Province of the
EASTERN CAPE
EDUCATION

SENIOR PHASE

GRADE 9

NOVEMBER 2016

TECHNOLOGY
MEMORANDUM

MARKS: **120**

This memorandum consists of 10 pages.

SECTION A: MULTIPLE-CHOICE QUESTIONS

QUESTION 1

1.1 D ✓ (1)

1.2 D ✓ (1)

1.3 C ✓ (1)

1.4 D ✓ (1)

1.5 B ✓ (1)

1.6 B ✓ (1)

1.7 C ✓ (1)

1.8 C ✓ (1)

1.9 D ✓ (1)

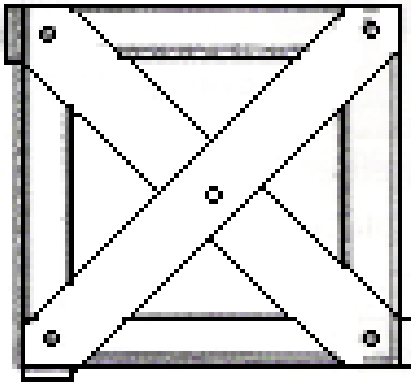
1.10 C ✓ (1)

TOTAL SECTION A: 10

SECTION B: STRUCTURES

QUESTION 2

2.1



(2)

2.2 Uneven load ✓ – It is placed off centre of the base on which it stands. ✓ (2)

2.3 2.3.1 A tender is a bid for work or providing products for a government entity or a municipality. ✓
It gives details of how much will be paid to the appointed company to complete the project. ✓ (2)

2.3.2 Building/constructing a bridge ✓ (1)

2.3.3
- Cost effective
- Safety
- The bridge is 100 m wide at the crossing point.
- River rises during summer rains.
- There are crocodiles in the river all year round. ✓✓ (2)

2.3.4 It is important so that construction can be started and be completed within a specified time to avoid delays and incomplete work. ✓✓ (2)

