2013 Building Construction

Higher

Finalised Marking Instructions

Part One: General Marking Principles for: Building Construction Higher

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this Paper. These principles must be read in conjunction with the specific Marking Instructions for each question.

(a) Marks for each candidate response must always be assigned in line with these general marking principles and the specific Marking Instructions for the relevant question. If a specific candidate response does not seem to be covered by either the principles or detailed Marking Instructions, and you are uncertain how to assess it, you must seek guidance from your Team Leader/Principal Assessor.

(b) Marking should always be positive ie, marks should be awarded for what is correct and not deducted for errors or omissions.

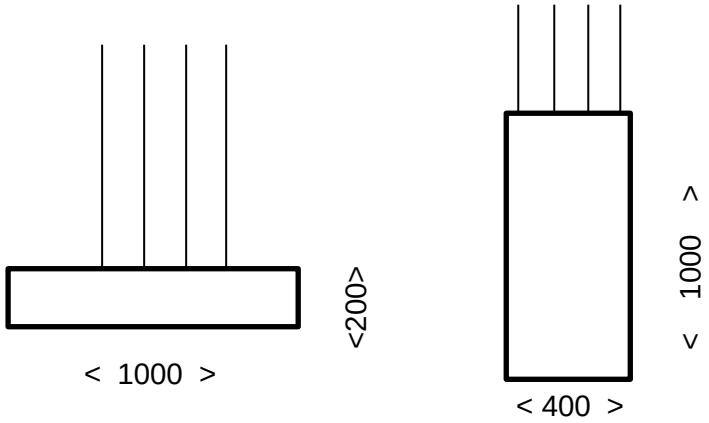
GENERAL MARKING ADVICE: Building Construction Higher

The marking schemes are written to assist in determining the "minimal acceptable answer" rather than listing every possible correct and incorrect answer. The following notes are offered to support Markers in making judgements on candidates' evidence, and apply to marking both end of unit assessments and course assessments.

Part Two: Marking Instructions for each Question

Section A

Question			Expected Answer/s	Max Mark	Additional Guidance
1	**a**		**State *two* objectives of a site investigation** Any two from the following list: • assess the suitability of the site for the proposed construction • examine the ground conditions so that the most appropriate type of foundation can be selected • plan the best method of construction; to avoid difficulties and delays due to unforeseen ground conditions • eliminate structural defects which would result from unacceptable ground movements • prevent chemical attack on foundations. **(1 mark each)**	**2**	
1	**b**		**State *two* common ways to carry out ground exploration** Trial pits dug by mechanical excavator **(1 mark)** Bore holes by light percussion drilling (shell and auger) **(1 mark)**	**2**	
1	**c**		**State *two* common *in-situ* field tests carried out during ground exploration and briefly describe what information each provides for the engineer.** Standard Penetration Test (SPT) This test gives an *N*value of the soil which indicates its relative density. **(2 marks)** Shear Vane Test This test determines the *in-situ* shear strength of very soft to firm cohesive soils. **(2 marks)**	**4**	

Question			Expected Answer/s	Max Mark	Additional Guidance
2	a		**Prepare an annotated sketch to show a typical vertical cross section through each of the following foundation types:** • **wide strip foundation** • **deep strip foundation.**		
			 Wide Strip (2marks) Deep Strip (2 marks)		Dimension may vary
2	b		**Briefly explain how a contractor may obtain a supply of fresh concrete for the foundations.** Contractor may obtain a supply of concrete from a local Ready Mixed Concrete supply depot (batching plant).	**3**	
3 3	a		**A dwelling house with traditional concrete strip foundations is to be constructed on a sloping site.** **State *two* factors which will control the width of the foundation.** **Factor 1** – Load being transmitted from the building **(1 mark)** **Factor 2** – Bearing capacity of the subsoil under proposed foundations. **(1 mark)**	**2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
3	b		***Figure Q3(b)*** **shows the stepped foundation (dotted) to a gable of the house.** **Sketch and dimension the detail at *A* to illustrate compliance with current standards.**	**4**	

