>															
<b>FACETS</b>	<b>M A R K S</b>																
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	
74 length	5																
M6 tapping	5																
Counter sink	5																
Clamp surfaces	5																
Finish	5																
<b>TOTAL</b>	<b>25</b>																
<b>SIGNATURE OF TEACHER</b>																	
<b>SIGNATURE OF SUBJECT HEAD</b>																	

<b>MECHANICAL TECHNOLOGY</b>																
<b>FITTING AND MACHINING</b>																
<b>MARK SHEET – GUIDE PINS (FIGURE 4)</b>																
<b>GRADE</b>		<b>12</b>			<b>DATE</b>											
<b>PROJECT</b>		<b>BENCH VICE</b>														
		<b>LEARNERS</b>														
<b>FACETS</b>	<b>M A R K S</b>															
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>
120 x 10	10															
M10 screw thread	5															
Finish	5															
<b>TOTAL</b>	<b>20</b>															
<b>SIGNATURE OF TEACHER</b>																
<b>SIGNATURE OF SUBJECT HEAD</b>																

<b>MECHANICAL TECHNOLOGY</b>																
<b>FITTING AND MACHINING</b>																
<b>MARK SHEET – SCREW (FIGURE 5)</b>																
<b>GRADE</b>		<b>12</b>			<b>DATE</b>											
<b>PROJECT</b>		<b>BENCH VICE</b>														
		<b>LEARNERS</b>														
<b>FACETS</b>	<b>M A R K S</b>															
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>
145 length	5															
25 length	5															
120 x 12	10															
M 12 screw thread	15															
3 mm hole	5															
8 mm hole	5															
Finish	5															
<b>TOTAL</b>	<b>50</b>															
<b>SIGNATURE OF TEACHER</b>																
<b>SIGNATURE OF SUBJECT HEAD</b>																



<b>MECHANICAL TECHNOLOGY</b>															
<b>FITTING AND MACHINING</b>															
<b>MARK SHEET – HANDLE (FIGURE 6)</b>															
<b>GRADE</b>		<b>12</b>				<b>DATE</b>									
<b>PROJECT</b>		<b>BENCH VICE</b>													
		<b>LEARNERS</b>													
<b>FACETS</b>	<b>M A R K S</b>														
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
108 x 8 mm length	5														
M8 screw thread	5														
12 mm cap length	5														
Finish	5														
<b>TOTAL</b>	<b>20</b>														
<b>SIGNATURE OF TEACHER</b>															
<b>SIGNATURE OF SUBJECT HEAD</b>															

<b>MECHANICAL TECHNOLOGY</b>															
<b>FITTING AND MACHINING</b>															
<b>MARK SHEET – BASE (FIGURE 7)</b>															
<b>GRADE</b>		<b>12</b>				<b>DATE</b>									
<b>PROJECT</b>		<b>BENCH VICE</b>													
		<b>LEARNERS</b>													
<b>FACETS</b>	<b>M A R K S</b>														
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>
Design	5														
Accuracy	10														
Finish	5														
<b>TOTAL</b>	<b>20</b>														
<b>SIGNATURE OF TEACHER</b>															
<b>SIGNATURE OF SUBJECT HEAD</b>															

<b>MECHANICAL TECHNOLOGY</b>																	
<b>FITTING AND MACHINING</b>																	
<b>MARK SHEET – ASSEMBLY AND TOTALS</b>																	
<b>GRADE</b>		<b>12</b>			<b>DATE</b>												
<b>PROJECT</b>		<b>BENCH VICE</b>															
		<b>LEARNERS</b>															
<b>FACETS</b>	<b>M A R K S</b>																
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	
Safety	5																
Assembly	5																
Presentation	5																
<b>TOTAL</b>	<b>15</b>																
<b>TOTALS</b>																	
FIXED JAW	50																
MOVING JAW	50																
JAW LININGS	25																
GUIDE PINS	20																
SCREW	50																
HANDLE	20																
BASE	20																
ASSEMBLY	15																
<b>TOTAL</b>	<b>250</b>																
<b>Total PAT Mark</b>	<b>100</b>																
<b>SIGNATURE OF TEACHER</b>																	
<b>SIGNATURE OF SUBJECT HEAD</b>																	

## 5. CONCLUSION

On completion of the practical assessment task learners should be able to demonstrate their understanding of the industry, enhance their knowledge, skills, values and reasoning abilities as well as establish connections to life outside the classroom and address real-world challenges. The PAT furthermore develops learners' life skills and provides opportunities for learners to engage in their own learning.