X226/301

NATIONAL QUALIFICATIONS 2009

THURSDAY, 11 JUNE 1.00 PM – 3.00 PM

ARCHITECTURAL TECHNOLOGY HIGHER

100 marks are allocated to this paper.

Answer **all** questions in Section A (40 marks).

Answer **two** questions from Section B (30 marks each).

An Ordnance Survey Sitemap is provided for use with the following questions, 10(*a*), (*b*), (*c*), (*d*) and (*e*).

A worksheet is provided for Question 9(*a*).

Marks

SECTION A

Attempt all the questions in this Section (total 40 marks)

1. Briefly explain, with the aid of an annotated sketch if necessary, what is meant by the term *Ordnance Survey National Grid*. **4**

2. (*a*) State the objective of a linear survey. **2**

(*b*) Briefly describe **two** items of ground data which are generally collected when carrying out such a survey. **4**

3. You are to be responsible for the setting out of a new building in a built-up urban area. All construction levels are to be related to Ordnance Datum (OD).

(*a*) How would you determine the location of the Ordnance Bench Marks (OBMs) in the vicinity of the site? **2**

(*b*) Briefly explain how you would use an Ordnance Bench Mark to establish levels on site, and how you would control the accuracy of day-to-day levelling work. **4**

4. A survey line has a slope-measured length of 76·18 m and an Abney level reading of 4·4°. Calculate the horizontal plan length. **4**

5. Briefly explain what is meant by the term *Building Design*. **4**

6. Identify **four** examples of how the construction industry impacts *negatively* on the environment and briefly explain what steps are being taken to reduce the damage. **8**

7. An outline design for a small housing development is to be prepared.

List **eight** items of information the designer will require from the client, prior to commencing work on the design. **8**

(40)

[*END OF SECTION A*]

Marks

SECTION B

Attempt any TWO questions in this Section (total 60 marks)

8. (*a*) A surveyor completes the linear survey of a site using a 30 m steel tape. On completion of the survey work a check on the length of the tape indicates that it has stretched and has an actual length of 30·28 m.

(i) Determine the true length of a line that was measured in the survey as 293·26 m. **4**

(ii) Identify **two** other possible sources of error that may occur, apart from that mentioned in part (*a*), when determining horizontal lengths by means of a steel tape. **2**

(iii) For each source of error identified in your answer to part (ii), briefly explain what a surveyor may do to reduce the error. **4**

(*b*) Briefly describe, with the aid of an annotated sketch, how *step taping* is carried out to establish the horizontal length of a survey line on sloping ground. **4**

(*c*) Briefly explain **two** functions of the foundations to a building. **4**

(*d*) Briefly describe the soil conditions which would lead to the choice of the following types of foundations:

(i) deep strip (trench fill); **2**

(ii) short bored piles with ground beams. **2**

(*e*) Briefly explain, with the aid of an annotated sketch, how you could provide adequate *thermal insulation* to **each** of the following elements of a domestic building:

(i) external brick cavity walls; **4**

(ii) suspended timber ground floor. **4**

(30)

[Turn over

Marks

9. (*a*) **Figure Q9(*a*)** shows a set of levels taken during the survey of a construction site.

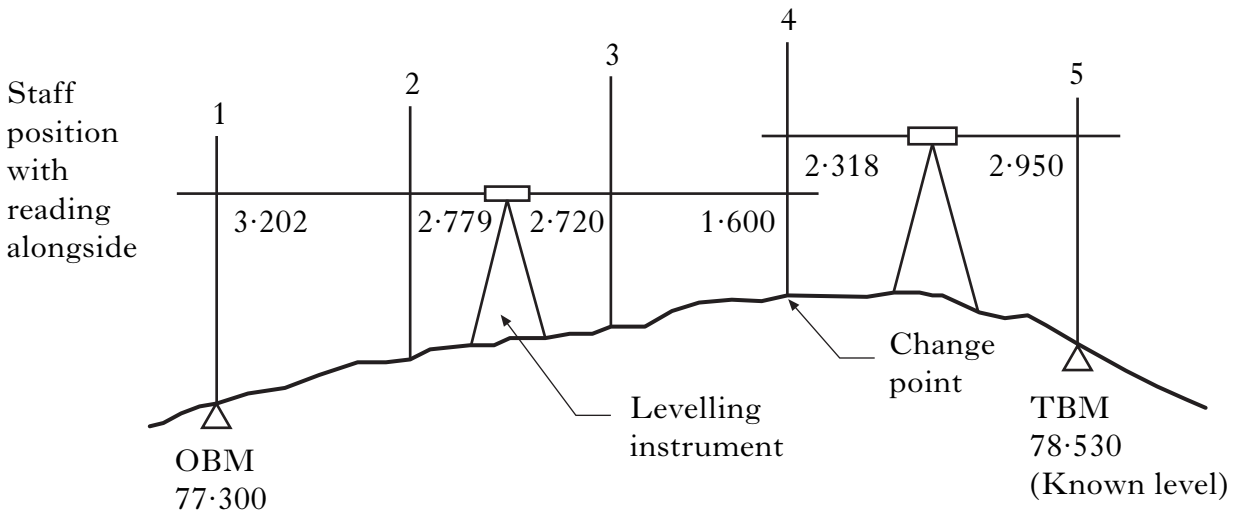

Figure Q9(*a*)

Using **Worksheet Q9(*a*)**:

(i) book the levels; **5**

(ii) reduce the levels using an appropriate method; **5**

(iii) carry out an appropriate arithmetic check on the reduction; **2**

(iv) state the magnitude of the closing error in the survey and suggest a reason for this error. **2**

(*b*) Briefly describe **two** common forms of house construction currently in use in the UK. In your answer mention the construction methods and materials used for each form of construction. **6**

(*c*) For **each** form of construction described in part (*b*), prepare an annotated sketch showing a suitable construction for the external walls. **10**

(30)

Marks

10. Refer to the 1:2500 scale Ordnance Survey Sitemap and answer the following questions.

(*a*) What area of ground is covered by grid square 760004? **2**

(*b*) Briefly describe **four** details contained in grid square 756004. **4**

(*c*) Identify the building that has the 10 m grid reference 75430043. **2**

(*d*) Determine the average gradient of Ardbroilach Road between its junction with the High Street and the point at grid reference 7570400873. **4**

(*e*) State the meaning of **four** of the symbols shown in grid square 753011. **4**

(*f*) Briefly explain how the design of a building may be influenced by the following *Design Factors:*

(i) safety; **2**

(ii) spatial suitability; **2**

(iii) architectural appearance/aesthetics. **2**

(*g*) Briefly describe **two** important properties of each of the following materials and state where in the building they would be used:

(i) lightweight concrete blocks; **2**

(ii) hardwood; **2**

(iii) unreinforced concrete; **2**

(iv) gypsum plasterboard. **2**

(30)

[*END OF SECTION B*]

[*END OF QUESTION PAPER*]

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FOR OFFICIAL USE

Mark

X226/302

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ARCHITECTURAL TECHNOLOGY
HIGHER
Worksheet for Question 9(*a*)

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth
Day Month Year

Scottish candidate number

Number of seat

To be inserted inside the front cover of the candidate's answer book and returned with it.

WORKSHEET Q9(*a*)

(i) Booking
(ii) Reduction

All entries in metres

Back Sight	**Inter Sight**	**Fore Sight**	***Ht of Collimation*** (or) **Rise & Fall**	**Reduced Level**	**Remarks**
					OBM
					TBM

(iii) Arithmetic Check

(iv) Closing error

[*END OF WORKSHEET*]