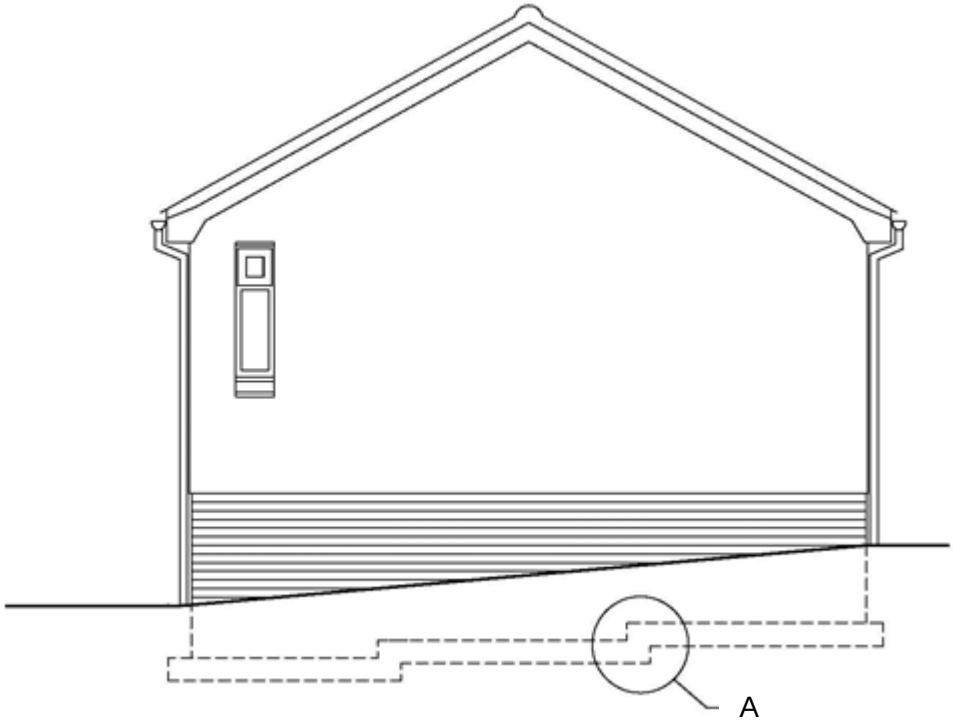
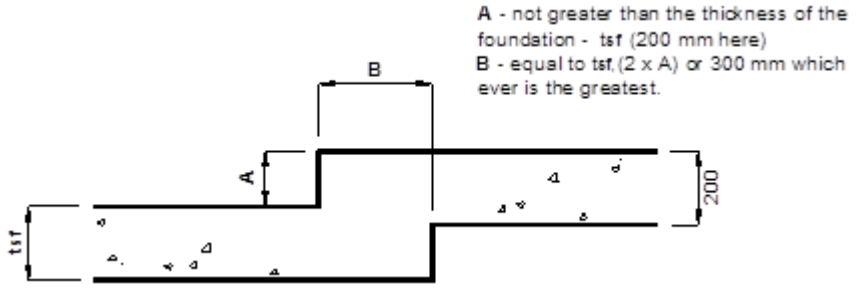
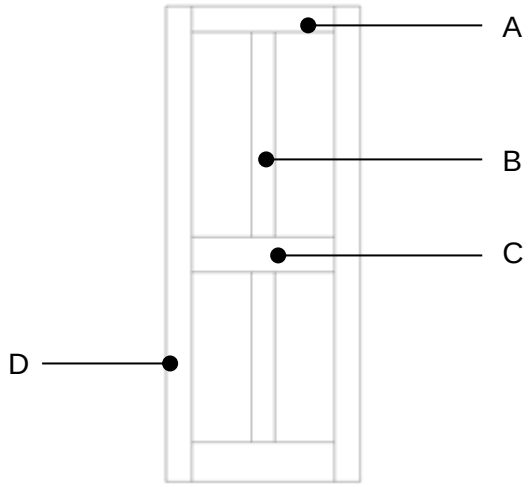


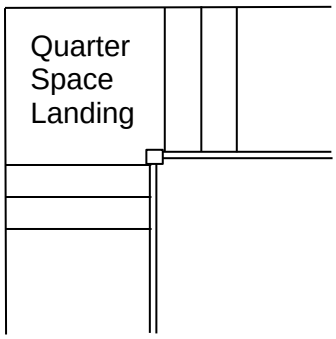
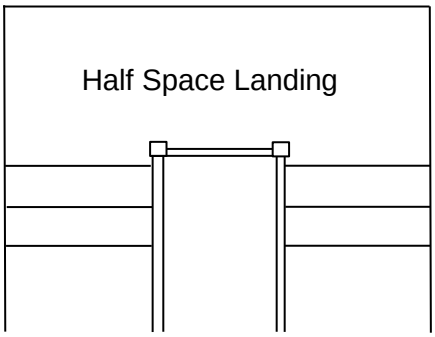
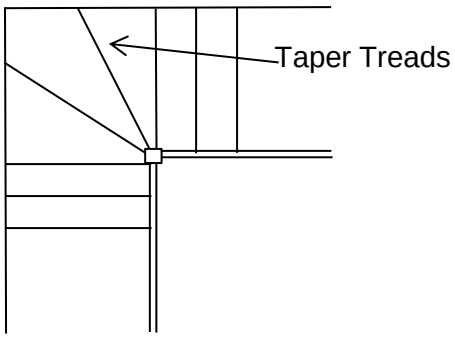
Figure Q3 (b)

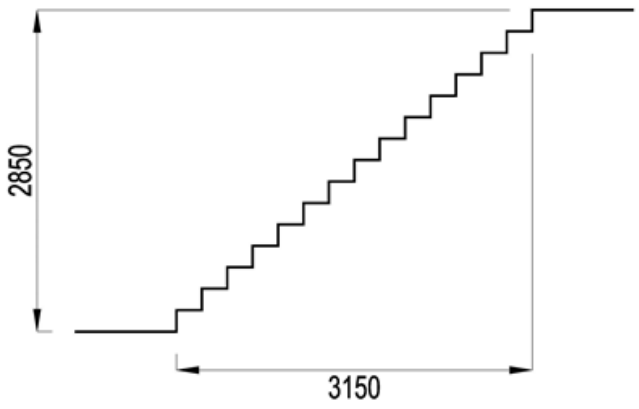


Solution – Detail at 'A'

