



# **EXAMINATIONS COUNCIL OF ESWATINI**

Eswatini Prevocational Certificate of Secondary Education

## **Technical Studies (5925)**

**Examination Report for 2023**

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**EPCSE TECHNICAL STUDIES****Paper 5925/02****General Comments**

This paper consists of two components namely Graphics which is found in **Section A** and Resistant materials in **Section B**. The overall performance was not up to the expected standard, but there were individual candidates who performed very well.

Candidates were expected to attempt all questions from both sections. The Graphics (**Section A**) component proved to be a challenge as some candidates left a number of questions unanswered. The Resistant Materials Component (**Section B**) was fairly done and most candidates were able to score good marks.

**Comments on Specific Questions****Section A****Question 1**

Five conventional symbols were shown and candidates were expected to state what each one represents. Most candidates performed below the expected standard on this question. Only six candidates from the ninety-two performed well on this question while fifteen did not even attempt it. Almost all candidates struggled with the last two sub-questions. The correct answer for (d) is rectangular piece of wood and steel for (e). **This suggests that educators have to pay attention to this topic because most candidates from centres struggled with conventions.**

**Question 2**

Two views of a simple rectangular block with a slot at the bottom were shown. Candidates were required to draw the block in perspective using the given vanishing points. Only ten candidates scored good marks on this question while thirty-one did not attempt it. A good majority of those who attempted it failed to use the given corner AB as a starting point. This was a poorly done item. Centres are advised teach this method of drawing because it is also part of the syllabus.

**Question 3**

A V-block drawn in isometric was shown. Candidates were expected to draw a front elevation of the block looking in the direction of arrow F. Most candidates drew a plan, front and an end elevation of the block yet they were only expected to produce a front view. This is an indication

that candidates do not read instructions. About a quarter of the total candidates were able to produce the front elevation correctly including the hidden detail. Another quarter did not attempt the question while the rest scored very low or no marks at all

#### **Question 4**

A plan and a front elevation of a truncated hexagonal duct were shown. Candidates were expected to produce a surface development of the duct with A-A as a seam. Half the total number of candidates who sat for this paper did not even try to answer this question while only five candidates scored good marks for themselves. The rest of the candidates who attempted this question scored very low or no marks at all. This was the most poorly done question in this paper.

#### **Question 5**

Views of an angle bracket were shown. This bracket has a web which is cut across. Candidates were expected to draw a sectional plan on X-X. The intention of this question was to test if candidates know how to treat a web when cut across. Only seven candidates scored good marks on this one. A very sizable number did not attempt this question while those who attempted it failed to show where the cut on the web ends, as a result they sectioned the whole web. They also sectioned the whole upright, failing to show that it tapers and it is cut halfway up.

#### **Question 6**

A view of an engineer's centre square was shown. Candidates were expected to reproduce the centre square using strict geometric constructions. Candidates were expected to show how the  $60^\circ$  angle and the tangent are constructed. About half the total number of candidates who sat for this paper did not attempt this question and only nine scored good marks for themselves. The rest of the candidates failed to construct the  $60^\circ$  angle. They also failed to use geometric constructions to produce the tangent, instead they just drew a line to touch the circular part at the top.

## Section B

### Question 1

- (a) Two safety symbols found on liquid perishables were shown and candidates were asked to state when each one is used. Most candidates failed to state the functions of the symbols.
- (i) The symbol is used to warn users that the **liquid can cause metals to rust.**
  - (ii) The symbol is used to warn users that the **liquid is flammable.**
- (b) Images of two PPEs were shown and candidates were required to name them. This item was well answered by most candidates.
- (i) The correct response is **Apron.**
  - (ii) The correct response is **overall.**
- (c) A table with hand tools was shown. The first tool is an **odd-leg caliper**. Most candidates got this one correct to scoop themselves one mark. The second tool is a **marking gauge**. Most candidates got it correct even though there a few who wrote mortice gauge. The last tool is a **micrometer screw gauge**, which more than 75% of the candidates got correct.
- (d) Two profiles cut on metal were shown and candidates were required to name the type of file that could be used to file each one of them. The profile in (i) can be filed using a **hand file** and most candidate answered this one correctly while a few wrote flat file. Those who wrote flat file were not awarded any mark while those who wrote hand file were credited with a full mark. Profile (ii) can be filed using a **half round file**. Candidates who wrote round file were also credited with one mark because such a file is used for filing profiles with inner radii.
- (e) Candidates were asked to name the tool used for locating a centre to allow a wing compass to be used without slipping when scribing an arc on a piece metal. The correct response is **a Dot punch**. Very few candidates wrote dot punch while the majority wrote centre punch. However, both responses were awarded one mark because a dot punch is a smaller version of a centre punch, hence they can perform the same function.

