



## **6720-044/544 Level 3 Constructing the Build Environment (Design & Planning)**

**Version 1.0 – November 2017**

**Sample Questions Mark Scheme**

**1**

State **two** forms of foundation that can be used in the construction of low-rise domestic buildings. (2 marks)

**Answer**

**One** mark **each** for any **two** of the following:

- Strip (allow deep strip and wide strip).
- Raft.
- Pile.
- Pad and beam (allow 'pad' on its own, but not 'beam').

A clear and accurate sketch is acceptable but it must be identified correctly.

Test Spec Reference: 301.1.1 AO1

**2**

Explain why the following are requirements of a cold water supply entering a building.

- a) The service pipe **must** enter the building at a minimum depth of 750 mm below ground level. (2 marks)
- b) The service pipe **must** enter the building through the wall but not below the foundation. (2 marks)

**Answer**

- a) At 750 mm below ground level the temperature is constantly above 0°C (1). This ensures that the cold water supply does not freeze (1).
- b) The service pipe does not suffer from ground movement below the foundation (1) and does not have to support the load of the wall and foundation (1).

Test Spec Reference: 301.1.1 AO2

**3**

State **two** benefits of off-site prefabrication in modern methods of construction. (2 marks)

**Answer**

**One** mark **each** for any **two** of the following:

- Better quality control.
- Shorter build times.
- Reduced labour requirement.
- Reduced waste.

Test Spec Reference: 301.2.2 AO1

**4**

Explain the physical and chemical properties of steel that make it an appropriate structural material for use in medium-rise industrial buildings. (6 marks)

**Answer**

**One** mark for identification of property and **one** mark for brief explanation to a maximum of **six** marks.

- High strength in compression, tension, bending and shear (1) better than nearly everything else, certainly at the price (1).
- High stiffness (1) therefore limited deformation under load (1).
- Can be welded (1) not like some metals (1).
- Readily available (1) but depends on country/state of market (1).
- Reasonably priced (1) compared to many other metals (1).
- Allows for higher-rise buildings (1) due to strength and stiffness (1).

Test Spec Reference: 302.1.3 AO2

**5**

State **two** items of information that should be collected during a site investigation. (2 marks)

**Answer**

**One** mark for any **two** of following:

- Site boundaries.
- Access to site.
- Local roads.
- Trees, hedges and fences.
- Topography.
- Existing structures.
- Position of existing services.
- Wildlife and habitat.

Test Spec Reference: 302.2.1 AO1

**6**

State **three** hazards associated with deep excavations. (3 marks)

**Answer**

**One** mark **each** for any **three** of the following:

- Slips, trips and falls.
- Hazardous materials.
- Use of electricity.
- Falling objects.
- Negligence and/or tiredness.
- Weather conditions.
- Hygiene and site housekeeping.
- Manual handling.
- Working in confined spaces.
- On-site traffic.

Test Spec Reference: 303.1.2 AO1

**7**

Failure to comply with health and safety legislation in the workplace can have corporate and human consequences.

- a) State **three** corporate consequences. (3 marks)  
b) State **two** human consequences (2 marks)

**Answer**

- a) **One** mark for any **three** of the following:
- HSE investigation.
  - Improvement notice.
  - Prohibition notice.
  - Fines.
  - Imprisonment.
  - Confiscation of equipment.
  - Seizure of assets.
  - Reputational damage.
  - Contractual implications.
  - Stoppage of work.
- b) **One** mark for any **two** of the following:
- Death or injury (whichever the outcome is).
  - Emotional impact (on family, friends and co-workers).
  - Loss of income (on family).

Test Spec Reference: 303.3.2 AO1

**8**

Define the term 'infrastructure requirements' as used in architectural design and planning.

(2 marks)

**Answer**

Marks as shown, up to a maximum of **two** marks.

Infrastructure requirements are basic physical (1) and organisational (1) structures and facilities (1) such as buildings, roads, railways, canals, power supplies, drainage (any 2) needed to support a construction project (1).

Test Spec Reference: 312.1.2 AO1

**9**

Explain how the construction of a new housing estate on a flood plain can increase the risk of flooding in other areas.

(4 marks)

**Answer**

Marks as shown, up to a maximum of **four** marks.

New homes on a greenfield site means more land covered by hard materials such as concrete, clay tiles or tarmac (1). Water runs off more quickly to surface water drains, and hence to nearby watercourses (1), than it would if it had to percolate through the land and make its way more slowly to those watercourses (1). Rivers flood, break their banks and widespread flooding may result (1).

Test Spec Reference: 312.2.3 AO2

**10**

A company has purchased land upon which a large petrol station once stood. Their intention is to construct a training centre that will specialise in delivering practical construction crafts training for trades such as brick laying. The training centre does not require gas services, however will require all other building services. The workshop in the training centre, must be at least 6 m high and the structure of the building is to be steel framed.

The company also wishes to build a new home for the resident site service manager. The house is to have all normal building services provided, be single storey and be of traditional masonry construction.

- a) Explain the sustainable techniques a designer may wish to incorporate into the house. (6 marks)

**Answer**

- a) The candidate will provide a reasonable explanation of a range of sustainable techniques given below.

- Solar panels.
- Waste management.
- Suds.
- Fabric Insulation.
- Sips.
- Grey water collection.
- Biomass technology.
- Heat pump technology.

- b) Discuss the issues concerned with site clearance, excavation, the construction of foundations and provision of building services to the two buildings. (12 marks)

**Indicative Content**

Site clearance techniques, remediation of contaminated land, excavation techniques, specification of suitable foundations to suit structural form, distribution to and introduction of building services to structures, health and safety hazards, risks and control measures associated with all of the above.

**Band 1 (0-4 marks)**

The candidate identifies a limited number of issues in basic level of detail associated with the proposed works.

Health and safety hazards are recognised but no detail is provided of the risks associated with that hazard.

**Band 2 (5-8 marks)**

The candidate describes a wide range of issues to an acceptable level of detail associated with the proposed works.

Health and safety hazards are recognised and detail is provided of the risks associated with that hazard.

**Band 3 (9-12 marks)**

The candidate discusses a comprehensive range of issues associated with the proposed works in depth

Health and safety hazards are recognised, detail is provided of the risks associated with that hazard, control measures are proposed.

SAMPLE