Question			Expected Answer/s	Max Mark	Additional Guidance
3	**c**		**State the minimum depth of the foundation lettered *X* in *Figure Q2(b)*.** 450mm	**1**	
4			**The external finish to a masonry cavity wall is to be a wet dash render finish.** **List the materials which make up this render finish.** Portland cement (may be white cement) Sand Water Plasticiser Aggregate chippings. **(2 marks)**	**2**	
5	**a**		**State *three* functional requirements of a door in an external wall.** Any three from the list below: • Security • Privacy • Weather resistance • Airtightness • Durability • Strength and stability • Thermal insulation • Sound insulation • Fire resistance **(1 mark each)**	**3**	

Question			Expected Answer/s	Max Mark	Additional Guidance
5	b		**Name the component parts A – D of the 4 panel internal door shown in *Figure Q5(b)* below.**  **Figure Q5 (b)** A – Top rail B – Muntin C – Middle rail D – Stile **(2 marks)**	**2**	

Question			Expected Answer/s	Max Mark	Additional Guidance
6	a		**Prepare sketches to illustrate the following terms relating to a stair:**	6	
6	a	i	 Quarter Space Landing		
6	a	ii	 Half Space Landing		
6	a	iii	 Taper Treads (winders)		

Question			Expected Answer/s	Max Mark	Additional Guidance
6	b		***Figure 6(b)*** **below illustrates a section through a private stair in a dwelling house. Using the information given:**		
6	b	i	**calculate the rise, going and pitch of the stair;** There are 15 risers. Each rise is therefore 2850 ÷ 15 = 190 mm **(1 mark)** Going will be 3150 ÷ 14 = 225 mm. **(1 mark)** Pitch: tangent angle = 190 ÷ 225 = 0.8444 Therefor angle (pitch) = inverse tan 0.844 = 40.18 degrees. **(1 mark)**	**3**	
6	b	ii	**state whether or not the stair complies with current standards, giving a reason for your answer;** Since the maximum pitch of a stair is 42 degrees, this stair complies with current standards for pitch. **(1 mark)** Also, twice rise plus the going must be between 550 and 700mm Therefore (2 × 190) + 225 = 605 confirming stairs comply. **(1 mark)**  **Figure 6 (b)**	**2**	
				(40)	

Section B

Question			Expected Answer/s	Max Mark	Additional Guidance
7	a		**State *four* functional requirements of a floor and briefly explain *each* one.** Any four from the list below (2 marks each): • Strength and stability: Must be strong enough to support the dead load of the floor and its finishes, fixtures and imposed loads of the occupants and furniture. Must have adequate stiffness to remain stable and horizontal. • Resistance to weather and ground moisture: Must be able to resist moisture rising to inside the building. • Durability: All floors should be durable and require little maintenance or repair. • Fire safety: Upper floors should be constructed to provide resistance to fire for a period of time. Important if floor separates dwellings in different occupancy. • Resistance to passage of heat: A floor should provide resistance to the passage of heat. • Resistance to passage of sound: Upper floors that separate dwellings in different occupancy need to resist the passage of sound.	**8**	
7	b		**Briefly describe how a contractor may reinforce an *in-situ* concrete ground supported floor slab and explain why this reinforcement is necessary.** The slab would be reinforced with steel fabric in the top of the slab. This is to provide crack control which may occur as a result of shrinkage and temperature movements in the early life of the slab. The steel fabric will also increase the load bearing capacity of the slab. **(4 marks)**	**4**	

Question			Expected Answer/s	Max Mark	Additional Guidance
7	**c**		***Worksheet Q7(c)*** **shows an incomplete detail drawing of a foundation and *in-situ* concrete ground supported floor slab to a dwelling house.** On the worksheet, complete the drawing in proportion to show the following: • support for the concrete slab • how moisture is prevented from entering the building • finished ground level • insulation. The solution is on the attached worksheet	**8**	
7	**d**		**Ready mixed concrete is required for an *in-situ* ground floor. Curing is an important process in the early life of concrete to minimize shrinkage, ensure adequate surface strength and durability.** **Briefly describe *two* ways in which successful curing may be achieved in the floor slab.** Any of the following methods may be used to prevent premature loss of moisture **(select any two for 2 marks each)**: • Covering concrete in damp Hessian • Covering concrete in plastic sheeting • Sprayed-on curing membranes	**4**	

Question			Expected Answer/s	Max Mark	Additional Guidance
7	e		**Briefly describe, with the aid of an annotated sketch, how the following floor finishes should be applied to the *in-situ* concrete ground floor slab.** • **clay ceramic floor tiles** • **sheet vinyl.** **<u>Clay ceramic floor tiles</u>** Select either direct bedding method or thin bed adhesive method. Direct bedding: Lay on a bed of sharp sand and cement spread to a level thickness of 20 mm on a dry concrete base. Mix should have just enough water for workability and pressing tiles into the bed. Thin bed adhesive (more common today): Spread adhesive on a level power floated concrete base to a thickness of approx. 5 mm combed to assist bedding and the tiles are then pressed and levelled in position. **(3 marks)** **<u>Sheet Vinyl</u>** Ensure base is level and free from any protruding concrete. Lay thin bed of epoxy resin adhesive and roll out vinyl sheet to ensure adhesion. Heat weld joints to provide a seamless finish. **(3 marks)**	**6**	
				30	