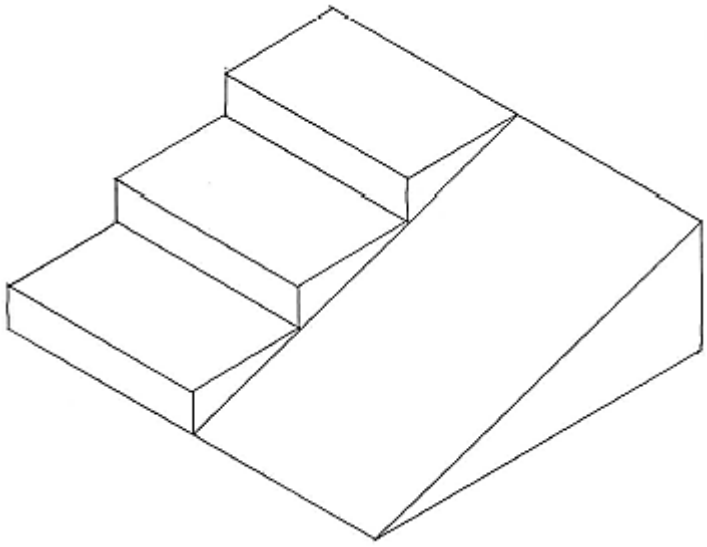
TOTAL SECTION B: 12

SECTION C: DESIGN AND GRAPHIC COMMUNICATION

QUESTION 3

3.1 Design and make a combined staircase and ramp. ✓✓ (2)

3.2 **RUBRIC FOR DESIGN SKILLS**



Possible answer for the free hand sketch

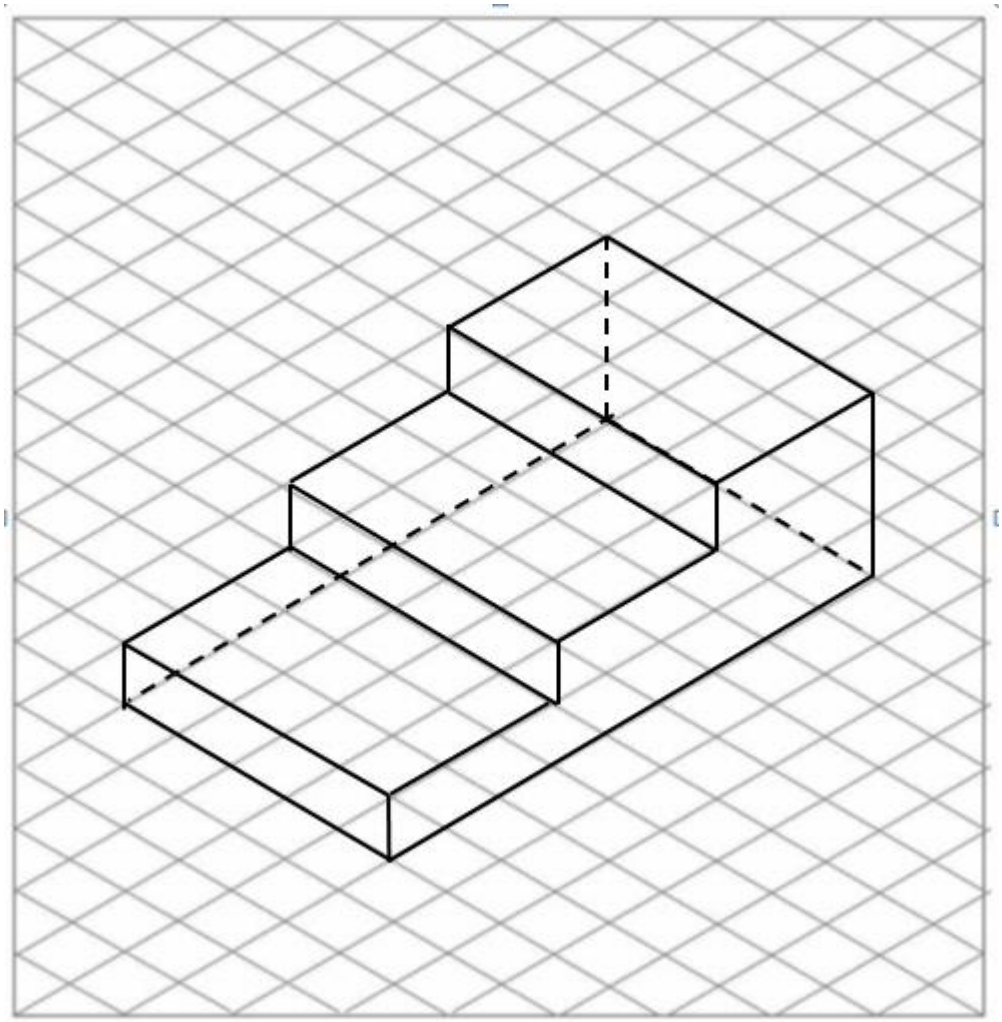
Skills	Description	Marks Allocated
Free hand sketches (maximum = 9 marks for the entire question)	It is evident from the sketch that it is a solution to the problem identified. Include stairs and ramp	(4)
	The view is complete and neatly drawn.	(3)
	All dimensions written in correct places.	(2)

3.3 a. The example shows 2 steps instead of 3. ✓

b. The length of the base shows 2 400 mm instead of 1 800 mm. ✓

c. The width of the stairs shows 1 200 mm instead of 1 000 mm. ✓ (3)

