Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

NOVEMBER 2019

CIVIL TECHNOLOGY: CIVIL SERVICES MARKING GUIDELINE

MARKS: 200

This marking guideline consists of 13 pages, including 3 page of answer sheets.

QUESTION 1: SAFETY AND MATERIALS (GENERIC)

1.1 Personal protective equipment (1)

1.2 Any TWO requirements of protective footgear on a building site: (2 x 1) (2)
- Sturdy
- Non-slip
- Metal reinforcements in the toes

1.3 Safety precautions for small plant equipment:

1.3.1 To ensure that the equipment is in a good, working condition. (1)

1.3.2 Less chance of inhaling the hazardous fumes of the engines. (1)

1.3.3 Avoiding any possible injuries. (1)

1.3.4 Insufficient training could lead to injuries and damaged equipment. (1)

1.4 Safe stacking of material:

1.4.1 Ladders or any similar answer (1)

1.4.2 Any TWO factors that should not be affected:

- Ventilation
- Lighting
- Fire-fighting equipment (2 x 1) (2)

1.4.3 3 x 500 mm (1) = 1 500 mm of 1,5 m (2) (2)

1.4.4 Can easily hook onto or bump against protruding parts and that could cause the stack to fall over. (1)

1.5 Cement (1) and fine sand (2) (2)

1.6 Any ONE example of a fine aggregate:
- Sand
- Silt
- Clay (1)

1.7 Any ONE purpose of lime:
- Increase the plasticity of the mixture
- Makes the mixture more workable
- Deduction of cracks (1)

1.8 Any TWO board products for panelling work:
- Plywood
- Block board
- Hardboard / Masonite (2 x 1) (2)

1.9 Any TWO uses of stainless steel:
- Sinks
- Wash tubs
- Water taps
- Water traps
- Extractor fans
- Any similar answers (2 x 1) (2)

1.10 Iron (1)

1.11 Two or more metals, or metals and non-metals are combined (1), to form a new, permanent metal (2), with enhanced qualities. (3) (3)

1.12 Any TWO uses of safety glass:
- Sliding doors
- Exterior doors with glass panels
- Shower cubicle and doors
- Bath glass screens
- Balustrades of staircases (2 x 1) (2)

1.13 Any ONE use of a mastic sealant:
- Adheres to almost any material (wood, glass, aluminium, concrete etc.)
- For filling cracks and sealing areas exposed to water
- Used in construction projects (roofing and brickwork) (1)

1.14 Can be reshaped (1) when reheated (2). (2)

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QUESTION 2: EQUIPMENT, TOOLS AND GRAPHICS (GENERIC)

2.1 Name the tools in FIGURES 2.1.1 to 2.1.4 and name ONE use of each.

2.1.1 Claw hammer
Any ONE use:
- General carpentry / Driving in nails
- Remove nails (2)

2.1.2 Plastering trowel
- Smooth finishing for walls / plaster work (2)

2.1.3 Club hammer
Any ONE use:
- Driving brick bolster / cold chisel
- Where heavy hammering is needed
- Driving pegs into the ground (2)

2.1.4 Angle grinder
Any ONE use:
- Cutting stone / concrete / tiles / metals
- Can be used as a grinder (2)

2.2 2.2.1 Bench grinder (1)

2.2.2 Portable circular saw / Radial arm saw (1)

2.3 Identify the tool in FIGURE 2.3 and name TWO uses of it.

Plate compacter

Any TWO uses:
- Compacting disturbed / loose soil up to 150 mm
- Tampering fillings for hardcore layer
- Compacting soil for paving bricks (3 x 1) (3)

2.4
- Wipe clean after use
- Do not allow mortar / concrete / screed to dry on it
- Store in a dry place (Any 2 x 1) (2)

2.5 Similar answer:
The jaws of the universal pliers cannot open big enough (1)

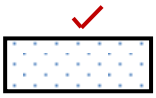
2.6 2.6.1 Section view (1)

2.6.2 2.6.A – Purline
2.6.B – Beam filling
2.6.C – Rafter
2.6.D – Window sill
2.6.E – Foundation
2.6.F – Wall plate
2.6.G – Wall tie
2.6.H – Lintel
2.6.I – Damp proof coarse
2.6.J – Hard core (10)

