**CARPENTRY & JOINERY** 

**ONE YEAR COURSE** 

## **LEADING TO THE**

## **INSTITUTE OF CARPENTERS**

# **FOUNDATION EXAMINATION**



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#### **INTRODUCTION TO THE COURSE**

This introductory course is designed and constructed for students who wish to study the craft of Carpentry and Joinery. The course requires at least <u>**216 hours**</u> after which it is envisaged that the student will attain the Institute of Carpenters Foundation examination which is set twice a year, February and May.

Lecturers must be aware however that the students attending on the course may not be working in the trade or may be unemployed, so the Lecturer teaching on the course may find that they will need to put in extra effort when teaching particular subjects.

#### **EXAMINATIONS**

Paper 1	40 short answer questions set and marked by the Institute of Carpenters		
	Time - One and a half hours.	<b>MARKS = 40%</b>	
Paper 2 A practical test piece set by the Institute and marked by the teacher /lecturer to a specific Marking Scheme supplied by Institute		the by the	
	Time - Three hours.	MARKS = 30%	
Paper 3	Three practical assignments – supplied by the Institute, to be completed within 36 weeks and marked by the teacher /lecturer		
	e.g. marks for skill, effort, attitude etc.	MARKS = 30%	

#### Marking of the completed test is to be:-

- 1. Undertaken by the Examination Centre.
- 2. Conform to a marking schedule devised by the Board.
- 3. Fall within the relevant broad bending:-

#### Fail Pass Credit Distinction

Following the publication of results, a Certificate of achievement will be issued to candidates listing only those components in which they were successful and stating the grade(s) of pass. All candidates will be notified of their achievement towards the required standard in the components for which they are registered.

It is of great importance that Lecturers follow the scheme of work and not miss out subjects they feel they have little experience of. Any problems with the course content should be conferred with the course director as soon as possible.

After each theory lesson it is recommended that the subject covered is entered in a **"Record of work" book** provided by the course director. It is most important that this task is carried out as it will give any Lecturer standing in for an absent colleague an idea of what subjects have been covered.

The theory lesson should be divided into two parts (for evening only students) with a possible short break in between. Some students may have come straight from work and have not had any refreshment. As the theory lessons are three hours in total it is for this reason each lesson has been designed to be one and a half hours long.

#### Finally some general notes especially for Lecturers teaching First year students.

- 1 Lessons should be planned to promote understanding of fundamental principles rather than over emphasise memory or factual subject matter.
- 2 At all stages, and particularly in the early weeks, students should have set for them high standards of draughtsmanship, lettering and, a proper pride in the production of neat accurate drawings and sketches.
- 3 It should not be necessary to remind Lecturers that during the first year's work the student will acquire skills and habits in drawing which will be reflected in all their whole career. Therefore, it is very important indeed that difficulties of EACH student are considered with a view to putting them on the right track from the very beginning. NO difficulty of ANY student at this stage is TOO small for the Lecturer to consider and to solve, e.g. sometimes it is worth getting the student to change the kind of pencil they are using because it is too hard or too soft for their particular hand and muscles.
- 4 It is intended that the teaching of theory of a particular craft shall provide the student with the opportunity of study of tools, materials and practices in a manner which is not possible in the workshop or on the building site, e.g. detailed comparison of similar tools or materials which would waste time in the workshop or on the site, can be very well be suited for teaching and discussion in the theory classroom. Whenever possible and desirable, the students should be encouraged to pursue their studies by means of drawing and sketching.
- 5 Maximum use should be made of British Standard Specifications, British Standards Codes of Practice, The current Building Regulations, together with manufacturers samples and catalogues as appropriate.
- 6 From time to time the students should be set homework to encourage self-study and improve on minor difficulties they may be having in a particular area.

Remember the students you are teaching will be the future Carpenters and Joiners, Site Agents, Trade Foremans, Architects, Contract Managers etc, or even Lecturers......

## **FOUNDATION THEORY 1.5 HOURS**

## year & syllabus reference

	The course content will cover:-
1.4	Wood trade calculations.
1.7	Hand tools.
1.8	Methods of timber jointing.
1.11	Safe use of portable power tools.
1.12	Doors
1.13	Door frames and linings
1.14	Casement windows
1.15	Fitments
1.16	Floors
1.17	Finishes
1.18	Roofs
1.19	Formwork
1.20	Access equipment

1.21 Setting out and levelling

## 1.7 Hand Tools

1	1.7.1	Introduction to the course. The examination structure.
	1.7.2	Describe the work of the Carpenter & Joiner.
	1.7.3	Differentiate between 1st & 2nd fixing.
	1.7.4	List a common tool-kit of a Carpenter & Joiner.
	1.7.5	Name & state the function of each hand tool.
	1.7.6	The selection of tools for specific purposes.
2	1.7.7	The care & maintenance of hand tools.
	1.7.8	Describe methods of sharpening hand tools.
	1.7.9	Explain the use of oil stones & slipstones.
	1.7.10	Describe methods of sharpening various plane irons, chisels & gouges.
	1.7.11	State the various grinding & sharpening angles.
	1.7.12	Understand the safe use of grinding wheels, regulations etc.
	1.7.13	Precautions to be observed when storing or guarding tools not in use.

