Province of the
EASTERN CAPE
EDUCATION

DIRECTORATE SENIOR CURRICULUM MANAGEMENT (SEN-FET)

HOME SCHOOLING SELF-STUDY WORKSHEET ANSWER SHEET

SUBJECT	WELDING AND MERALWORK	**GRADE**	12	**DATE**	JULY 2020
TOPIC	MAINTENANCE & TERMINOLOGY	**TERM 1 REVISION**	(Please tick)	**TERM 3 CONTENT**	(√)

QUESTION 1

1.1 Reasons maintenance:

- Promote cost saving
- Improves safety
- Increases equipment efficiency
- Fewer equipment failure
- Improves reliability of equipment (ANY 2)

1.2 Lockout on machines:

To ensure that nobody can turn on the machine while maintenance is being carried out.

1.3 Reasons for service records:

- Assist in the monitoring of the condition of the machines.
- Assist in upholding warrantees.
- Assist in keeping a history of maintenance and repairs. (ANY 2)

1.4 Methods of reducing friction:

- By reducing both drill speed and feed speed.
- By applying lubrication. (cutting fluid)
- Use the correct drill bit
- Drill a pilot hole

Question 2

2.1 **Lockout on machines:**

To ensure that nobody can turn on the machine while maintenance is being carried out.

2.2 **Tagging plates:**

It has multiple holes, so that more than one technician can lock out the machine simultaneously.

2.3 **Aspects of plant and equipment maintenance**:

- Do not ignore maintenance.
- Do not ignore reports of damaged or unsafe equipment.
- Do not ignore faulty or damaged equipment.
- Do not ignore inspection. (ANY 2)

2.4 **Maintenance guidelines of the horizontal band saw:**

- Check electrical wiring and isolation.
- Change the band saw blade as required.
- Check band wheels at every blade change.
- Monitor band wheel bearings.
- Inspect band guides.
- Inspect the condition of the guards.
- Check blade tension and alignment.

- Inspect the hydraulic system and oil level.
- Check vice for wear on both stationary and movable parts.
- Align vice with the blade.
- Inspect the chip removal system daily. (ANY 2)

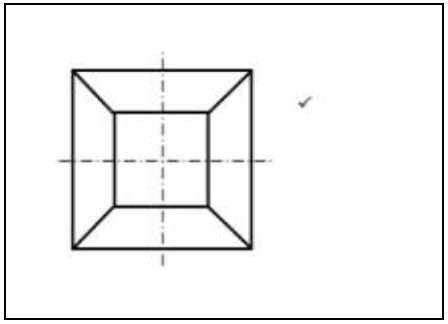
2.5 Effect of overloading of the rolling machine:

It limits the lifespan of bearings, gearbox and motor components.

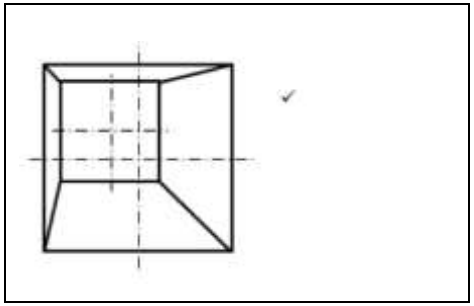
Question 3 Use of transformers: DEVELOPMENT (Specific)

3.1 **Transformers** are used to connect ducting sections of dissimilar shapes to each other.

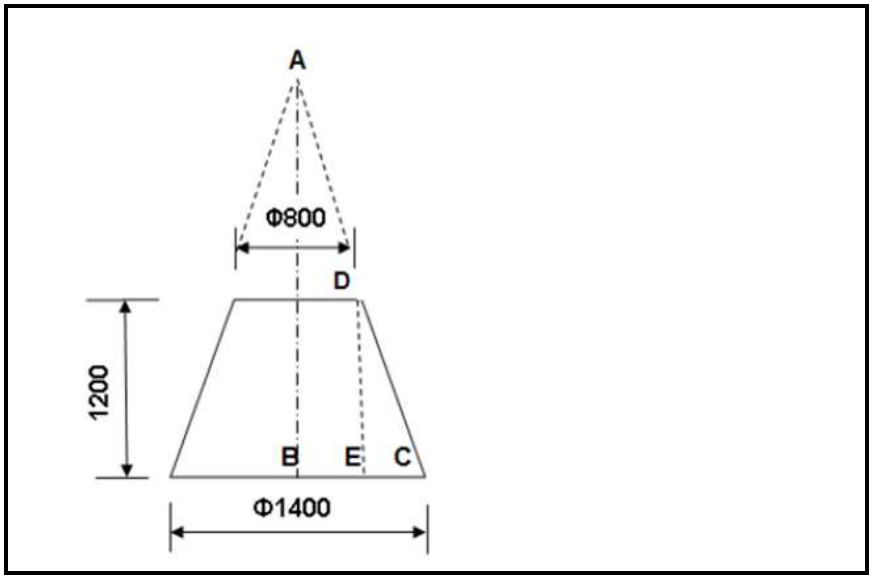
3.2 (a) On-centre hopper:



3.2 (b) Off-centre hopper:



QUESTION 4 Truncated cone: DEVELOPMENT (Specific)