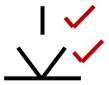
2.6.3 114 x 38 (2)

2.6.4 Bind 2 wall leaves (1)

2.7
- Pitch of roof
- Type of roof covering
- Barge board
- Facia board
- Gutters
- Downpipes (Any 4 x 1) (4)

2.8 2.8.1 Plaster  (2)

2.8.2 Undressed wood  (2)

2.8.3 Invert level  (2)

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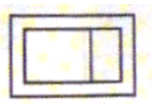
QUESTION 3: QUANTITIES, JOINING AND GRAPHIC (GENERIC)

3.1 Make neat sketches to illustrate the following symbols on a floor plan:

3.1.1 Grease trap  (2)

3.1.2 DPC (Damp-proof course)  (2)

3.1.3 Staircase  (2)

3.2 **Use ANSWER SHEET 1** (12)

3.3
- Basic sealant against air and leakage
- Enhance materials
- Used in aviation
- Construction repairs (Any 3 x 1) (3)

3.4
- Apply enough adhesive to both sides of the areas to be bonded
- Allow to dry
- After drying, hold the two pieces of material together or clamp, roll or press them together (3)

3.5
- Joins PVC pipes
- Clear / transparent
- Dries quickly (Any 1 x 1) (1)

3.6
- To allow light into building
- To prevent rain, wind, dust and insects from entering
- Enhance the aesthetic qualities of a structure (3)

3.7
- Polythene: strong and light / becomes brittle when exposed to sunlight / can be used in underground waterproofing / can be reshaped / remoulded after heating
- Polyvinyl chloride: can be reshaped / solid material / two types available flexible and rigid / good insulating properties / not dissolved by alcohol (2)

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QUESTION 4: MATERIAL, EQUIPMENT AND JOINING (SPECIFIC)

4.1 Any THREE steps to prevent infections by sewerage:
- Wear suitable personal protective equipment
- Avoid hand-to-face contact
- Cover open wounds
- Wash hands
- Remove protective equipment upon leaving the area
- Place protective gear in a plastic bag
- First-aid equipment should be available
- Clean equipment thoroughly
- Immunisations must be up to date (3 x 1) (3)

4.2 Any TWO safety measures which must be applied to avoid breathing in of soldering fumes:
- Extractor fan
- Keeping head not directly above the work
- Mask can be used (2 x 1) (2)

4.3 4.3.1 D – Unreinforced concrete

4.3.2 C – Mortar

4.3.3 B – Screed (3 x 1) (3)

4.4 Plywood (1)

4.5 Meranti is more expensive / Pine is cheaper (1)

4.6 Explain the difference in use of filler bricks and face bricks
(1) Filler bricks are used where it is not visible/is plastered
(2) Face bricks are used for facing purposes/not to be plastered/esthetical display (2)

4.7 Copper does not rust / Keeps heat longer (1)

4.8 Zink (1)

4.9 Area of the window (1)

4.10 Any THREE properties of polypropylene which make it ideal for the use as sewer pipes.
- Flexible
- Light
- Strong
- Resistance to chemicals
- Durable (3 x 1) (3)

4.11 4.11.1 A – Cold chisel
B – Pop rivet gun (2)

4.11.2 Any TWO maintenance measures which must be applied to tool 4.11.A.
- Sharpen regularly
- Grind down mushroom heads (2 x 1) (2)

4.11.3 (1) Securing rivet pins (2) in tin sheets /sheet metal (2)

4.12 (1) Clean ends (2) Ends must be square (2)

4.13 4.13.1 False (1)

4.13.2 False (1)

4.13.3 True (1)

4.13.4 False (1)

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QUESTION 5: GRAPHIC, CONSTRUCTION AND JOINING (SPECIFIC)

5.1 FIGURE 5.1 on ANSWER SHEET 2 shows the plan and elevation of a square down pipe.
Use ANSWER SHEET 2 and develop and draw the development of the square down pipe on scale 1 : 1. (16)

5.2 (1) Protection against drying out / keeping damp so that (2) hydration process / hardening process can complete. (2)

