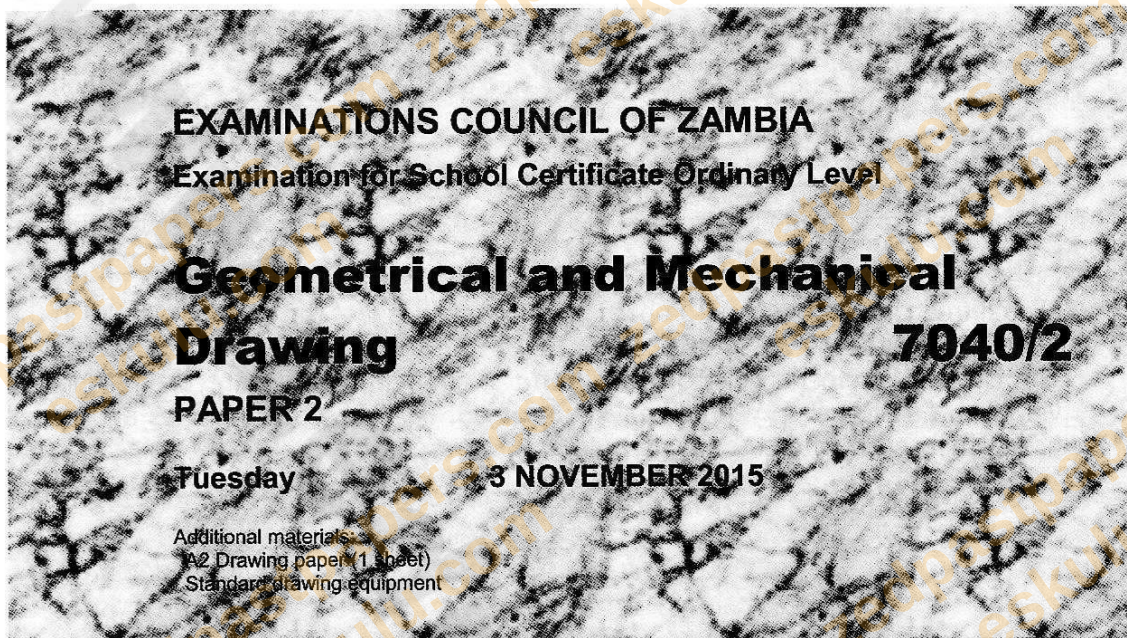


G12 ECZ GMD PAPER 2 2015 SOLUTIONS

Grade 12 ECZ Geometrical and Mechanical Drawing Paper 2, 2015 (7040/2)

Construction/assembly methods -- this is a practical drafting exam, see note

A practical drafting exam: the true answer is a full-size drawing on A2 paper. This PDF gives the exact construction method and every dimension, not a



Time: 2 hours 40 minutes

Marks: 100

Instructions to candidates

Print your **name**, **centre number** and **candidate number** in the Title Block at the bottom right-hand side of your drawing paper.

There are **two (2)** questions in this paper. Answer **both** questions.

Use **both** sides of the drawing paper for your answers.

Information for candidates

The number of marks is given in brackets [] at the end of each question or part question.

The insert contains **Figure 2** for Section 2.

You have an additional **10 minutes** to read carefully the text of Section 2 before answering the questions.

Arcs of circles less than **5mm radius** may be drawn freehand.

All dimensions are in millimetres unless otherwise stated.

Cell phones are not allowed in the examination room.

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Answer the question **from Section 1 on one side** of the drawing paper and that **from Section 2 on the other side.**

All dimensions are in **millimetres.**

SECTION 1 (16 MARKS)

Candidates are advised to spend not more than **20 minutes** on this section of the paper:

- 1** Orthographic views of a BRACKET are shown in First Angle Projection in **Figure 1.** Sketch freehand and in good proportion, a pictorial view of the bracket with 'C' in the foreground of the view.
The use of instruments, including any form of straight edge, when constructing the view or when lining up will be heavily penalised. Faint construction lines and points used when construction the view should not be erased.