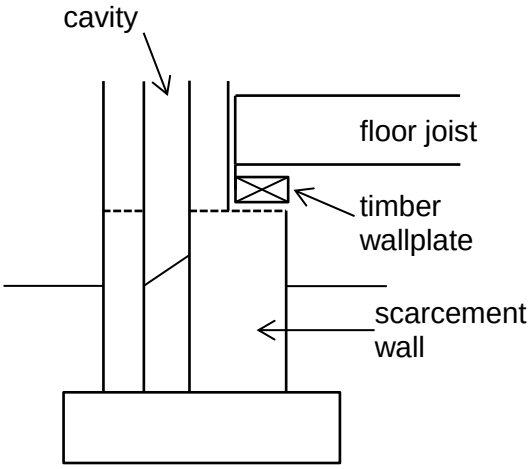
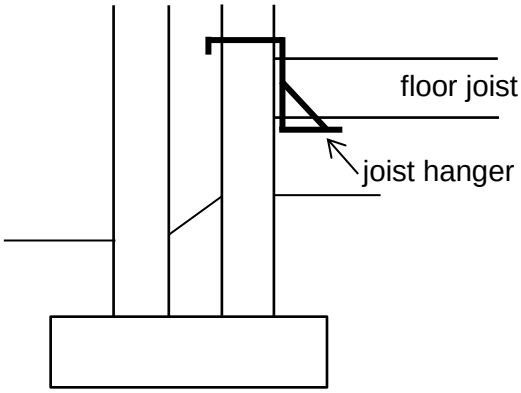
Question			Expected Answer/s	Max Mark	Additional Guidance
8	a		**Briefly describe how the following materials should be correctly stored on site:**	6	
8	a	i	**Clay facing bricks** Clay facing bricks should stand on a firm, level well drained base, not in contact with the soil. They must be wrapped in polythene to prevent them becoming wet or splashed by vehicles.		
8	a	ii	**Quilt insulation** Quilt insulation should be stored under cover in a dry area to prevent it becoming wet.		
8	a	iii	**Timber floor joists** Timber joists – should be stored off the ground and under cover to prevent timber becoming wet. Store flat in racks to prevent timber becoming distorted.		
8	b		**Briefly explain the terms *designed mix* and *standardised prescribed mix* as used in the specification of concrete.** **Designed** concrete mixes are concretes for which the concrete producer is responsible for selecting the mix proportions to meet the required performance as communicated by the specifier. Therefore it is essential that the specifier, in compiling the specification, takes account of: • uses of the fresh and hardened concrete • environmental exposure conditions • surface finish • maximum nominal aggregate size • restrictions on suitability of materials. **(4 marks)**	4	

Question			Expected Answer/s	Max Mark	Additional Guidance
8	b		**(Continued)** Standardised prescribed concrete mixes have their constituent weights pre-defined and are given in current standards. These mixes may only be used for a limited number of applications. For these concretes it is necessary to specify: • a requirement to conform to the current standard (BS 8500-2) • the concrete description, eg STI, ST2, ST3, ST4 or ST5 • the maximum aggregate size • the slump class • any restrictions on types of cement, cement combinations or aggregates • admixtures. **(4 marks)**	**4**	
8	c		**Briefly describe *one* common method of placing fresh concrete in foundations on a site where there is restricted access for ready mixed concrete trucks.** **Any two from:** • Truck mixer – The majority of ready-mix concrete is batched and mixed in a truck mixer • Dumper trucks • Concrete crane skip • Concrete pump • Chutes and conveyors **(2 marks)**	**2**	

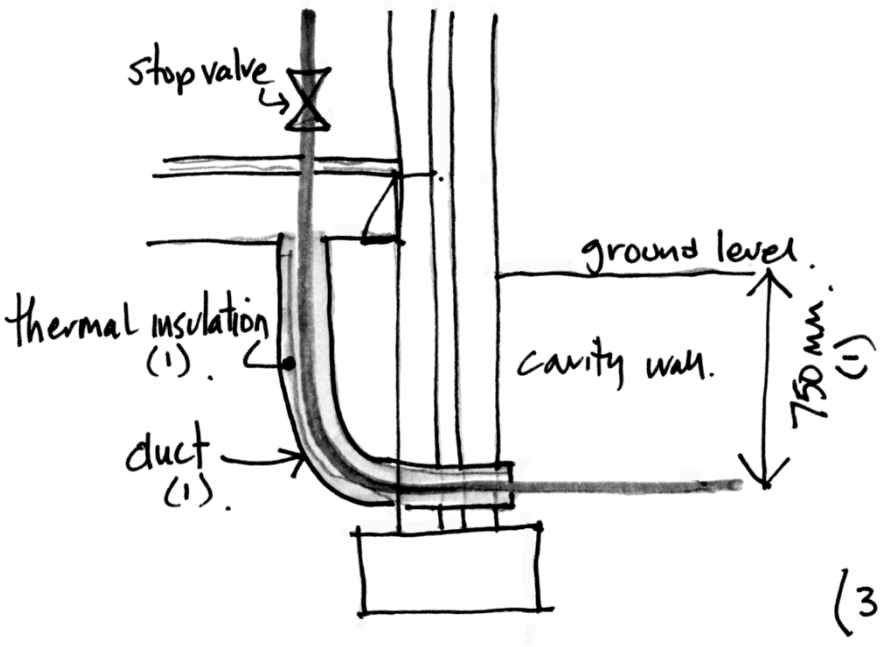
Question			Expected Answer/s	Max Mark	Additional Guidance
8	d		**Briefly explain why the compaction of fresh concrete is important and describe how it may be carried out.** The process of compaction is important because concrete which has been placed contains entrapped air in the shape of large voids. If air voids are not removed by compaction their presence will: • Reduce the strength of the concrete • Increase concrete permeability • Reduce bond between concrete and reinforcement • Result in visual blemishes on the finished concrete. Compaction of the concrete: may be undertaken by using either a poker vibrator or a beam vibrator. The poker vibrator (one of the most common) is inserted into the concrete during pouring/placing operations. The beam vibrator is designed for concrete slabs. Slabs usually have to have a flat top surface and the necessary compaction and shaping can be done in one operation.	**4**	
8	e		***Worksheet Q8(e)*** **shows an incomplete detail of a raft foundation for an extension to an existing house. The walls are masonry cavity construction finished internally with plaster.** **On the *Worksheet* complete the drawing in proportion to show the following:** • ground preparation • cavity wall construction • floor construction • how moisture is prevented from entering the building • insulation • floor and wall finishes. The solution is on the worksheet	**8**	

