



EXAMINATIONS COUNCIL OF ESWATINI

Eswatini Prevocational Certificate of Secondary Education

**Technical Studies (5925)
Examination Report for 2024**

TABLE OF CONTENTS

<u>Subject Code</u>	<u>Name of Component</u>	<u>Page N°</u>
5925/02	Technical studies	3 - 10

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 well.

Candidates were expected to attempt all questions from both sections. The Graphics (**Section A**) component proved to be a challenge even this year as a majority of candidates did not even attempt answering some of the questions. The Resistant Materials Component (**Section B**) was fairly done and most candidates were able to obtain marks in some questions.

Comments on Specific Questions

Section A

Question 1

- (a) An incomplete first angle projection symbol was shown, and candidates were expected to complete it. The correct response was a front view of the frustum with the small end on the left and positioned on the left of the end elevation or a front view of the frustum with the small end on the right and on the right of the end elevation. Most candidates were able to draw and place the front view of the frustum correctly.
- (b) A line diagram of a signpost was shown. Point D was at the bottom of the post and points A, B and C formed a triangular shape at the top of the post.
 - (i) Candidates were required to geometrically construct a circle to pass through points A, B and C. Only a few candidates were able to use geometrical constructions to find the centre of a circle that would pass through the three points. The correct way of doing this is by bisecting any two sides of the triangle ABC. The two bisectors meet at a point that is used as a centre to draw a circle that would pass through the three points.
 - (ii) Candidates were to draw a tangent from D which was at the bottom of the sign post to touch the circle at E. Very few candidates were able to use geometrical constructions to draw the tangent. Even though most candidates did draw a tangential line from D, they did not follow the due procedure which resulted in them not being awarded any mark. The correct procedure was to first join the centre of the circle to point D, bisect the distance between D and the centre and draw a semi-circle. Draw a normal from the centre passing through the point where the semi-circle cuts the circle (point E). Finally draw line from D to pass through point E.

Question 2

A table with features was given and candidates were required to draw conventional symbols in the corresponding columns. This proved to be a challenge for most centres as candidates once again dismally failed to score marks. The 2023 cohort also dismally failed to produce creditable responses on conventional symbols and it was even worse in 2024 because most candidates did not even attempt to answer the question.

Question 3

A front view of a truncated square duct was given and candidates were expected to produce a plan and a surface development. All candidates failed to score the five marks on offer. Candidates were expected to draw projection lines from the front view first to get the plan. A 45° is then used to get the true length of sides for the base.

Candidates were to draw projection lines from the front view to get the correct height of the development, take one side of the base/plan and step/mark it four times to get the length of the net and finally locate the points at the top for the cut.

Question 4

Three orthographic views of a shaped block were shown. Candidates were to draw a full-size isometric view of the block with corner X on the foreground. Most candidates did not attempt this one and the few that did could not position corner X correctly and did not score good marks.

Question 5

A front view and an incomplete plan of a truncated cylinder were shown. Candidates were expected to draw the true shape of the section taken from Y-Y. All candidates did not attempt this question.

Candidates were supposed to divide the base/plan into twelve equal parts, project all points to the side and transfer to the true shape. Project the twelve divisions from the plan to the front view until they meet the cutting plane Y-Y, project the twelve points at 90° to the cutting plane to the right. Transfer the divisions on the side of the plan such that they run parallel to the cutting plane Y-Y. Plot where these points meet to get the true shape of the section. The result is a hyperbolic shape with a straight line on one end.

Question 6

A front and an end elevation of a slide support were shown and candidates were expected to produce a sectional plan taken from S-S. One or two candidates attempted this one and they failed to score good marks, otherwise most candidates did not even do this one. This shows that educators from all centres must pay much attention on orthographic projection and sections if candidates are to score good marks in those areas of the syllabus.

Section B

Question 1

- (a) A marking gauge with parts A and B were shown. Candidates were required to label the parts. Part A is the Spur and part B is the Stock. Most candidates scooped the two marks on offer. There were, however, a few candidates who labeled part B as a head instead of stock which not awarded any mark.
- (b) Candidates were asked to state two things to consider when inserting a coping saw blade. The correct responses are (direction of teeth, blade tension and pins being in line). Most candidates were able to scoop the two marks on offer.
- (c) An image of a hammer in use was shown and candidates were asked to name it. The correct response is a claw hammer, and almost all candidates got this one correct.
- (d) A cross section of two hardwood pieces to be joined by means of a screw were shown. Candidates were required to name the three pre-drilled holes shown in the diagram. Hole 1 is a pilot hole, hole 2 is a clearance hole and hole 3 is a countersunk hole. A good majority scored all three marks while a few scooped 2 marks. This item was well answered. There were a few candidates who wrote shank for hole number two which was marked as wrong. Hole number accommodates the shank of a screw, but it is not called the shank.
- (e) A figure of a G-cramp holding down a workpiece was shown. Candidates were to give two reasons for having a scrap piece of wood between the G-cramp jaw and the workpiece. The scrap piece is meant to prevent damaging the workpiece and for increasing the surface area for increased cramping pressure. Most candidates scooped the 2 marks for themselves.

