X226/301

NATIONAL QUALIFICATIONS 2007

TUESDAY, 5 JUNE 9.00 AM – 11.00 AM

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 Superplan map is provided for use with Question 9 and Question 11.

A Worksheet is provided for Question 10(*a*).

PB X226/301 6/370

Marks

SECTION A

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

1. (*a*) Briefly explain the functions of **each** of the following local authority departments/sections in construction development:

- Building Control
- Planning. **6**

(*b*) Identify the principal legislation under which **each** department/section operates. **2**

2. List and briefly explain the main stages in the building design process from the point at which the client's requirements are identified to the preparation of production information. **8**

3. Figures Q3(*a*) and Q3(*b*) show two graduated staffs as observed through the telescope of a surveyor's level. State the staff reading in **each** case.

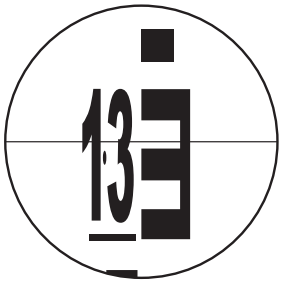

Figure Q3(*a*)

Figure Q3(*b*) **4**

4. State what **each** of the following symbols commonly used in Ordnance Survey maps represents.

- BM
- TCB
- PH
- PO **4**

Marks

5. With reference to linear measurement surveying, briefly explain the meaning of **each** of the following terms.

- Trilateration
- Offsetting. **4**

6. A survey line between points **A** and **B** has a slope-measured length of 72·486 m and an *Abney level* reading of 7·2°. Calculate the horizontal plan length and the difference in height between points **A** and **B**. **4**

7. Briefly describe the procedure which should be followed when setting up a *three-foot-screw automatic level* to take a series of readings on to a levelling staff. **4**

8. Briefly describe **two** defects which frequently occur in the exterior walls of low-rise traditionally-built housing. **4**

(40)

[*END OF SECTION A*]

[Turn over

Marks

SECTION B

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

9. Refer to the 1:2500 scale Ordnance Survey Superplan sheet and answer the following questions.

(*a*) The National Grid sheet reference at the centre of this Superplan is NN9358. Briefly explain the meaning of this reference. **4**

(*b*) Name the building that has the 10 m grid reference 93415826. **2**

(*c*) Determine the average gradient of Atholl Road between its junction with Birnam Place and the point opposite the bank at grid reference 9393058158. **4**

(*d*) Briefly describe the detail in plan square 940580. **4**

(*e*) For **each** of the commonly used construction materials listed below, identify one *advantageous property* and one *disadvantageous property*.

- Facing brick
- Lightweight concrete block
- Softwood timber
- Expanded polystyrene. **8**

(*f*) For **each** of the materials listed in Q9(*e*) above, briefly describe where in the building it is used and what function it is performing. **8**

(30)

Marks

10. (*a*) Figure Q10(*a*) shows a set of levels taken during a survey of a building site to establish a Temporary Bench Mark (TBM).

On the **Worksheet Q10(*a*)**:

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

(ii) reduce the levels using either the *Collimation* or *Rise and Fall* 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. **2**

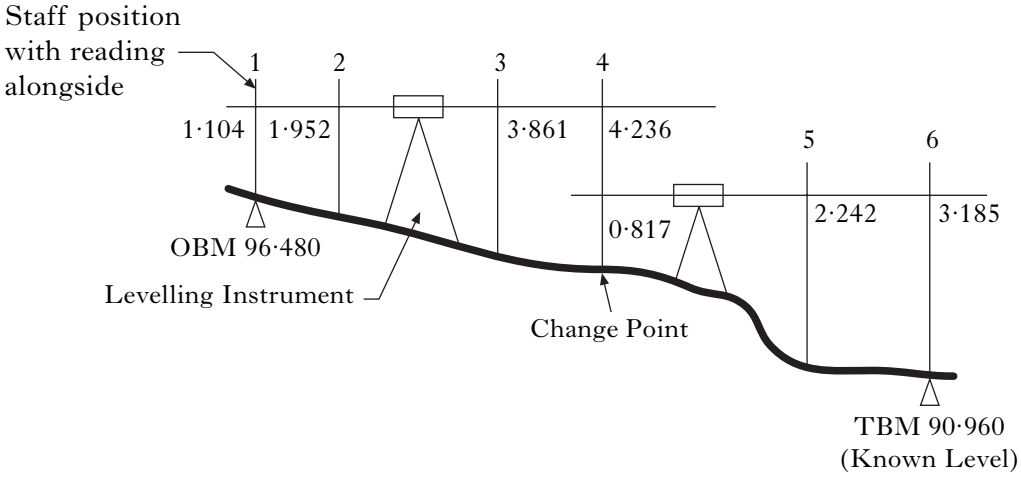

Figure Q10(*a*)

(*b*) You have been appointed to assist in the design of a large housing development on an area of land on the outskirts of a small town.

(i) Briefly explain why it is important that the impact of the development on the local environment is assessed. **4**

(ii) List **four** factors that you would consider when carrying out such an assessment. **4**

(*c*) (i) State **two** important functions of the external walls for the proposed housing. **2**

(ii) For **each** of the **two** functions identified in part Q10(*c*)(i), briefly explain the design principles which are applicable. **6**

(30)

[Turn over for Question 11 on *Page six*

Marks

11. Refer to the 1:2500 scale Ordnance Survey Superplan Sheet and answer the following questions.

(*a*) There is a sports field shown at grid reference 94175773. The boundaries of the field are shown in heavy outline. Briefly describe, with the aid of an annotated sketch, how a linear survey could be carried out to establish accurately the actual size and shape of this sports field. **5**

(*b*) In which direction does the River Tummel flow? **1**

(*c*) Briefly describe the physical features of the ground topography associated with the railway line routed North West from Pitlochry Station to the edge of the plan. **4**

(*d*) A surveyor completes a linear survey of a site using a 30 m tape. On completion of the work the surveyor establishes that the tape has stretched and the actual length of the tape is 30·035 m.

Determine the true length of a line which was measured in the survey as 216·351. **4**

(*e*) A new housing development is to be designed on a local greenfield site.

(i) Identify **three** *performance requirements* for the buildings that will be considered at the design stage. **3**

(ii) For **each** of the performance requirements identified, briefly explain **two** important *design factors* that will influence the design. **6**

(iii) Briefly explain the function of the ground floors of the buildings. **3**

(iv) Briefly describe, with the aid of an annotated sketch, a form of construction which may be used for the ground floors of the buildings. **4**

(30)

[*END OF SECTION B*]

[*END OF QUESTION PAPER*]

FOR OFFICIAL USE

Mark

X226/302

NATIONAL QUALIFICATIONS 2007

TUESDAY, 5 JUNE
9.00 AM – 11.00 AM

ARCHITECTURAL TECHNOLOGY
HIGHER
Worksheet for Question 10(*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.

PB X226/302 6/370

WORKSHEET Q10(*a*)

(i) and (ii) Booking and 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