Question			Expected Answer/s	Max Mark	Additional Guidance
8	f		**Briefly explain how a plaster wall finish is applied to the structure.** Prepare background. Apply undercoat plaster by trowel to a thickness of 11mm. this is followed by a finish coat of plaster applied by trowel to a depth of 2mm. **(2 marks)**	**2**	
				30	

Question			Expected Answer/s	Max Mark	Additional Guidance
9			**Ten new detached houses are to be constructed on a greenfield site.**		
9	**a**	**i**	**State the title of the current construction regulations which control site accommodation.** The Construction (Design and Management) Regulations 2007 (CDM)	**1**	
9	**a**	**ii**	**Identify *four* items of temporary accommodation required on site by the contractor.** Any **four** from the list: • Sanitary and washing facilities • Canteen/rest facilities • Facilities to change and store clothing • Office accommodation • Meeting rooms • Storage accommodation for tools and materials **(4 marks)**	**4**	

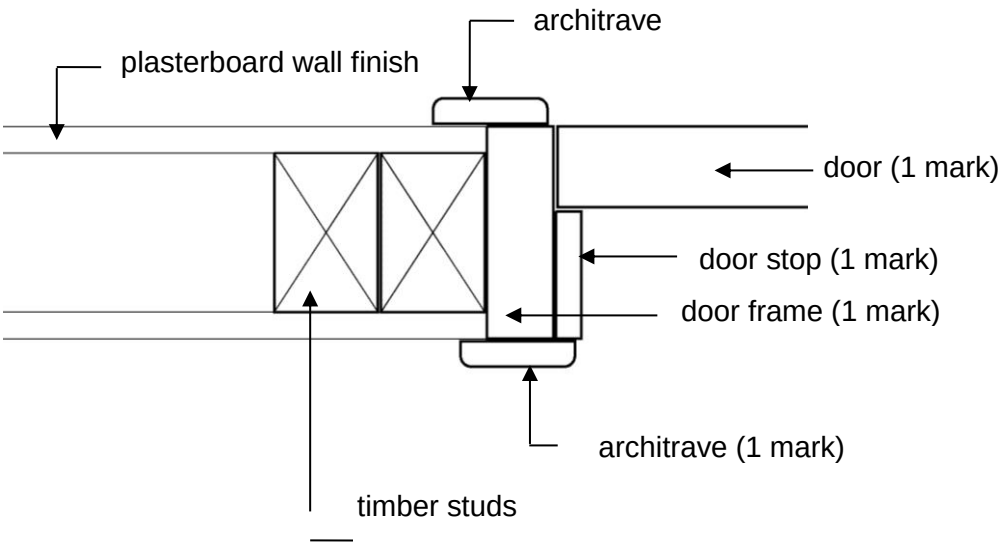
Question			Expected Answer/s	Max Mark	Additional Guidance
9	b		**Prepare annotated sketches to show *two* methods of supporting a suspended timber floor at the junction with a traditional masonry cavity wall.**  Method 1: Scarcement Wall (2 marks)  Method 2: Joist Hangers (2 marks)	**4**	

Question			Expected Answer/s	Max Mark	Additional Guidance
9	c		**Prepare an annotated vertical cross section to show a suitable arrangement for the cold water service entry to a dwelling house.** **Show *one* critical dimension.**	3	