Question 2

- (a) A figure of a garden shed door with a structural weakness was shown.
 - (i) Candidates were asked to name the door. This is a ledged battened door. This was a poorly done part of the question. Most candidates only wrote battened door yet this door is made of ledges and buttons.
 - (ii) Candidates were required to modify the door to improve its structural strength. Fix the brace such that it points towards the bottom hinge to withstand compression. Almost all candidates were able to score at-least 1 mark from the possible 2. A good number of candidates scooped all the 2 marks.
 - (iii) The weight of the door will make it sag such that the button on the opening side of the door can end up touching the floor. A very good number of candidates gave creditable responses on this one to take the 1 mark on offer.
 - (iv) A suitable hinge for hanging this door is Tee hinge. A majority of the candidates gave varying responses and only a handful gave the correct response.

- (b) A labeled exploded view of a trolley was shown and candidates were expected to fill in the missing information in the cutting list. This proved to be the one of the easiest items as most candidates scored a minimum of 3 out of 4. Some candidates scooped all the 4 marks. The correct responses were: (i) 2600 (ii) Axle (iii) 2 and (iv) Nylon

Question 3

(a)

- (i) Candidates were to complete the given table by giving a suitable glue for the given situation. This was a poorly done item as most candidates failed to get the three marks on offer. Candidates were just clueless such that some gave names that are not associated with glues/adhesives.

Correct responses are shown in the table below.

Situation	Suitable adhesive
Joining metal to metal	Epoxy resin, two part (resin and hardener)
Joining plastic to wood	Impact, Super glue
Joining wood to wood	PVA, Cascamite

- (ii) Candidates were expected to detail how surfaces are prepared for wood to wood gluing. The most common response was use of glass-paper which is not accreditable. Another common mistake was the use of emery cloth, a finishing material for metal.

The correct response is ensuring the surfaces are clean, (free from grease/dust, no old paint/varnish/glue).

Very few candidates gave responses suggesting the cleaning of the surfaces hence this was a poorly done item.

- (iii) Candidates were expected to give details on how to apply an adhesive in wood-to-wood gluing. The most common response was 'apply glue to the two surfaces' which was not enough. The correct response was to outline the steps from start to finish as follows: Apply glue to both surfaces, clamp to squeeze out excess glue and wipe with a wet cloth.

- (iv) Candidates were to give one safety consideration when gluing.

Most candidates said gloves should be worn which did not score them the 1 mark. Creditable responses are: working in a well-ventilated place and avoiding contact with the skin.

- (b) A mild steel sheet with centres of two holes marked out was shown. Candidates were required to complete a given table by naming the appropriate tool used to perform the process on the corresponding column.
- (i) For marking out centre lines an odd-leg caliper, engineer's try square and a scribe are used. The most common response, which however did not score any mark was a centre/dot punch. Poorly done question
 - (ii) For drilling holes, a pedestal/Bench/Pillar drill, Electric hand drill are used. Most candidates scored this one mark.
 - (iii) For making edges flat a flat file is used. Most candidates said a hand file for which the one mark on offer was also given.
 - (iv) For testing for flatness, a straight edge is used. Candidates who wrote steel rule were awarded the full mark as were candidates who wrote try-square. This was one of the few questions that most candidates got correct.

Question 4

- (a) (i) A drawing of a sheet metal bracket and a wooden workpiece were shown. Candidates were required to name the most appropriate type of screw that could be used to fasten the bracket to the wooden part. A round head screw was the expected response. Very few candidates were able to score the one mark.
- (iii) Two wooden pieces to be joined by means of screws were shown. Candidates were to sketch a fixture that could be used with the screws to ensure they hold firmly on the end grain of one piece. Not even a single candidate was able to produce a correct sketch of the fixture. The fixtures are a raw plug and a dowel.
- (iii) Candidates were to specify two things to mention when buying screws. Correct responses are: Material used to make screw, material used on, type, size/gauge. Most candidates scored the two marks for themselves.
- (b) A solid wood frame was shown and candidates were required to:
- (i) Name parts A and B. This was a poorly done item as almost all candidates failed to score the two marks on offer. Centres are advised to teach constructional methods. The expected responses were: stile, for part A and rail for part B.
 - (ii) State two ways that could be used to test the frame for squareness. This one was well done as the majority of candidates scooped full marks. The correct responses are measuring to see if diagonals are equal and using a try-square to test if all four corners are at right angles.
 - (iii) Name any joint that could be used to part A to part B. This one was also poorly done which suggests that centres never paid attention to joints used in the different constructional methods. The correct joints are mortice and tenon, dowelled, corner halving, butt, mitre among others.