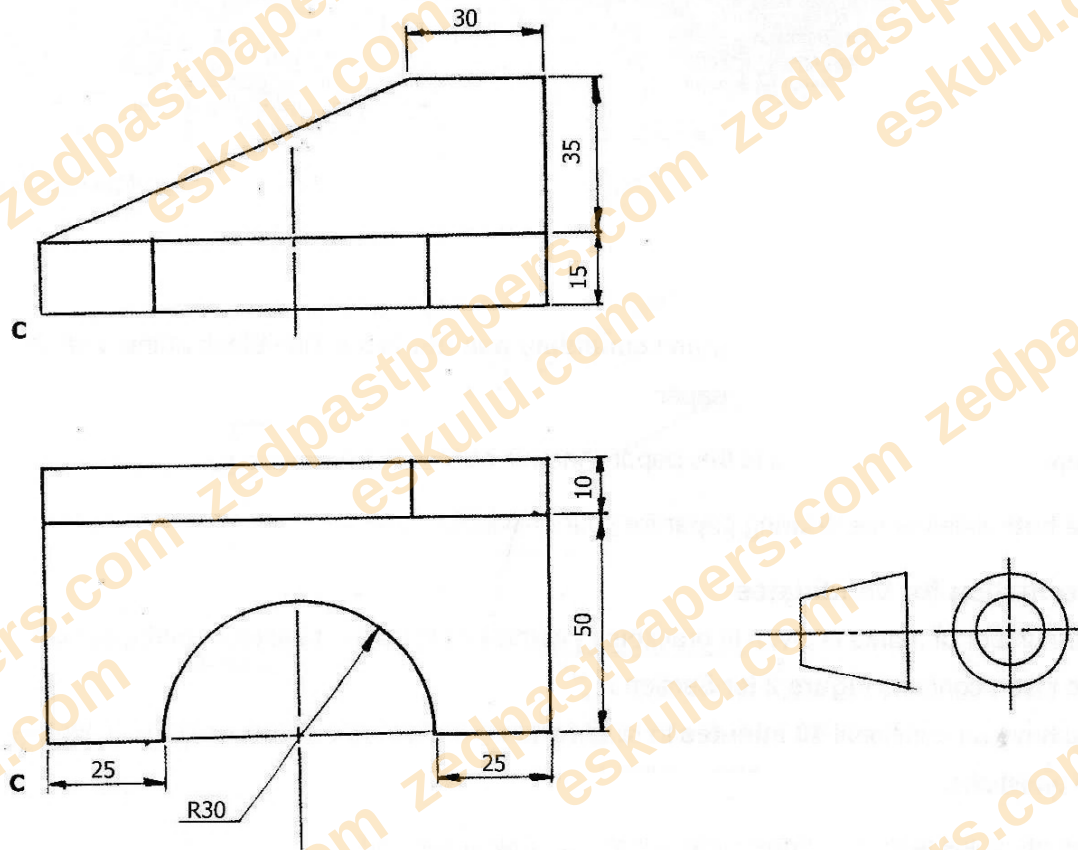


Figure 1

SECTION 2 (84 MARKS)

- 2** **Figure 2** on the insert shows details of a **SLIDE** on the lathe machine in Third Angle Projection.

The components are assembled as follows:

The machined **spindle** ③ is inserted into the 30mm square hole of the **slide** ① from under in the dovetail slot until it flushes. The **tool holder** ② is then placed on top of the slide with the four M8 holes on top until the two components are in contact. The **washer** ⑦ is then placed on to the M10 part of the spindle.

The **Handle** ⑤ is screwed onto the M6 hole of the **cap** ④ after which the cap is tightened on the M10 portion of the spindle until tight.

Finally, the four **M8 Hexagonal bolts** ⑥ are screwed into the four M8 threaded holes of the tool holder.

With the components assembled as above, showing only one bolt on the far left and the handle in the horizontal position to the right, draw full size in **either First Angle or Third Angle** Projection,

- (a) A Sectional Front Elevation, the plane of the section and the direction of the required view being indicated by X – X in the plan view of the main body.
- (b) A plan as viewed arrow P.

Hidden detail is not required in any view. Suitable dimensions should be estimated where not provided.

In the lower right-hand corner of the drawing paper and on the same side as you have drawn the above views, draw a title block. Print in this block your **name, examination number, the title, the scale and indicate the projection** you have used by using the appropriate British Standard symbol.

