



2013 Architectural Technology

Higher

Finalised Marking Instructions

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Part One: General Marking Principles for ARCHITECTURAL TECHNOLOGY 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: ARCHITECTURAL TECHNOLOGY 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

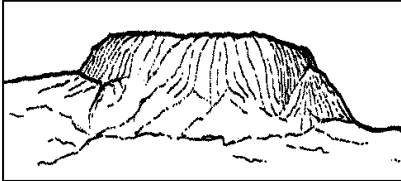


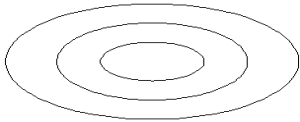
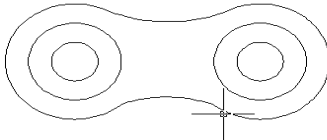
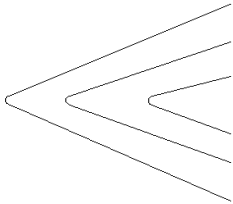
SECTION A

| Question | | Expected Answer/s | Max Mark | Additional Guidance |
|----------|--|--|----------|---------------------|
| 1 | | <p>State four <i>functional</i> requirements of a small domestic building.</p> <p>Safe, provide adequate living space, adequate circulation space, comfortable, protection from elements, etc.</p> <p>One mark for each reasonable answer.</p> | 4 | |
| 2 | | <p>State four items that should be noted during a walkover survey prior to carrying out a survey of a site in an urban area.</p> <p>North point, slopes, obstructions, local surroundings, quality of ground etc.</p> <p>One mark for each reasonable answer.</p> | 4 | |
| 3 | | <p>Briefly describe two ways in which the <i>comfort</i> of the occupants of a building can be improved.</p> <p>Good quality - design, temperature control, ventilation, access to amenities etc.</p> <p>One mark for each method and one mark for appropriate description.</p> | 4 | |
| 4 | | <p>During a <i>levelling survey</i> using a 10m grid, two adjacent points on the grid were found to have spot levels of 10.157m and 9.352m. Determine the positions of a 9.5m and 10m contour.</p> <p>One mark each for</p> <ul style="list-style-type: none"> a) similar triangular sketch b) correct annotation c) correct use of formula d) correct solution | 4 | |

| Question | | Expected Answer/s | Max Mark | Additional Guidance |
|----------|--|---|----------|---------------------|
| 5 | | <p>Briefly describe two factors in the design of a domestic kitchen that will be influenced by the size of the average person.</p> <p>Height of work surfaces, height of cupboard doors, width of cupboards etc.</p> <p>One mark for each method and one mark for appropriate description.</p> | 4 | |
| 6 | | <p>Briefly describe, with the aid of an annotated sketch, how the horizontal distance of a slope can be determined during a <i>linear survey</i>.</p> <p>Abney level, step taping.</p> <p>Two marks for each method and two marks for appropriate description with sketch.</p> | 4 | |
| 7 | | <p>Briefly explain two methods that may be used to improve the <i>Design Life</i> of a building.</p> <p>Use of good quality materials on major components such as windows, doors, etc. Design specification outlining what materials required. High standards of construction. Inspection at critical points. Design appropriate to local conditions such as weather.</p> <p>One mark for each method and one mark for appropriate description.</p> | 4 | |
| 8 | | <p>Briefly describe how the person holding the staff can ensure that the readings taken during a <i>levelling survey</i> will be as accurate as possible.</p> <p>Held still & vertical, if necessary moved gently backwards and forwards, use of pillbox bubble level.</p> <p>Two marks for each point mentioned.</p> | 4 | |

| Question | | Expected Answer/s | Max Mark | Additional Guidance |
|----------|--|--|----------|---------------------|
| 9 | | <p>Briefly describe two common causes of structural instability.</p> <p>Frost heave, swelling/shrinkage of clay in soil, trees, soil conditions, mining subsidence</p> <p>Any other acceptable causes</p> <p>Two marks for each cause with good description.</p> | 4 | |
| 10 | | <p>One form of <i>Legal Constraint</i> in a building project is a <i>contract</i>. Briefly describe two legal constraints that may form part of a building contract.</p> <p>Work to be done, cost of building work, penalties, completion dates, warranties etc</p> <p>Two marks for each constraint with good description</p> | 4 | |