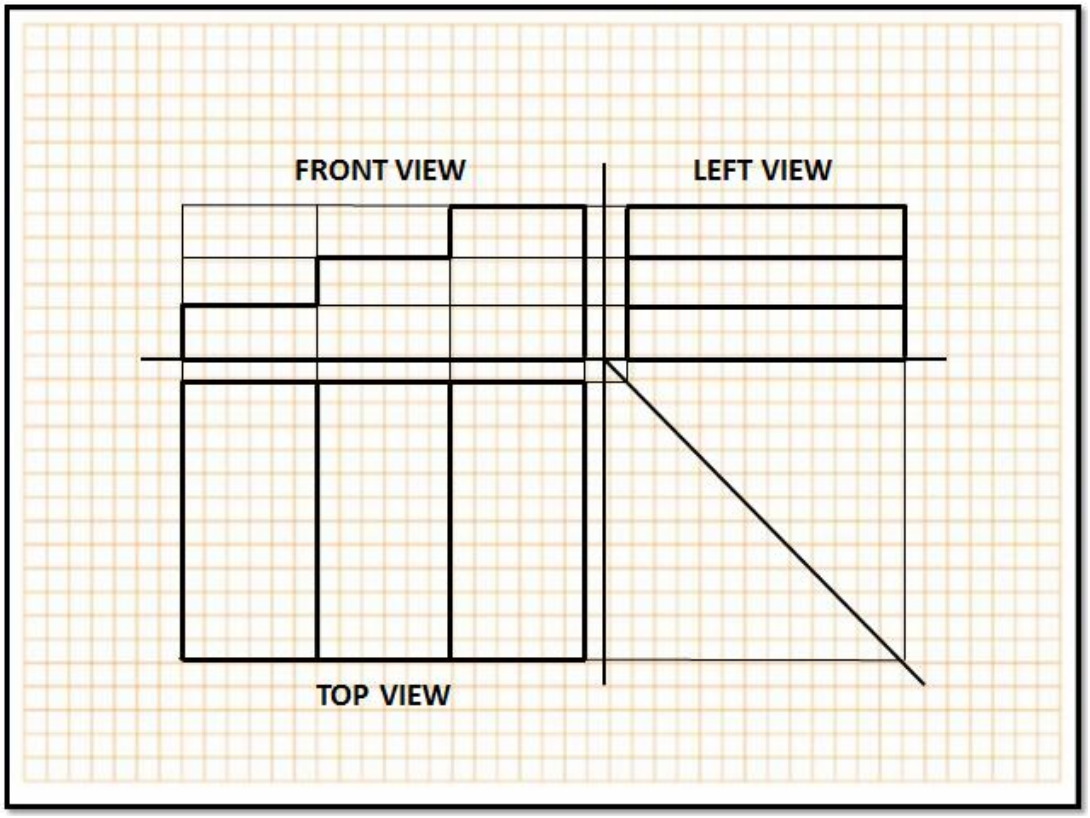
3.4 **ASSESSMENT RUBRIC**



Skill	Description		Marks Allocated
Isometric projection **(maximum marks = 8)**	(a)	The features of the sketch are those of an isometric projection, e.g. angles at 30°.	3 marks
	(b)	Hidden detail shown.	2 marks
	(c)	Lines are constructed effectively.eg. hard, soft, broken lines	1 marks
	(d)	Neatness	1 marks
	(e)	Isometric grid used effectively	1 mark

(8)

3.5 **ASSESSMENT RUBRIC – Design**



(The above drawing is an example of what learners should do in QUESTION 3.5.)

Skill	Description		Marks Allocated
First Angle Orthographic Projection Total marks allocated = 14 marks	(a)	3 views labelled and drawn to a scale of 1 : 20	6 marks
	(b)	Dimensioning	6 marks
	(c)	Layout of the drawing	2 marks

(14)

3.6 The learner must be able to draw at least FIVE steps (on sequence of operations) that he/she will follow to provide a solution.

NOTE: The teacher must check for logical sequence of steps to be followed and allocate 1 MARK for each step.

E.g.

No.	Operation
1.	Collecting materials
2.	Measuring
3.	Cutting/sawing etc.
4.	Joining/applying glue
5.	Applying of finish

(5)

3.7 Check the ability of the learner to formulate FIVE questions against the list of specifications to evaluate the final solution:

E.g.:

- Is the staircase and ramp made in two units that can be moved?
- Are the stairs wide enough for two people to move at the same time?
- Are there three steps of the same size?
- Is the flat part of each step 600 mm long?
- Is the ramp wide enough for one wheelchair to move?
- Is the base of the ramp 1 800 mm long?