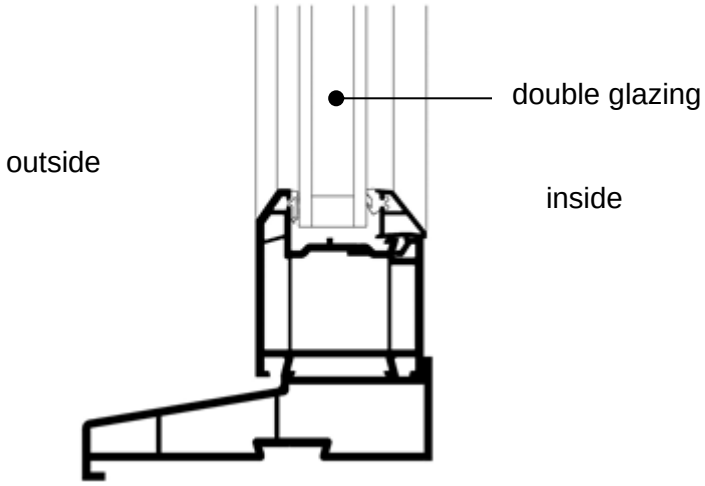


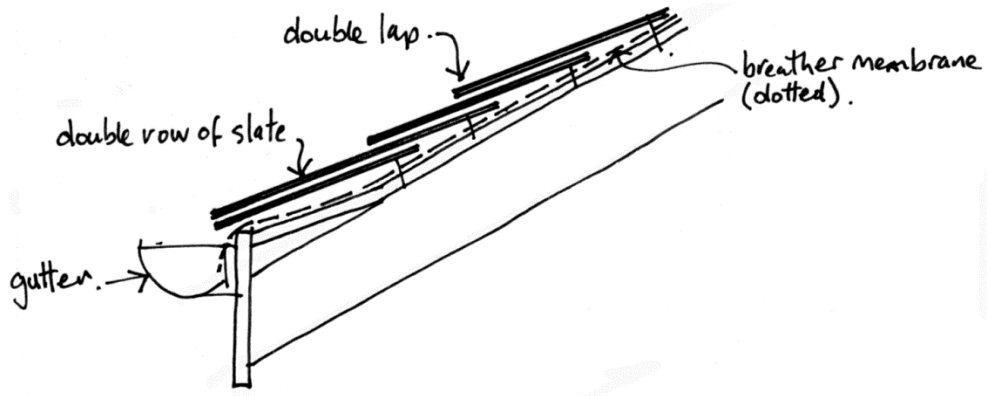
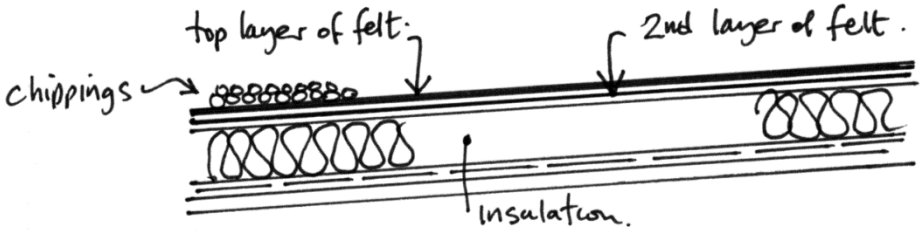
(3 marks)

Question			Expected Answer/s	Max Mark	Additional Guidance
9	d		**A door and door frame have to be fitted into an internal timber stud partition wall. The wall is finished with 10mm plasterboard to each side.** **Describe by means of an annotated sketch, a typical plan detail of the construction to show the door, door frame, door stop and architraves**.	4	