SECTION B

| Question | | Expected Answer/s | Max Mark | Additional Guidance |
|----------|---|--|----------|---------------------|
| 11 | a | <p>Briefly describe how the pillbox bubble can be centred after the level has been positioned securely on its tripod.</p> <ol style="list-style-type: none"> 1. Adjust legs of tripod to comfortable height at approximate eye level and fix firmly in ground 2. Rotate level over two of the tribrach screws. 3. Adjust tribrach screws with thumbs using '<i>thumbs in/thumbs out</i>' method. 4. Bubble will travel in same direction as left thumb. 5. Adjust until bubble is central. 6. Rotate level through 90°. 7. Use tribrach screw not yet used to centre bubble. 8. Alternate between the double and single screws used until bubble is perfectly centred. <p>Any six steps in correct sequence one mark each.</p> | 6 | |
| 11 | b | <p>Shown below are three sketches of different land terrain. Show by means of sketches how the contours for these terrains would be represented.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>(i) Large flat topped hill</p> </div> <div style="text-align: center;">  <p>(ii) Gap between two hills</p> </div> <div style="text-align: center;">  <p>(iii) Ridge with steep slopes at either side</p> </div> </div> | 6 | |
| | | <p>Anything similar to the sketches below 2 marks each.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>(i)</p> </div> <div style="text-align: center;">  <p>(ii)</p> </div> <div style="text-align: center;">  <p>(iii)</p> </div> </div> | | |

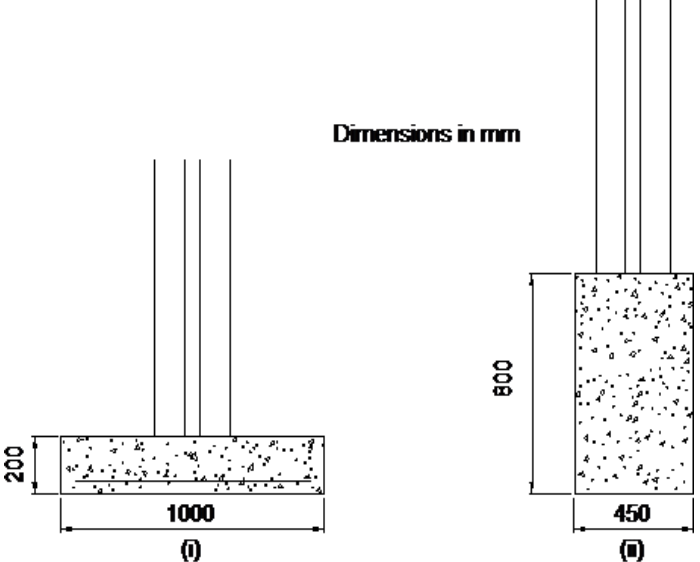
| Question | | Expected Answer/s | Max Mark | Additional Guidance |
|----------|---|--|----------|---------------------|
| 11 | c | <p>State two advantages and two disadvantages of <i>timber frame over traditional</i> construction.</p> <p>Timber Frame advantages: speed of construction, reduction in site work, economy of labour, less dependent of 'wet' skills, reduced drying out time, reduced dead load, ease of high insulation levels, low waste.</p> <p>Disadvantages: Difficulty in alteration, requires specialist timber frame manufacturer, good noise insulation difficult, houses don't have traditional solid feel.</p> <p>One mark each for advantage/disadvantage, must have two of each.</p> | 4 | |
| 11 | d | <p>Briefly describe two ways in which the reading obtained from each of the following types of measuring tape can be inaccurate.</p> <p>i Steel</p> <p>Extreme temperature differences, kinked, markings worn</p> <p>ii Synthetic</p> <p>Incorrect tension, sagging, stretched.</p> <p>Any two reasonable answers for each tape type one mark each. Cannot use same answer twice.</p> | 4 | |
| 11 | e | <p>Briefly describe two <i>aesthetic</i> factors that can influence the design of a building project.</p> <p>Buildings should be pleasing and tasteful and the following should be considered - proportion, balance, shape, colour texture, unity, duality, texture, materials, etc</p> <p>Good explanation of each factor 5/6 lines 4marks Fair explanation of each factor 2/3 lines 2marks.</p> | 8 | |

