

# X226/301

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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).



## 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.

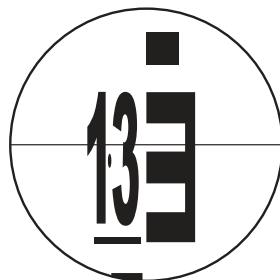


Figure Q3(a)

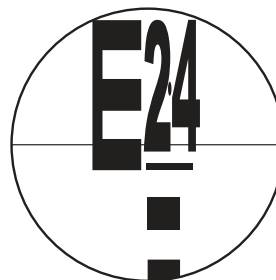


Figure Q3(b)

4

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

- BM
- TCB
- PH
- PO

4

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  $7.2^\circ$ . 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

## 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)**

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

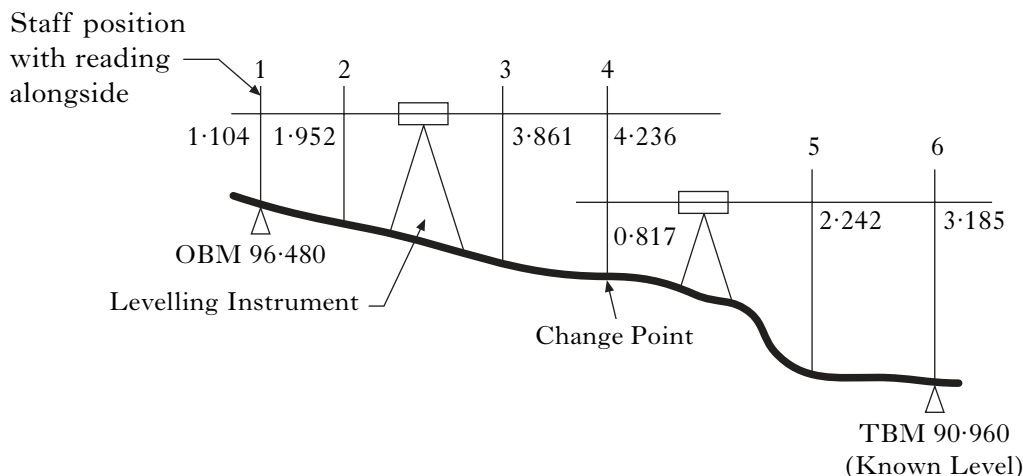


Figure Q10(a)

- (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

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 30m 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

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Mark

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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.



**WORKSHEET Q10(a)**

(i) and (ii) Booking and Reduction, all entries in metres

<b>Back Sight</b>	<b>Inter Sight</b>	<b>Fore Sight</b>	<b>Ht of Collimation (or) Rise &amp; Fall</b>	<b>Reduced Level</b>	<b>Remarks</b>
					<b>OBM</b>
					<b>TBM</b>

(iii) Arithmetic Check

(iv) Closing error