5.3 Any TWO defects in concrete which is caused by inadequate curing.
- Low strength
- High permeability
- Shrinkage
- Cracks
- Dusting
- Crazing (2 x 1) (2)

5.4 5.4.1 Single brick wall (1)

5.4.2 Stretcher bond (1)

5.4.3 220 mm (1)

5.5 (1)Pipes will rattle / vibrate and (2) cause stress / leaks in pipe joints. (2)

5.6 5.6.1 Galvanised pipes (1)

5.6.2 To bind thread with teflon-tape (1)

5.7 (1) Spring action of wings (2) spread against the back of the board. (2)

5.8 Make a neat sketch to illustrate the shape of a grooved seamed joint in sheet metal. (1)

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QUESTION 6: COLD AND HOT WATER SUPPLY, DRAINAGE AND SANITARY FITMENTS (SPECIFIC)

6.1 6.1.1 Soldering – Copper pipe (1)

6.1.2 Compression joint – Copper pipe (1)

6.1.3 Threaded joint – Galvanized pipe (1)

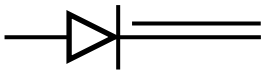
6.2 6.2.1 Complete the sketch on ANSWER SHEET 3 by drawing in the TWO lacking parts of the valve. (2)

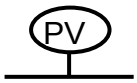
6.2.2 Ball valve (1)

6.2.3 (1) Is used to control the water level in (2) cisterns and supply tanks. (2)

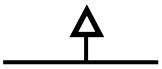
6.3 (1) Protection against external pressure / Allow movement because
(2) it is difficult to repair below the building. (2)

6.4 6.4.1 Automatic shut-off valve  (1)

6.4.2 Non-return valve  (1)

6.4.3 Pressure-relief valve 

(1)

6.4.4 Vacuum-relief valve  (1)

6.5 Similar answer:
(1) Water rise to the top of (2) the geyser when it is heated. (2)

6.6 Any TWO:
- Thermal expansion
- Excess system pressure
- Low temperature relief
- Too high setting on the water heater (Any 2 x 1) (2)

6.7 6.7.1 (1) South elevation does not get / water will not get hot (2) direct sun light. (2)

6.7.2 Placing on north elevation. (1)

6.8 Ensure that the tank is not subjected to any pressure. (1)

6.9 6.9. A – Radiation absorbing coating
6.9. B – Fluid tube
6.9. C – Inner glass tube (3)

6.10 6.10.1 False (1)

6.10.2 True (1)

6.10.3 False (1)

6.11 Similar description.
(1) It causes greater atmospheric pressure (2) which forces out (3) the water locked (4) in the trap. (4)

6.12 Installing a vent pipe. (1)

6.13 Vent valves of a stub-stack sanitary system are lower than the valves of a one-pipe sanitary system. (1)

6.14 Any TWO disadvantages of a one-pipe sanitary system.
- Human waste could back up through the gully.
- Rapid flushing could cause the drainage of adjacent water seals.
- Larger waste pipes can be required. (2 x 1) (2)

6.15 Any TWO materials water closets are manufactured from.
- Glazed porcelain
- Ceramic
- Special clay
- Plastic
- Stainless steel (2 x 1) (2)

6.16 (1) The pipe is projected to the bottom of the cistern (2) and silences the noise of the incoming water. (2)

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TOTAL: 200

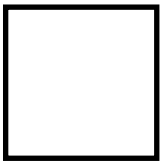
ANSWER SHEET 1	CIVIL TECHNOLOGY CIVIL SERVICES	NAME: _____