## Question 2

- (a) A piece of wood was shown in a sketch with waste material clearly marked. Candidates were required to explain how the waste material could be marked out and removed on a table saw.
- (i) Candidates were expected to mention the **use of a marking gauge and a try-square to mark the lines**, which a good majority did to score the two marks on offer.
  - (ii) Candidates were expected to make mention of **setting of the fence to be 25mm away from the blade, setting the blade height to be at 25mm and the cutting process** to be guaranteed all four marks. Only two candidates were able to mention the setting up procedure which scored them good marks. The rest of the candidates seemed clueless about the use of the table saw. Centres, are advised to give their students practice on machine use to familiarize them with what they can expect in the industry.
- (b) Candidates were expected to complete a table on the use of holding devices. A bench vice holding a piece of acrylic was shown. Candidates were expected to state the possible damage to the work piece when it is cut with a saw and how this could be prevented. The possible damage is **breaking of the acrylic through uncontrolled vibrations**. The correct preventive measure is **putting a piece of scrap wood behind the acrylic piece before cramping**. This was probably one item that most candidates were able to answer correctly.

In the second part of the question, a G-cramp holding two pieces which are being glued together is shown. The possible damage in this operation is the cramp **denting the workpieces**. Well answered question even though most candidates wrote damage the pieces under the possible damage column.

## Question 3

- (a) A lathe machine was shown in this part of the question
- (i) Candidates were asked to name the machine. This was a poorly answered question because most candidates simply wrote **lathe** instead of giving the specific type of lathe. Centres are advised to note and emphasize to their students that there are two types of lathes: A **wood turning lathe** and a **centre lathe** for turning metal products. The correct answer for this question is a **wood turning lathe**.

- (ii) Candidates were asked to explain why one of the centres of this machine is referred to as a live centre. A lot of candidates wrote: because it holds the work, which is not a creditable response. A live centre does not hold the work but it merely supports long work pieces to reduce vibration which compromises the surface finish. It is referred to as a live centre because it has moving parts which allows the work piece to rotate freely or simply put: ***it is called a live centre because it rotates.***
- (iii) A square piece of wood to be turned on a lathe machine was shown. Candidates were required to explain how this piece could be prepared before being mounted to the lathe for turning. Only 3 candidates scooped good marks on this one. Most candidates had no clue at all which may be an indication that lathe work is not adequately covered in most centres.
- (b) (i) An incomplete drawing of a firmer chisel was shown and candidates were asked to complete it. Very few candidates got this one right. Most candidates drew a beveled edge chisel. This could be attributed to the fact that some books classify both chisels as Firmer chisels (square edged firmer and bevel edged firmer) yet some only refer to the square edged as a firmer chisel. Candidates were given the benefit of doubt and awarded full marks even for drawing a beveled edge chisel. I will recommend that in future it would be better to refer to this chisel as a square edged firmer chisel rather than simply firmer chisel.
- (ii) Candidates were asked why a hammer is not used to drive chisels. Most candidates responded by writing: The handle will split, which is not an entirely correct response. However, those who gave this response were credited with the full mark. The correct response is: ***a hammer can damage the handle of the chisel.***
- (iii) Candidates were required to state the purpose of a ferrule in a chisel. The correct response is: ***It prevents the handle splitting.*** A well answered item.
- (iv) In this part of the question, candidates were asked to name any material that could be used to make chisel handles. ***Creditable responses are plastic (softened polyethylene, nylon) and wood (ash, beech, oak, hickory).*** Candidates who simply wrote plastic and wood were awarded the full mark because the question

did not require them to name specific materials. Most candidates scooped the one mark for themselves.

