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Maximum
 score per
 question.
 In total,
 there are
 100 points
 to obtain
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I Textual questions 40

1a When / in what case do you need foundation piles? 1

When the top layers of soil cannot carry the building.

1b How long do they need to be? 1

They need to extend to firm layers of soil.

2a Frost is a point of concern for substructures. What physical principle makes it dangerous? 1

Water expands when it freezes.

2b Which technical solutions (2x) prevent frost-damage in substructures? 2

- **Start the foundation at frost free-depth.**
- **Use concrete and other frost-proof materials.**

Not expected, but accepted answer: waterproofing subsurface materials (not foils/membranes, this is too vulnerable but otherwise).

3 Casting concrete directly on (dry) bare soil is never a good idea. Why not? 3

The water and fine parts will leak away from the concrete mix (and both can mix). This reduces the quality of the concrete.

Not expected, but accepted answer: you need a bedding for placing the steel reinforcement.

4 Give two reasons for movement joints in sand-lime walls. 2

- **Shrinkage of the material**
- **Deflection of the floor**

5 Name two types of construction floors (so no covering floors or finishing floors!) that are designed to keep pipes and ducts permanently accessible. 2

- **Wing slab floor**
- **Slimline-floor / infra+ floor**

Not expected, but accepted answer: wooden beam floor.

- 6 What is the functional difference between a fixed connection and a hinged connection? 4
A hinged connection resists displacement, but not rotation
A fixed connection resists displacement and rotation.
- 7 Name three fundamentally different ways to prevent that a waterproofing membrane a/o roof insulation get sucked off the roof due to underpressure. 3
- **Ballast (gravel / green / terrace)**
 - **Glue (partially or fully)**
 - **Mechanical fixation (anchors)**
- Not expected, but accepted answer: battens (for pitched roofs).**
- 8 Which three types of heat transfer are there? 6
 And what technical solutions are there for each type?
- **Transmission: insulation material, thermal bridge interruptions, minimizing contact surfaces.**
 - **Convection: prevent air leaks/streams**
 - **Radiation: aluminum foil**
- Not expected, but accepted answer: evaporation/condensation.**
- 9 What are the dimensions of a Waal size brick? 2
l x w x h = 210mm x 100mm x 50mm
- 10 What is the difference between an integrated frame and a mounted frame? 2
Integrated frame: a frame that is joined with the construction frame. They are processed together on the construction site.
Mounted frame: a frame that is mounted to a construction frame in a later stage (when the rest of the facade is ready).
- Not expected, but accepted answer: difference between integrated and mounted frames for door openings in interior walls.**
- 11 What is the difference between a cement based and an anhydrite based covering floor in terms of processing? 3
Cement is relatively dry and needs manual/mechanical levelling.
Anhydrite is fluid and self-levelling.

- 12 How can you get a good sound insulation with a Metal Stud separation wall? 3
Give three strategies/methods.
- **Place two “mirrored” walls slightly separate from each other.**
 - **Adding insulation, gypsum boards, OSB/multiplex boards.**
 - **Carefully sealing the seams and joints.**
- 13 Infrastructure takes up space. What is the diameter of a toilet sewage pipe? 2
100mm
- 14 Name three water systems that you will find in a bigger building. 3
- **Tapwater**
 - **Fire estinguishing water**
 - **Water for cooling and heating**

Not expected, but accepted answers: sewage (dirty water), rainwater.