EXAMINATIONS COUNCIL OF ZAMBIA

Examination for School Certificate Ordinary Level

**Geometrical and
Mechanical Drawing**

7040/2

PAPER 2

Tuesday

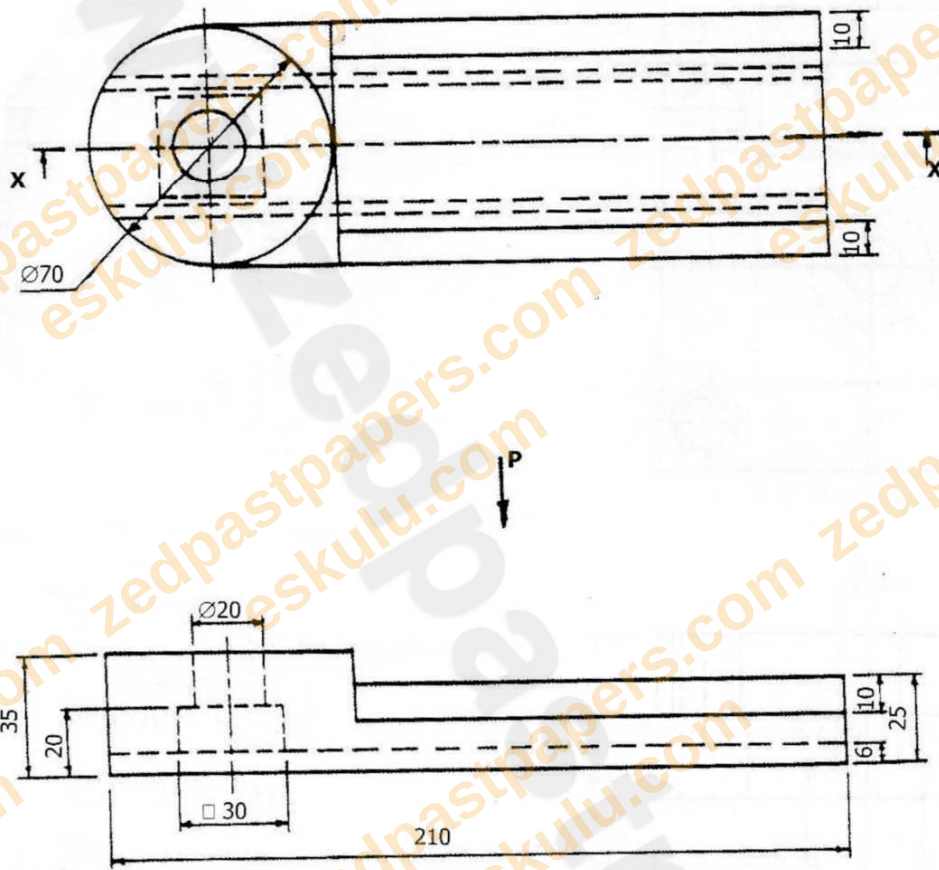
3 NOVEMBER 2015

Additional materials:

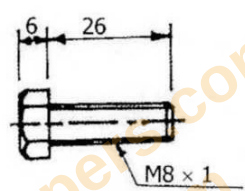
A2 Drawing paper (1 sheet)
Standard drawing equipment

INSERT

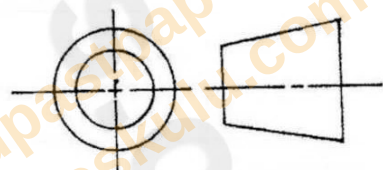
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1 SLIDE
1 REQUIRED