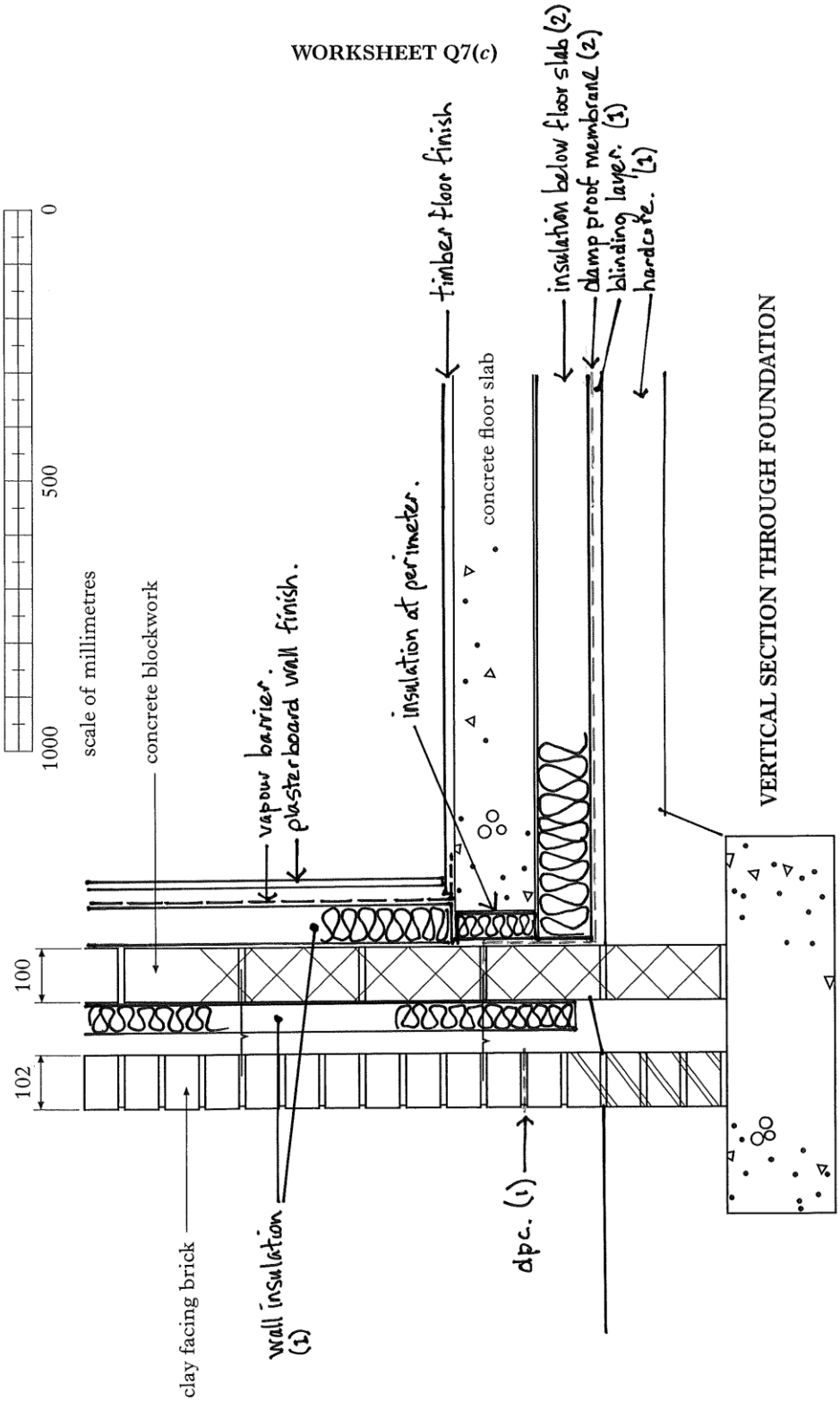


CROSS SECTION THROUGH AN INTERNAL DOOR JAMB

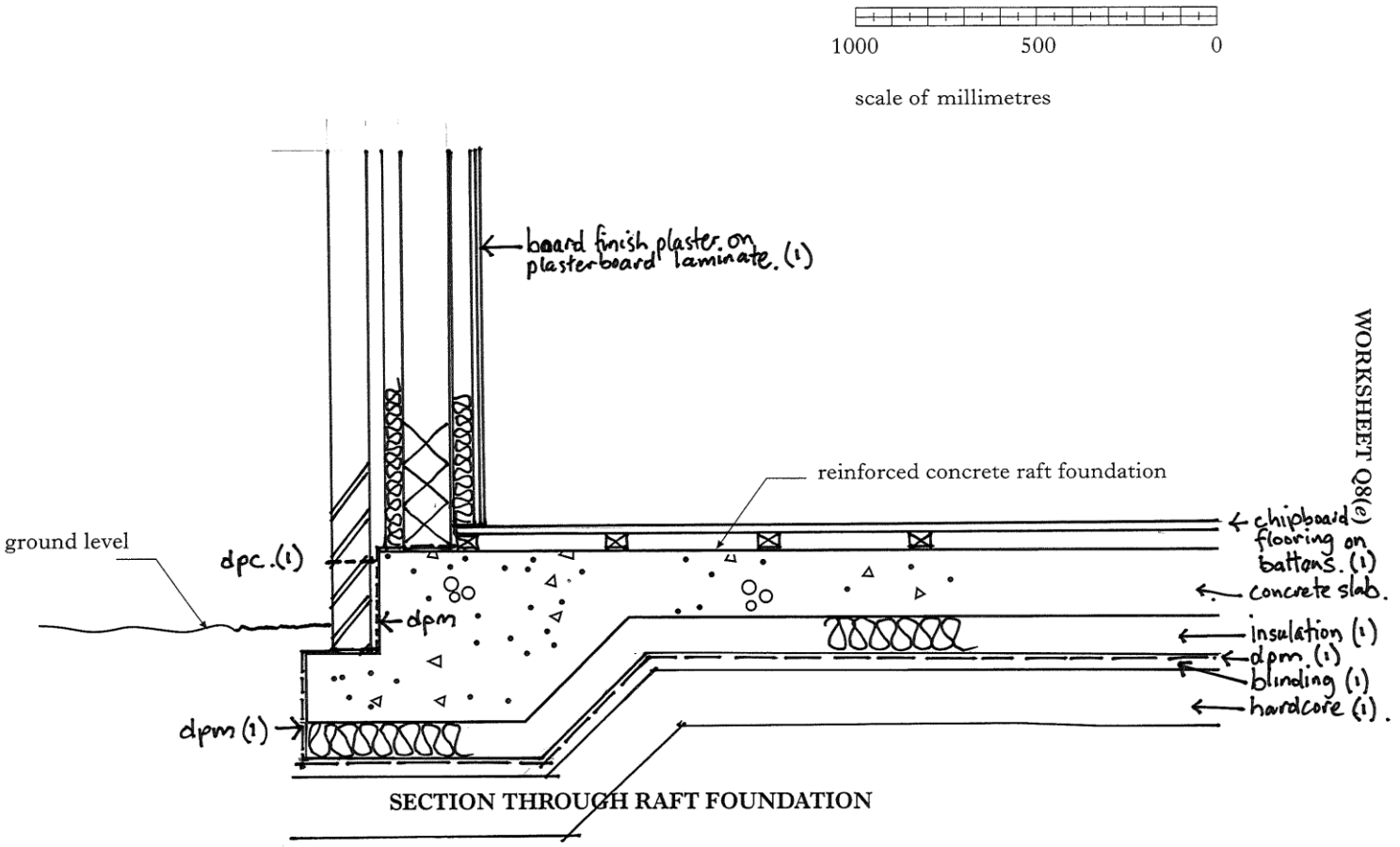
Question			Expected Answer/s	Max Mark	Additional Guidance
9	e		***Worksheet Q9 (e)* shows an incomplete vertical section through the sill of a window opening. The simplified vertical section through the sill of the uPVC window frame is shown in *Figure Q9 (e)*.** On the **Worksheet**, sketch this vertical section to complete the sill detail. Show the location of the window frame and all adjoining components and finishes.  **Figure Q9 (e)** **The solution is shown on the attached worksheet**	**8**	