(1 mark for each of the FIVE evaluation questions asked.) (Any 5 x 1) (5)

3.8 a. Show symmetry ✓ (1)

b. Outlines ✓ (1)

c. Hidden detail line ✓ (1)

d. Construction lines ✓ (1)

TOTAL SECTION C: 46

SECTION D: SYSTEMS AND CONTROL (MECHANICAL)

QUESTION 4

4.1 4.1.1 Piston B moves up. ✓ (2)

4.1.2 10 mm ✓ (1)

4.1.3 Mechanical advantage = $\frac{\text{load}}{\text{effort}}$ ✓ (ONE mark for formula)

$= \frac{400\ \text{N}}{50\ \text{N}}$ ✓

= 8 ✓ (3)

4.2 Disc brakes are used to stop a moving vehicle more effectively. ✓ (1)

4.3
- Rim brakes are cheap. ✓
- They are easy to maintain. ✓ (2)

4.4 4.4.1 A – Pawl ✓ (1)
B – Ratchet ✓ (1)
C – Crank handle ✓ (1)

4.4.2 Car seat belts, mechanical jack, turnstiles in shops, a winch in a water well, etc. ✓ (1 mark for a correct answer) (Any 1 x 1) (1)

4.5
- Rack-and-pinion gears ✓
- Bevel gears ✓
- Worm gear ✓
- Spur gears ✓ (Any 2 x 1) (2)

4.6

INPUT	PROCESS	OUTPUT
Person pushes and pulls the handle of the jack up and down. ✓	The hydraulic fluid is forced past the one way valve and moves the output piston. ✓	The jack lifts the car or the load. ✓

(3)

4.7 4.7.1 Cleat – Boats, blinds, mountain climbing equipment, flag poles ✓ (1)

4.7.2 One-way valve –- Hydraulic jack, taps, pneumatic safety valves. ✓ (1)

4.8 4.8.1 Force needed/Effort
= 40 N ÷ No. of falls away from moving pulleys ✓
= 40 N ÷ 4
= 10 N ✓ (2)

4.8.2 MA = 4 ✓ (1)

TOTAL SECTION C: 23

SECTION E: SYSTEMS AND CONTROL (ELECTRICAL)

QUESTION 5

5.1 5.1.1 Parallel ✓ (1)

5.1.2 Lamp 2 (L2) ✓✓ (2)

5.1.3 A – Battery of cells ✓
B – Open switch or circuit breaker ✓ (2)

5.2 (*Voltage)* V = I x R ✓

= 2A × 15 Ω ✓

= 30 V ✓ (3)

5.3 5.3.1 Touch or moisture detector – Input ✓ (1)

5.3.2 LED – output ✓ (1)

5.3.3 Photovoltaic panel/cell – input ✓ (1)

5.4 5.4.1 Transistor ✓ (1)

5.4.2 They can be used as switches. ✓
They can be used as amplifiers. ✓ (1)

5.4.3 e – Emitter ✓
b – Base ✓
c – Collector ✓ (3)

TOTAL SECTION E: 16

SECTION F: PROCESSING

QUESTION 6

6.1 6.1.1 Drying, pickling, fermenting, salting, heating, freezing. ✓✓✓
(Any 3 of the listed methods.) (Any 3 x 1) (3)

6.1.2 a. Food preservation enabled groups of people to live in one place and form a community. ✓ (1)

b. Humans no longer had to consume hunted animals or harvest immediately, they could preserve some of their food to eat at a later time. ✓ (1)

6.2 6.2.1 Different plastics have different properties, mixing them would also affect the expected outcomes of the recycled material. ✓ (1)

6.2.2 High Density Polyethylene ✓✓ (2)

6.2.3 Some of recycled products of HDPE are:

- Crates ✓
- Pipes ✓
- Flower pots ✓
- Buckets ✓
- Recycling bins ✓
- Dog houses ✓
- Picnic tables ✓
- Floor tiles ✓
- Motor oil, ✓ etc. (Any 1 x 1) (1)

6.2.4 Society: Employment opportunities ✓ – skills development a way of making money. ✓

Environment: Less pollution/reduces the amount of waste that ends up in landfills, reduces environmentally harmful processes such as mining, power generation and water exploitation. ✓ (1)

TOTAL SECTION F: 10
GRAND TOTAL: 120