| Question | | | Expected Answer/s | Max Mark | Additional Guidance |
|----------|---|-----|---|----------|---------------------|
| 11 | f | | <p>State two factors that will control the width of a foundation.</p> <p>Applied loading, subsoil conditions, chemical content of soil, bearing capacity of soil.</p> <p>One mark for each reasonable answer.</p> | 2 | |
| 12 | a | | <p>Briefly explain three specific design factors that would have to be considered when designing semi-detached dwelling houses.</p> <p>Noise insulation, spread of fire, access shared features such as drainage, roofing, parking etc.</p> <p>Two marks for each factor and explanation. Factor only one mark.</p> | 6 | |
| 12 | b | | <p>Refer to the 1:1250 scale map and answer the following questions.</p> | | |
| 12 | b | i | <p>Identify the item that is contained in the map at grid reference 256890, 666340.</p> <p>Sluice</p> | 2 | |
| 12 | b | ii | <p>Identify items 1 – 4 marked on the map.</p> <ol style="list-style-type: none"> 1. Embankment/cutting, 2. Trees, 3. Direction of river flow, 4. Bench Mark. <p>One mark each</p> | 4 | |
| 12 | b | iii | <p>Determine the average gradient of Sauchiehall Street between Radnor Street and Grey Street.</p> <p>Vertical difference $19.3 - 18.0 = 1.3\text{m}$ (1) Horizontal distance = 125m (1) $1.3/125$ (1) 1:96 or 1% (1)</p> | 4 | |
| 12 | b | iv | <p>Using the scale located at the bottom of the map determine the area of the bowling green marked as item 5 on the map.</p> <p>1600sqm</p> | 2 | |

| Question | | Expected Answer/s | Max Mark | Additional Guidance |
|----------|---|---|----------|---------------------|
| 12 | c | <p>After completion of a survey using a 30m steel tape, the surveyor found that on checking the accuracy of the tape that its actual length was 30.19m. Determine the true length of a line that was measured in the survey as 272.88m.</p> <p>No of tape lengths = $272.88/30.19 = 9.039$</p> <p>Difference in tapes = $30.19 - 30 = 0.19$</p> <p>Correction = $0.19 \times 9.039 = 1.717$</p> <p>$272.88 + 1.717 = 274.597$ (accept 274.6)</p> <p>One mark for each correct step</p> | 4 | |
| 12 | d | <p>Prepare an annotated sketch, to show the detail of a suspended timber ground floor construction for a timber frame domestic dwelling, at its junction with the external wall.</p> <p>12 items sketched and annotated 8 marks 10 items sketched and annotated 6 marks 8 items sketched and annotated 4 marks</p> | 8 | |

(30)