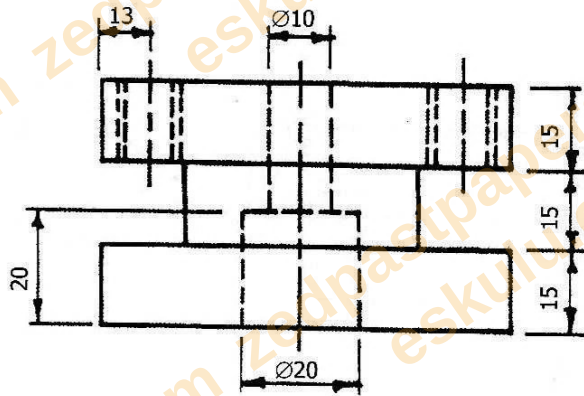
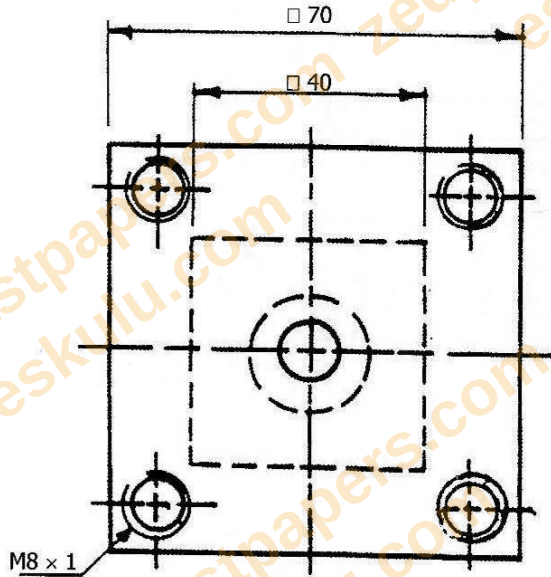


6 BOLT
4 REQUIRED

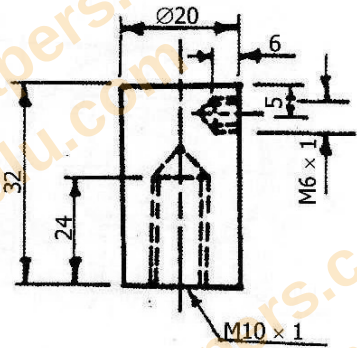


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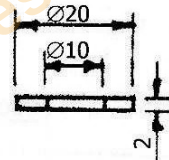
FIGURE 2



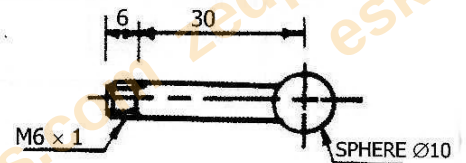
2 TOOL HOLDER
1 REQUIRED



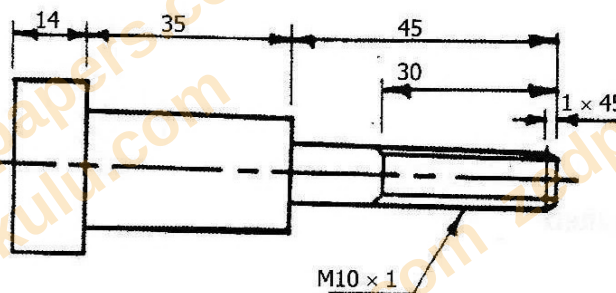
4 CAP
1 REQUIRED



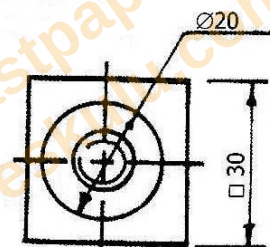
7 WASHER
1 REQUIRED



5 HANDLE
1 REQUIRED



3 SPINDLE
1 REQUIRED



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Question 1. SECTION 1 [16]. Figure 1 shows first-angle orthographic views of a BRACKET (wedge-shaped top with a 30mm flat, 35/15mm heights; base with a semicircular R30 cutout, 25+25mm side divisions). Sketch freehand, in good proportion, a pictorial view with point C in the foreground, no instruments.

Method: as with the equivalent 2014 question, this tests freehand proportion, not instrument accuracy. Build a mental 3D model from the two views: a wedge/ramp-shaped bracket (rising from 15mm to 35mm over part of its length, then a flat 30mm-wide top) sitting on a base plate that has a semicircular notch (R30) cut into its front edge, flanked by two 25mm side sections, with point C marking the front-bottom-left corner nearest the viewer.

Sketch freehand (oblique or isometric-style pictorial, angles estimated by eye, NOT measured with instruments), starting from a light freehand bounding box sized in proportion to the given dimensions, blocking in the wedge/ramp profile first, then the base plate with its semicircular cutout (sketched as a freehand near-circle/arc, not compass-drawn), keeping point C as the nearest visible corner. Per the instructions, use NO straight-edge or instrument at any stage (including lining-in), and do NOT erase the faint construction lines/points.