Question 5

- (a) An image of two wood pieces glued and nailed together was shown. Candidates required to:
- (i) Name the most suitable method of nailing for the kind of joint. About half of the candidates gave dovetail nailing as the correct response to scoop the mark on offer.
 - (ii) Show by means of a sketch the method of nailing best suited for this kind of joint. Very few candidates were able to produce creditable sketches of dovetail nailing hence most lost the one mark.
- (b) (i) An image of a leg, rail and top of a solid timber was shown and candidates were asked to show by means of sketches how the rail could be fixed to the top. All candidates failed to produce creditable sketches with most not even attempting the sketch. All candidates lost the two marks on offer. The expected sketches were of pocket screwing, counterboring, metal plate, modesty block among others.
- (ii) Candidates were required to give two advantages of manufactured boards over solid timber. Candidates performed very well on this item as a good majority scooped all the two marks. The expected responses were any two from the following: They come in large/wide boards of even thickness, consistent/uniform strength, free from knots and other variations, easy to work with.
 - (iii) Three exploded plies were shown. Candidates were required to show the direction of grains on the plies when making three plywood. This was a poorly done item across all centres. The most common response was having the direction of the grain on all three sheets showing on one side which is wrong. The correct way of drawing this is having the grains of the two outer plies running in one direction on the end and having the grain of the middle ply running at right angles to the two outer plies and showing on the front side.

Question 6

- (a) A spice rack made from acrylic was shown and candidates were required to:
- (i) Give two reasons why one would choose acrylic over solid timber to make the rack. The expected responses were: Acrylic is water resistant, easy to clean and maintain, easy to machine, readily polished, glass clear. These properties make acrylic superior to wood. Most candidates scooped all the two marks.
 - (ii) State why acrylic is supplied covered with plastic or paper. The film on the surface of acrylic helps to prevent scratching during transportation and handling. This proved to be one of the most popular of all the items as all candidates attempted it and scored the one mark on offer.
 - (iii) Use sketches and notes to explain how the edges of spice rack could be finished. Acceptable sketches and notes include a plastic sheet, a file, draw-filing, scraper, wet and dry paper, polishing mop. Most candidates only mentioned the use of a hand file or flat file and nothing more. Most sketches did not deserve being credited any mark. This was another poorly done item.

- (b) A bracket for holding a table tennis net was shown and candidates were asked to:
- (i) Name a ferrous metal that could be used to make the bracket. The expected response was mild steel. This item was well answered as a majority of the candidates scored the one mark for themselves.
 - (ii) Give a reason apart from strength why a ferrous metal would be suitable to make the bracket. The expected response is: fairly malleable, durable, cheap.
 - (iii) Give two reasons why it would be wise to drill the material before shaping it. The expected responses were: It would easier to drill a flat piece than a c shaped workpiece, it is safer and more accurate. Candidates seemed to lack knowledge on the aspect of planning for production as most of the gave uncreditable responses and hence failed to get the two marks on offer.

Question 7

- (a) An image of a garden tool holder made from a mild steel sheet was shown and candidates were expected to:
- (i) State two important aspects to consider when designing the tool holder. The expected responses were: the shape of the tool, the size of the tool, the weight of the tool. This proved to be one of the easiest as most candidates scooped the two marks on offer.
 - (ii) Explain how to mark out the centres of the holes so that the drill does not slip. The expected response was: use a centre punch and a hammer to make a mark. Most candidates mentioned the use of a centre punch only and such a response was credited the full mark.
 - (iii) State one safety precaution to be observed when drilling the mild steel sheet. The expected responses were: hold the workpiece securely, place a scrap piece of wood underneath the workpiece, set the drilling machine to the correct speed, remove the chuck key. Reference to personal safety also acceptable (wear safety goggles, remove jewellery, hair must be tied back, no loose clothing. All candidates were able to give one correct safety precaution.
 - (iv) Give two reasons for having the garden tool holder painted. Expected responses were: to improve appearance, to protect the steel, to cover imperfections. Most candidates gave only one response which is to prevent rusting. This response scooped one mark out of the possible two. There were very few candidates who were able to grab all the two marks on offer. Centres are advised to pay attention the topic “finishes and finishing” because it is very crucial to have products finished in-order to increase their life span.
 - (v) Describe how to prepare the surface of the garden tool holder for painting the surface of the garden tool holder for paining. The most common and wrong response was the use of glass-paper. The expected response was: use of a

smooth file, wire brush, steel wool, wet and dry paper, degrease where necessary, use of emery cloth, supporting/setting up work for painting.

- (b)** An incomplete drawing of an odd-leg caliper was shown. Candidates were required to complete the drawing showing how the caliper is used to mark a line on a piece of metal. The expected sketch has the leg with a stub resting on the datum/true edge and the leg with a scribe point pointing to the line drawn on the workpiece. Centres are advised to give learners practice exercises on sketching as most sketches were of poor quality and they fail to communicate effectively.