| Question | | Expected Answer/s | Max Mark | Additional Guidance | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-------|--|-------------------------------------|---------------------|--------|------------------------------|-----------------|----|---------------|---------|-------|--|--|--|--|--------|-------|---|--|-------|--|-------|--|--|--------|---|-------|--|-------|-------|--|--------|--------|-----|--|-------|--|-------|--|--|--------|---|-------|--|-------|-------|--|--------|--------|-----|--|--|-------|-------|--|--|--------|-----------------|--|--|--|--|--|--|------------------------------|--|--|--|
| 13 | a | <p>Figure Q13(a) shows a set of levels taken during a survey of a construction site.</p> <p>Using Worksheet Q13(a)</p> <p>i book the levels;</p> <p>ii reduce the levels using an appropriate method;</p> <p>iii carry out an appropriate arithmetic check on the reduction;</p> <p>iv state the magnitude of the closing error in the survey and suggest a reason for this error.</p> | <p>5</p> <p>5</p> <p>2</p> <p>2</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <p style="text-align: center;">All dimensions in metres</p> <p style="text-align: center;">Fig Q13(a)</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>BS</th> <th>Int</th> <th>Fore</th> <th>R</th> <th>F</th> <th>HC</th> <th>Reduced Level</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>1.567</td> <td></td> <td></td> <td></td> <td></td> <td>11.218</td> <td>9.651</td> <td>1</td> </tr> <tr> <td></td> <td>0.952</td> <td></td> <td>0.615</td> <td></td> <td></td> <td>10.266</td> <td>2</td> </tr> <tr> <td>0.558</td> <td></td> <td>0.221</td> <td>0.731</td> <td></td> <td>11.585</td> <td>10.997</td> <td>3CP</td> </tr> <tr> <td></td> <td>0.740</td> <td></td> <td>0.152</td> <td></td> <td></td> <td>10.845</td> <td>4</td> </tr> <tr> <td>0.312</td> <td></td> <td>0.535</td> <td>0.205</td> <td></td> <td>10.628</td> <td>11.050</td> <td>5CP</td> </tr> <tr> <td></td> <td></td> <td>0.628</td> <td>0.316</td> <td></td> <td></td> <td>10.734</td> <td>6 TBM 10.679</td> </tr> <tr> <td colspan="6" style="text-align: left;"> <u>2.467</u> <u>1.384</u> <u>1.083</u> </td> <td style="text-align: right;"> <u>9.651</u> <u>1.038</u> </td> <td></td> </tr> </tbody> </table> | BS | Int | Fore | R | F | HC | Reduced Level | Remarks | 1.567 | | | | | 11.218 | 9.651 | 1 | | 0.952 | | 0.615 | | | 10.266 | 2 | 0.558 | | 0.221 | 0.731 | | 11.585 | 10.997 | 3CP | | 0.740 | | 0.152 | | | 10.845 | 4 | 0.312 | | 0.535 | 0.205 | | 10.628 | 11.050 | 5CP | | | 0.628 | 0.316 | | | 10.734 | 6 TBM 10.679 | <u>2.467</u> <u>1.384</u> <u>1.083</u> | | | | | | <u>9.651</u> <u>1.038</u> | | | |
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| 1.567 | | | | | 11.218 | 9.651 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 0.952 | | 0.615 | | | 10.266 | 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | 0.740 | | 0.152 | | | 10.845 | 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | <p>All levels correctly booked 5 marks</p> <p>Each correct reduced level One mark each</p> <p>Two arithmetic checks One mark each</p> <p>Closing error $10.734 - 10.679 = 0.055$ one mark</p> <p>Reason - Movement of staff, level incorrectly set up, movement of level, carelessness, incorrect reading of staff.</p> <p>Any reasonable answer one mark.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Question | | Expected Answer/s | Max Mark | Additional Guidance |
|----------|---|---|----------|---------------------|
| 13 | b | <p>Briefly describe how the interior of a single storey domestic building would be designed to accommodate a wheel chair user.</p> <p>External access, width of doors both internal & external, height of work surfaces, height of electrical sockets and switches, direction of door openings, window openings, fire escape etc.</p> <p>Four points one mark each.</p> | 4 | |
| 13 | c | <p>State the name given to each type of foundation shown at Fig Q13(c) (i) and (ii) below, and briefly describe one situation where each may be used.</p>  <p style="text-align: center;">Dimensions in mm</p> <p style="text-align: center;">(i) (ii)</p> <p style="text-align: center;">Fig Q13(c)</p> <p>i Wide strip used for high loads from walls on poor bearing capacity soils.</p> <p>ii Deep Strip in shrinkable clay soils where it is necessary to have deep foundations that will not be affected by seasonal variations in moisture content.</p> <p>One mark for naming type and one mark for correct description.</p> | 4 | |

| Question | | Expected Answer/s | Max Mark | Additional Guidance |
|----------|---|--|----------|---------------------|
| 13 | d | <p>State two approvals by the <i>local authority</i> which must be gained prior to commencing on a building project.</p> <p>Planning permission and Building warrant.</p> <p>One mark each</p> | 2 | |
| 13 | e | <p>Identify three ways in which <i>noise pollution</i> can affect the occupants of a domestic building and briefly describe how each can be minimised.</p> <p>Noise pollution can come from the following:</p> <ol style="list-style-type: none"> 1. External noise from items such as machinery or traffic. 2. Poor noise insulation between neighbouring houses. 3. Noise from nearby buildings such as factories, entertainment arenas etc 4. Aircraft. <p>Which can result in the following problems:</p> <ol style="list-style-type: none"> 1. Reduced quality of life for those living close by. 2. Housing being difficult to resell. 3. Vibration which can cause cracking in walls, weakening of supports deterioration of structure and fabric of building etc. 4. Health problems through increased stress levels. 5. Hearing problems possible deafness <p>Minimised through:</p> <ol style="list-style-type: none"> 1. Good design such as living areas being sited away from source of noise 2. Good quality materials used as sound insulators in construction. 3. Noise barriers such as grass mounds around building to absorb noise. 4. Regulation to prevent excess noise levels. <p>One mark for each problem identified and one for each solution given.</p> | 6 | |

[END OF MARKING INSTRUCTIONS]