#### Question 4

- (a) A product made from a combination of wood and acrylic is shown. Candidates were required state which type of plastic acrylic is. **Acrylic is a thermoplastic.** Well answered question as most candidates got this one correct.
- (b) Candidates were asked to state properties of acrylic. Expected and creditable responses are: **Stiff, hard, glass clear, very durable, safe with food, good electrical insulation etc.** Most candidates scooped the full mark.
- (c) Candidates were expected to make a neat sketch of a mould that could be used to make the acrylic part of the product. Most candidates could not sketch a creditable mould. From the look of things candidates didn't have an idea of what a mould is because what they sketched is nothing near what was expected.
- (d) Candidates were required to outline how marking out of the acrylic part could be done. This had to include tools to be used. The correct response was expected to include **a soft pencil or felt pen and a try-square.** Most candidates were able to score at least one mark from the allocated two.
- (e) Candidates were expected to use sketches and notes to show how the acrylic top could be folded to shape. The sketch has to **show retaining strips and grooves/housings for holding the acrylic in position in position while it cools.**

#### Question 5

A figure of a polystyrene tray to be made in the workshop was shown.

- (a) (i) Candidates were required to state the name of a suitable plastic shaping machine that could be used to make the tray. Candidates mentioned a variety of plastic shaping machines most of which cannot perform the operation. The correct machine is a **vacuum former.**



- (ii) This question required candidates to make a sketch of a suitable mould that could be used to produce the tray. Very few candidates were able to sketch a suitable mould while the majority reproduced the image of the tray.
- (b) This part of the question shows a sketch of two metal components that are to be joined by means of a temporary fastener. Candidates were expected add to the sketch, a suitable temporary fastener that could be used to hold the two pieces together. Most candidates were able **to sketch bolts and nuts while some sketched machine screws**. This was a well answered question. Full marks were awarded for a sketch of correct fastener in the correct position.

### Question 6

- (a) A sketch of a bench vice is shown. Candidates were expected to use sketches and notes to show an improvement that could be made to enhance the gripping of round bars. The best improvement is the use of **Vee grooved jaws**. Other creditable improvements were welcome. One or two candidates did sketch vee shaped jaws and were awarded full marks otherwise most of the sketches and notes did not deserve the two marks on offer. Any other design improvement apart from the vee groove could have been duly rewarded.
- (b) An image of a bench drilling machine without the guard was shown. Candidates were required to draw a V-belt in a position suitable for a 2mm diameter drill. Most candidates positioned the belt correctly **which is the biggest driver/driving pulley**. A few candidates decided to cross the belt which produces a reverse motion.
- (c) In this part of the question a sketch of 3mm thick sheet of mild steel with a slot running through the middle was shown. The ends of the slot are curved. Candidates were required to outline stages that could be followed to produce the slot. Candidates were expected to list processes and tools used in a chronological order. Processes include marking out, drilling, cutting/chopping out and filing. Almost all the candidates failed to state the processes and correct tools that could be used to cut out the slot.

**Question 7**

- (a) (i) A good majority scooped the mark on offer. The primary function of a window is **to admit light into a building.**
- (ii) In this part of the question candidates were required to use a sketch with notes to show what a casement window is. A good number of candidates were able to produce creditable sketches of this window but ignored to annotate them which deprived them of the full two marks on offer.
- (b) Candidates were asked to identify the sections of mild steel. This was a well-done question more especially the last part. The sections are **Angle iron and Square tube/tubing.**
- (c) This question was based on lathe work and candidates were expected to name the operations shown. **The first operation is parting off, the second is parallel turning and the last one is knurling.** A lot of candidates did not do well on this one. It would seem most centres do to adequately teach about the lathe. Centres are advised to give this topic enough attention because even in the previous years, candidates did not score good marks in lathe related items.
- (d) Another item on lathe work and poorly done as well. In this question, a three-jaw chuck holding a piece of work was shown and candidates were to sketch a lathe tool in position for a facing operation. Not even a single candidate could draw the tool, let alone placing it in the correct position for facing. It goes without saying that centres are not doing enough in lathe work hence the failure by candidates to give out correct responses for years on end.