Answer: Answer: correct procedure is freehand-only (no instruments, construction lines left visible), built from a light bounding box in the given proportions (base ~50mm wide by its depth, ramp rising 15 to 35mm high over a 30mm-wide top), with the R30 semicircular cutout sketched by eye, and point C positioned as the nearest corner to the viewer.

Question 2. SECTION 2 [84]. Figure 2 (insert) shows a lathe SLIDE assembly: SLIDE (1, 210mm long, Ø70 head with a square 30mm dovetail slot for the spindle, 35/20/10/25/16mm height divisions, 48/40mm base-block widths), TOOL HOLDER (2, four M8 threaded holes, Ø20 central hole, 13/15/15/15/20mm), SPINDLE (3, M10x1 threaded top with a square 30mm base foot, 14/35/45/30/1x45deg chamfer, Ø20 shaft), CAP (4, M10x1 tapped, M6x1 side hole for the handle, 32/24/6/5mm), HANDLE (5, M6x1 threaded end, sphere Ø10 ball end, 6/30mm), 4x BOLT (6, M8x1, 6/26mm), WASHER (7, Ø20/Ø10, 2mm thick). Assemble as instructed (only the far-left bolt shown, handle horizontal to the right) and draw, full size, in first- or third-angle projection: (a) a sectional front elevation on X-X (plan) [marks per paper]; (b) a plan viewed from arrow P.

Assembly logic (from the given instructions): the SPINDLE's square 30mm foot is inserted from underneath into the SLIDE's Ø70/30mm-square dovetail slot until it sits flush; the TOOL HOLDER is then placed on top of the slide (its Ø20 central hole over the spindle's shaft) with its four M8 holes aligned over the slide's threaded holes, until the tool holder and slide are in contact; the WASHER (Ø20 OD, Ø10 bore, 2mm thick) is placed onto the spindle's M10 upper portion. The HANDLE is screwed into the CAP's M6x1 side hole; the CAP (with its M10x1 internal thread) is then tightened down onto the spindle's M10 top portion, trapping the washer and tool holder in place. Finally, the four M8 hexagonal BOLTS thread into the tool holder's four M8 holes (only the far-left one is to be shown, per the instruction), and the handle is positioned horizontally, pointing to the right.

(a) Sectional front elevation on X-X: the section plane (shown in the plan, cutting along the slide's long axis through the Ø70 head and the 210mm body) exposes, in order from bottom to top: the slide's dovetail/Ø70 boss with the spindle's square foot seated flush inside it; the spindle's shaft rising up through the slide and the tool holder's Ø20 hole; the washer sitting on the spindle's shoulder; the cap

threaded down onto the spindle's M10 top, with the handle projecting horizontally to the right out of the cap's M6 side hole (the handle, being a fastener/rod, is conventionally shown in true elevation, NOT sectioned, even though it crosses the cutting plane); and the single far-left M8 bolt shown threaded down into the tool holder and slide (also unsectioned, per convention), with the other three bolt positions left as plain holes. All cut solid material (slide body, tool holder, cap) is hatched at 45 degrees; no hidden lines are required.

(b) Plan viewed from arrow P: shows the top face of the assembly -- the tool holder's square/rectangular outline with its 4 M8 bolt positions (only the far-left one shown with a bolt head, the other three as plain circles), the Ø20 central hole showing the spindle/cap arrangement below, and the handle projecting horizontally to the right as instructed, matching its position in the elevation.

Answer: Answer: assembly order is Slide -> Spindle (square foot flush in the Ø70/30-square slot) -> Tool Holder (over the spindle's shaft, resting on the slide) -> Washer -> Cap (threaded onto the spindle's M10 top, trapping washer+tool holder) -> Handle (screwed into the cap's M6 side hole, horizontal, pointing right) -> far-left M8 Bolt only (through the tool holder into the slide). Section X-X cuts through this full stack for the sectional elevation (fasteners/handle shown unsectioned); the plan from arrow P shows the tool holder's outline with the single visible bolt and the horizontal handle. See the detailed method above for what each view must show.

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