Question			Expected Answer/s	Max Mark	Additional Guidance
9	f		**Briefly describe with the aid of annotated sketches, how the following roof finishes would be applied to the structure of the building:** • **natural slates** • **built-up felt roofing.** Natural slates are laid direct on a breather membrane and are head nailed through the deck with a single nail. In is important that slates are laid with a double lap and that you commence at the eaves with a double layer of slate. **(3 marks)**  Built-up felt roofing is used on flat roofs and there are two method of applying the felt. It is either bonded in hot bitumen or felt can be torch applied with a hot blow torch. Normally laid in two layers with the top layer being of thicker quality. **(3 marks)**  	**6**	
				30	

WORKSHEET Q7(*c*)

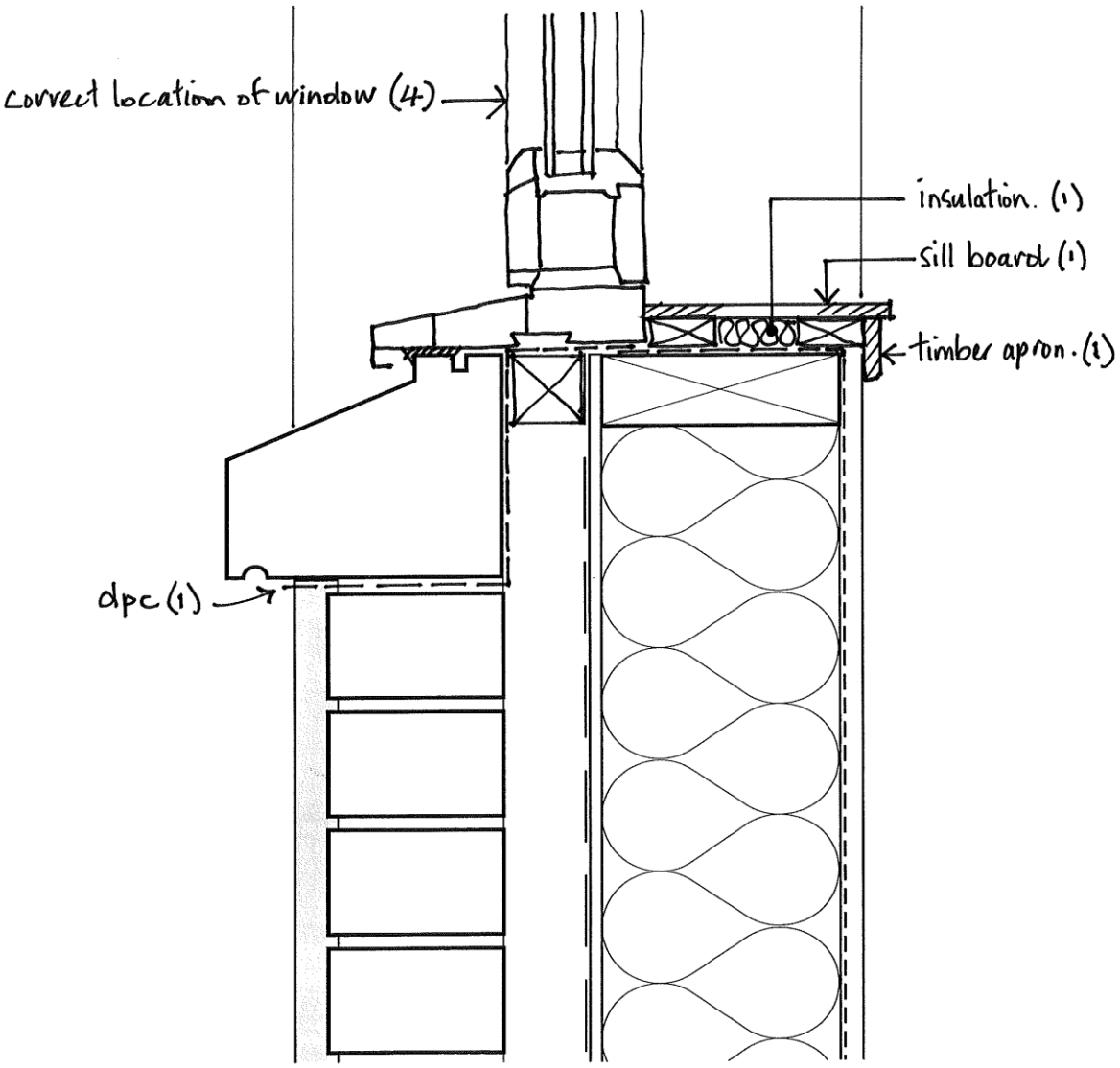


VERTICAL SECTION THROUGH FOUNDATION



SECTION THROUGH RAFT FOUNDATION

WORKSHEET Q9(*e*)



[END OF MARKING INSTRUCTIONS]