**EPCSE TECHNICAL STUDIES****Paper 5925/03 Project****General comments**

EPCSE Technical studies is a coursework paper and a school-based component of the syllabus that is compulsory to all candidates registered for EPCSE Technical Studies. Each candidate undertakes a personally identified project based on a theme. Candidates are required to research, develop and assess their work in terms of user, purpose and functionality. The total number of candidates who registered for this course was 81. This is a slight increase in registrations over the previous years.

Most centres were able to meet the submission dates however some submitted incomplete projects especially the written work. It was noted that some candidates completed their projects without proper guidance by their supervisors which is their teachers in this case. Completion of the tangible product without proper documentation was a clear indication that guidance was not well provided hence most candidates lost marks due to lack of key elements of the design process.

It was also noted that some candidates submitted work sourced from previous examinations and this is serious malpractice. This tarnishes the image and integrity of the centre and may lead to disciplinary action. It is the responsibility of the teacher in charge to ensure that candidates do not engage in plagiarism.

**Comments on specific sections****Stage 1 – Proposal**

- At this stage candidates are expected to establish the need for design through theme analysis and problem identification. Candidates should be advised to try as much as possible to come up with a wide range of situational design ideas. Most candidates in tend to focus in similar design situations and that results in the duplication of ideas.
- Candidates should be advised that this stage informs stage 2 and 3 of the practical examination.
- Most candidates were able to generate a meaningful design brief with all the three basic elements i.e. user, function and location however some could not link the design brief with the problem statement.
- Generally most candidates demonstrated limited understanding of what is meant by methodology in a proposal as they presented very shallow information.

## **Stage2 – Investigation and Development**

### **Research and Product specification**

- The research stage should lead to information and key points to take forward to the design stage. The candidate should collect relevant data to stimulate ideation. Existing ideas should be relevant and informative. No marks awarded to ideas that are out of context of the design brief.
- Most candidates did not give a summary of information gathered from the research. The summary should state the insight of research that will inform the exploration new ideas.
- It was noted that most candidates have a tendency of reproducing existing ideas without any innovation.
- Most candidates did not show a clear understanding of the product specification in their research. A well written product specification should detail exactly what the product should comply with. The specification should be related to the environment or condition where the product will be used. A number of candidates say their products should be light in weight even when portability is of no value in the use of the product.

### **Ideation**

- Candidates should come up with a wide range of ideas that will answer the design problem. Three different concepts considered. Some candidates lost marks due to duplication of same concept.
- Most candidates presented creative design possibilities however some displayed a low level of creativity in the generation and exploration of own ideas. Some candidates would copy concepts of existing ideas and present them as their own ideas.
- All initial ideas should be analyzed and evaluated with meaningful justification of the chosen idea.
- There is a need to improve in graphic skills as most candidates demonstrated very low standard of sketching. Some candidates lost marks due to poor graphical communication.

### **Development and planning for production**

- This area was generally not well done as most candidates did not show clear understanding of the development stage. Candidates should understand that this a refining stage of the initial idea so that the developed idea performs much better than the initial idea. Any alteration should be made with justification and aim to improve the idea. Most candidates made insignificant alterations on the selected idea which do not add any value to the product. The developed idea should be evaluated against all specifications to justify the development.
- Candidates lost marks for failing to show creativity in modeling and trialing
- Some projects were completed without basic documentation like working drawings and cutting lists.
- Most candidates did not produce a detailed, logical sequence of the stages of manufacture.

**Product Realization**

- Most candidates had the product to show regardless of the basic documentation mentioned above yet marks are awarded with reference to the write up.
- Candidates should be advised to demonstrate a high level of competence in making as this is a skill based assessment. Some centres have demonstrated a very low standard of manufacture over the years.
- Some candidates lost marks for failing to apply finish.

**Testing and Evaluation**

- This section was fairly done as most candidates carried out a test of their products however some candidates did not show the essence of testing.
- This stage should inform the designer if the product really addresses the problem identified in the proposal stage. So candidates should evaluate the final product against the original specification.
- Few candidates did objective testing with proposals for further improvement.