higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE (VOCATIONAL)

MATERIALS
NQF LEVEL 4

16 November 2023

This marking guideline consists of 6 pages.

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INSTRUCTIONS TO MARKERS

1. Mark all the questions.
2. Follow the answers according to the numbering system used in this question paper.
3. Use only a red pen.
4. Put your ticks and crosses neatly and legibly.

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QUESTION 1

1.1
- Plastics are recyclable
- Withstand corrosion well if treated properly
- Are quick and easy to manufacture and assemble in construction
- Have a high strength-to-mass ratio
- Pave the way for new industries
- Allow designers to be flexible and innovative
- Require less energy to manufacture (Any 3 × 1) (3)

1.2
- Take a copper wire of about 12 cm long and pick it up with a tweezers of pliers.
- Heat the free end of the copper wire at the free end until it glows red and put it on the plastic you want to test so that a piece of plastic sticks to the wire.
- If no plastic sticks to the wire, it is most likely a thermoset, which is not PVC.
- If there is plastic sticking to the wire, continue to burn it.
- If the flame remains orange, the plastic is no PVC.
- If it changes green it is PVC. (6)

1.3
- Sink test
- Knife slither test
- Cigarette lighter test (3)

1.4
- Pipes and sewers
- Boats, sports cars, aircraft
- Wind-turbine blades
- Storage tanks
- Baths, Jacuzzis and swimming pools
- Canopies for bakkies
- Plant pots (Any 5 × 1) (5)

1.5
1.5.1 Polyamides
1.5.2 Polycarbonate
1.5.3 Polypropylene
(3 × 1) (3)

[20]

QUESTION 2

2.1
- Concrete
- Bricks and plaster
- Timber
- Marble
- Mild steel
- Copper
- Brass
- Zinc (Any 4 × 1) (4)

2.2 Clean the concrete surface with a wire brush.✓ Sweep the slab to remove all dust.✓ Use a commercial cleaner to clean the slab according to the manufacturer's instructions.✓ Take a moisture reading to ascertain that the slab is dry.✓ Prime the surface thoroughly.✓ Apply a sealant to the slab. (6)

[10]

QUESTION 3

3.1 Clean both surfaces of grease, dirt, and other contaminants. ✓ Apply a thin even layer of glue to both sides. ✓ Allow one or two minutes for the glue to be absorbed. ✓ Place the two pieces in its correct direction. ✓ Clamp the wood to restrict movement. ✓ Leave the clamp in position for the appropriate duration (+- 24hrs). ✓ Use a wet rag to remove the access glue while still wet. ✓ (7)

3.2
- Sets at room temperature in good air circulation.
- Only work on porous material, such as timber.
- Most are not completely waterproof.
- Prevents timber stains from reaching the timber, so timber needs to be stained first before PVA GLUE used.
- Must have pressure applied to joint surfaces if they are work properly.
- Prone to creep and they stretch under long term loads, so they are not recommended for structural applications.
- Are water-based and can be washed off with warm water if they haven't dried properly.
- Do not emit toxic fumes and are nontoxic to touch, but are toxic when swallowed. (Any 3 × 1) (3)

3.3 It is an adhesive that sticks to itself.✓ One applies the adhesive to both surfaces that needs to be joined.✓ You allow adhesive to dry a little and then bring the two glued surfaces together to form a solid bond.✓ (3)

3.4
- Flexible
- Water-resistant
- Solvent-free
- Strong
- Resistant to oil and chemicals (Any 2 × 1) (2)

[15]

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QUESTION 4

4.1 A hazard rating scale is provided on all treated timber according to the SANS 10005 to indicate the risk✓ that the treated timber can be exposed too.✓ (2)

4.2 H2 treated timber is timber not in contact with the ground✓ that is covered by a roof✓ and not exposed to outside weather conditions.✓ (3)

4.3
- They are easy to clean up.
- They are cheaper than solvent-based paints.
- They are easy to apply and are resistant to most chemicals.
- They dry more quickly than solvent-based paints.
- Their odour is weaker than that of solvent-based paints. (Any 2 × 1) (2)

4.4
- Pigments
- Binders
- Additives
- Solvents (4)

4.5 Duplex coating system consists of a hot-dip galvanized base on steel, covered by a coat of paint suitable for the environmental conditions.✓ The two layers of the duplex coating (galvanize and paint) works together✓ that increase the life span of the zinc and paint.✓ The synergistic effect of a duplex coating can then be described as the increase of protection✓ that is generated by the application of the two layers✓ where each overcome the shortcomings of each other that will increase the life span of the protective layer and structure.✓ (6)

4.6 Stick a piece of Sellotape onto a clean area of the steel surface.✓ Remove the Sellotape.✓ Compare any dirt particles to the SANS cleanliness test for dust and debris.✓ (3)

[20]

QUESTION 5

5.1
- Acrylic resin-based cementite
- Polymer modified bitumen membrane (torch ones)
- Insitu reinforced liquid system
- Bitumen emulsion system (Any 3 × 1) (3)

5.2 Paint the area to be waterproofed using the waterproofing paint.✓ Lay the membrane on top of the wet paint.✓ Using the bristles of the paint brush, press the membrane onto the wet paint.✓ Any air trapped under the membrane will form air bubbles; remove them by dabbing the cloth with the brush.✓ Immediately apply the waterproofing paint over the membrane to ensure a watertight finish.✓ Apply maintenance every two to three years.✓ (6)

5.3 The application of the national building regulations specifies that all concrete roofs of buildings in South Africa must be slanted towards downpipes to drain water away.✓ The minimum fall for a flat roof slanted towards a downpipe must have a ratio of 1:50.✓ It translate as a fall of 10 cm over a distance of 5 m.✓ (3)

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5.4
- Silicones
- Silanes
- Organo-silanes (3)

[15]

QUESTION 6

6.1 6.1.1 It is a natural substance produced from coal ✓ and it is extremely toxic. ✓

6.1.2 It is a natural substance that is black in colour and highly viscous and it is extracted from crude oil. ✓ It is the residue after distillation of the volatile components. ✓

6.1.3 It is a mixture of bitumen and aggregates. ✓ It is used for roads surfaces. ✓

(3 × 2) (6)

6.2
- Black in colour
- Non-volatile
- An adhesive
- Soluble in many organic solvents
- Resistant to attack by acids, alkalis and salts
- Insoluble in and immiscible with water (Any 4 × 1) (4)

[10]

QUESTION 7: FASTENERS

7.1 *Fasteners* such as bolts, nuts, set screws and studs are widely used in the construction industry✓ to join various parts, components and systems together.✓ (2)

7.2
- Apply the correct torque to the bolts.
- Ensure that the friction is reduced with a washer.
- Ensure that even loads are applied to the bolts by using a tightening sequence.
- Ensure that the bolted surfaces are protected. (4)

7.3
- Nylock nuts
- Oval nuts
- Jam nuts
- Spring washers
- Internal-tooth lock washers
- Thread-locking adhesives (Any 4 × 1) (4)

[10]

TOTAL: 100

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