3.2 Calculate the volume of concrete needed to cast the floor slab between the external walls. (12)

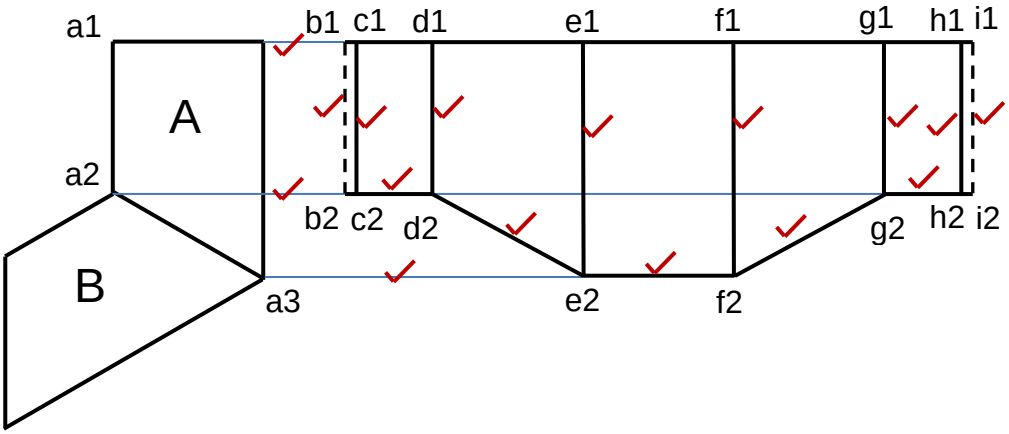
A	B	C	D
			Internal measurements of long walls
			= 9 000 mm – 220 mm √ – 220 mm √
			= 8 560 mm √ (3)
			Internal measurements of short walls
			= 5 000 – 220 mm √ – 220 mm √
			= 4 560 mm √ (3)
			Volume of concrete needed
1/ √	**8,56 √**		**Length of floor slab = 8 650 mm**
	4,56 √		**Width of floor slab = 4 560 mm**
	0,085 √	**3,318 m³ √√**	**Thickness of floor slab = 85 mm (6)**
			(12)

ANSWER SHEET 2	CIVIL TECHNOLOGY CIVIL SERVICES	NAME: _____

5.1 FIGURE 5.1 on ANSWER SHEET 2 shows the plan and elevation of a square down pipe.
Use ANSWER SHEET 2 and develop and draw the development of the square down pipe on scale 1 : 1. (16)



PLAN VIEW



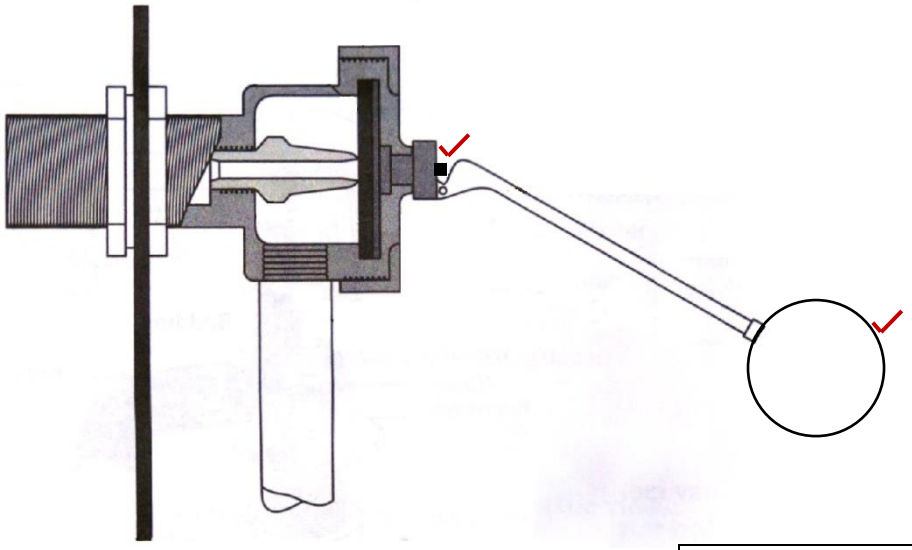
ELEVATION VIEW

Base lines: a1-i1, a2-12, a3-f2	3	
Seam lines: b1-b2, i1-i2	2	
Vertical construction lines: c1-c2 tot h1-h2	6	
Intersection lines: c2-d2, d2-e2, e2-f2, f2-g2, g2-h2	5	
TOTAL:	**16**	

ANSWER SHEET 3	CIVIL TECHNOLOGY CIVIL SERVICES	NAME: _____

6.2 FIGURE 6.2 op ANSWER SHEET 3 shows an incomplete sketch of a valve for cold water supply. Answer the following questions with regard to the valve.

6.2.1 Complete the sketch on ANSWER SHEET 3 by drawing in the TWO lacking parts of the valve. (2)



Lacking parts.	2	
TOTAL:	**2**	