4.1 Base circumference:

Circumference = π x Base diameter

= π x 1400
= 4398,23 mm

4.2 Main radius (AC):
Triangles ABC and CED has the same shape:

$$AC : DC = BC : EC$$

$$\text{Thus } \frac{AC}{DC} = \frac{BC}{EC} \quad \checkmark$$

$$\text{From where } AC = \frac{BC \times DC}{EC} \quad \checkmark$$

$$\text{and } CE = \frac{\text{Base Dia} - 800}{2} \quad \checkmark$$

$$= \frac{1400 - 800}{2} \quad \checkmark$$

$$CE = 300\,\text{mm} \quad \checkmark$$

For : DC

$$DC^2 = DE^2 + CE^2 \quad \checkmark$$

$$DC = \sqrt{1200^2 + 300^2} \quad \checkmark$$

$$DC = 1236{,}93\text{mm} \quad \checkmark$$

$$\text{rounded} = 1237\,\text{mm}$$

$$AC = \frac{BC \times DC}{EC}$$

$$= \frac{700 \times 1237}{300} \quad \checkmark$$

$$= 2886{,}17\text{mm} \quad \checkmark$$

$$\text{rounded} = 2886\,\text{mm}$$

4.3 **Small radius (AD):**

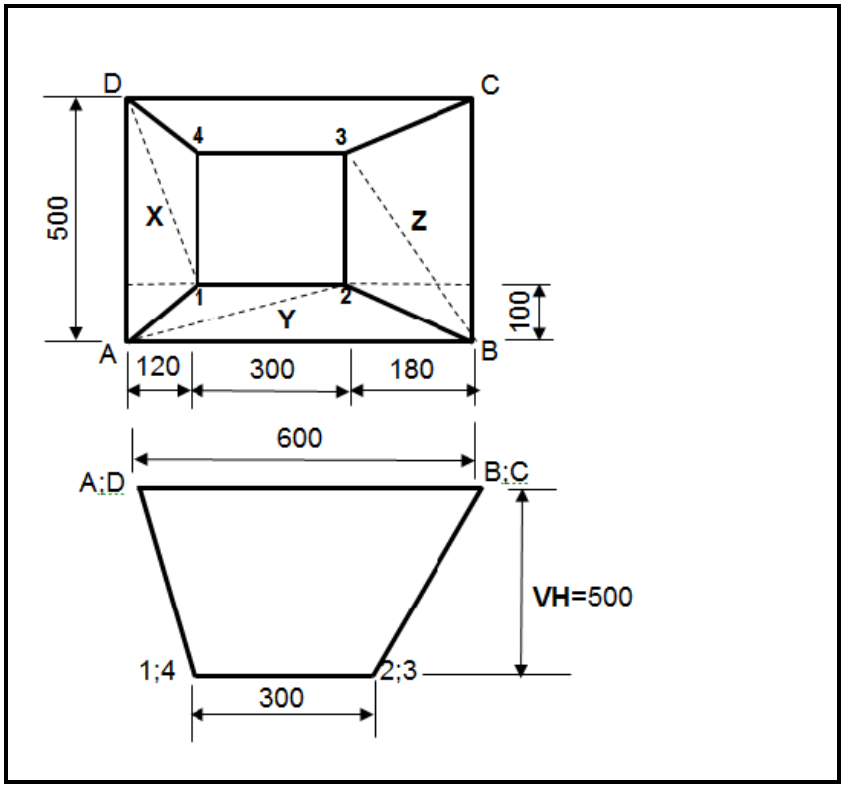
AD = AC - DC

= 2886 – 1237

AD = 1649mm (1649.24mm)

QUESTION 5 DEVELOPMENT (Specific)

5.1 Square to rectangular hopper off centre:



5.1.1 True lengths of A-1:

Given that Vertical height = 500 mm,

True length (A-1):

$$A-1=\sqrt{120^2+100^2+500^2} \quad \checkmark$$
$$=\sqrt{14400+10000+250000} \quad \checkmark$$
$$=523{,}83\,\text{mm} \quad \checkmark\ \checkmark$$

5.1.2 True length (A-2):

Vertical height = 500 mm

$$A-2=\sqrt{100^2+420^2+500^2} \quad \checkmark$$
$$=\sqrt{10000+176400+250000} \quad \checkmark$$
$$=660{,}61\text{mm} \quad \checkmark\ \checkmark$$

5.1.3 True length (B-2):

Vertical height = 500 mm

$$B-2=\sqrt{100^2+180^2+500^2} \quad \checkmark$$
$$=\sqrt{10000+32400+250000} \quad \checkmark$$
$$=540{,}74\,\text{mm} \quad \checkmark\ \checkmark$$

5.1.4 True length (B-3):

Vertical height = 500 mm

$$B-3=\sqrt{180^2+400^2+500^2} \quad \checkmark$$

$$=\sqrt{32400+160000+250000} \quad \checkmark$$

$$=665{,}13\text{mm} \quad \checkmark\ \checkmark$$

5.1.5 True length(D-1):

Vertical height = 500 mm

$$D-1=\sqrt{120^2+400^2+500^2} \quad \checkmark$$

$$=\sqrt{14400+160000+250000} \quad \checkmark$$

$$=651{,}46\text{mm} \quad \checkmark\ \checkmark$$