## **1.8** Timber Jointing

Week No

3	1.8.1	State the reasons why timbers need to be jointed.
	1.8.2	Describe correct proportioning for joints.
	1.8.3	Describe the halving joint, cross, tee & dovetail.
	1.8.4	Mortice & tenon joint, including stub tenon, barefaced etc.
	1.8.5	Joints used to widen timbers, i.e. tongue & groove, loose tongue.
4	1.8.6	Machine edge joints.
	1.8.7	Slot screws.
	1.8.8	Dovetail joints.
	1.8.9	Biscuit jointing.
	1.8.10	Methods used for lengthening timbers to include scarf joints etc.

1.4 Wood trades calculations

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- **1.4.1** Solve simple decimal problems of addition & subtraction.
  - **1.4.2** Solve simple decimal problems of multiplication & division.
  - **1.4.3** Calculate cost of materials from given prices.

## 1.11 Portable power tools

6	1.11.1	State the safety precautions to be observed when using power tools.
	1.11.2	Understand the purpose of using reduced voltage transformers.
	1.11.3	Describe the use of transformers in the workshop or on site.
	1.11.4	State the purpose of double insulation with 240 volt power tools.
	1.11.5	Understand colour coding.
	1.11.6	State the purpose of isolators.
	1.11.7	Describe the safe use & application of:-
		<ul> <li>a) Drill in two speeds &amp; percussion</li> <li>b) Orbital sander</li> <li>c) Belt sander</li> </ul>
7	1.11.8	Describe the safe use & application of the electric screwdriver/drill.
	1.11.9	Explain the need for regular maintenance of power tools.
	1.11.10	Describe the construction & use of simple jigs.

## 1.4 Wood trades calculations

Week No

8	1.4.4	Compile material specifications & cutting lists.
	1.4.5	Estimate quantities of materials including percentage for waste & vat.
	1.4.6	Evaluate simple costings with allowance for waste.

1.13	Doors	
9	1.13.1	State the common sizes for doors.
	1.13.2	Describe & name the components of a ledge & battened door.
	1.13.3	State the need for allowance for movement.
	1.13.4	Name the components & construction of a framed ledge & braced door.
	1.13.5	Describe the methods used for forming the joints.
	1.13.6	Describe the methods used to protect the door for transport & storage.
	1.13.7	Explain the methods for fitting, hanging and finishing the door.
10	1.13.8	Describe the construction of a flush door.
	1.13.9	Describe the construction of a glazed door.
	1.13.10	Understand the machine processes used.
	1.13.11	Describe the need for long & short shoulders.

## Continued.....

10	1.13.12	Explain the need for scribes, machine & hand.
	1.13.13	Explain the need to protect the door for transport and storage.
	1.13.14	State the methods used for fitting, hanging and finishing the door.
11	1.13.15	State common size sections of materials & names of components.
	1.13.16	Identify the types of joints used.
	1.13.17	Describe the manufacturing processes.
	1.13.18	Understand positioning of the tenon with regards to rebates, mouldings & grooves.
	1.13.19	Describe long & short shoulders.
	1.13.20	Understand machine & hand scribes.
	1.13.21	Understand planted & stuck mouldings & door stops.
	1.13.22	Describe the cramping up of the door frame/lining (braces etc) to include draw-bore pins.
	1.13.23	Explain the method for checking the frame for square.
	1.13.24	State the sequence for inserting the wedges.

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1.15

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1.13.25	Explain why the frame is left long for transport to site.
1.13.26	Describe the sequence for fixing the door frame in the opening to include metal pins at the base of the jambs.
1.13.27	Describe the use of plumb-bob, water level, straight edge & packers etc.
1.13.28	Describe the types of fixings available.
1.13.29	Explain how the frame must be fitted straight & level to receive the door.
1.13.30	Explain how the frame can be protected on site prior to being used.
Casemen	t windows
1.15.1	State the common size sections & component terms to include glazing bars.
1.15.2	Understand the terms single, multiple light, traditional and stormproof casement windows.
1.15.3	Explain the terms side, top or bottom hung.
1.15.4	Describe method of manufacture.

14	1.15.5	Explain the methods	of fixing into ar	opening.
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- **1.15.6** Describe the use of dpc.
- **1.15.7** List the ironmongery used.
- **1.15.8** Describe the use of single & double glazing.

15	1.17.1	Show common mouldings used.
	1.17.2	Describe the fixing of architraves around door & window openings.
	1.17.3	Explain the methods of jointing.
	1.17.4	Describe the jointing of two architraves of different widths.
	1.17.5	Explain the use of a mitre box & guillotine.
	1.17.6	Describe the method of scribing mouldings.

16	1.17.7	State the purpose of skirtings.
	1.17.8	Name & describe common mouldings used
	1.17.9	Explain internal and external jointing.
	1.17.10	Describe the methods used to scribe the skirting to an uneven floor.
	1.17.11	State the use of a mitre box.
	1.17.12	Explain the methods used to fix the skirting.
	1.17.13	Describe fitting and fixing of dado and picture rails.
	1.17.14	Explain jointing sections at inclined and horizontal situations.

#### 1.15 Fitments (domestic free standing & built in)

Week No

17	1.15.1	Identify related elements & components.
	1.15.2	Describe the construction of a simple cupboard unit.
	1.15.3	State the materials used.
	1.15.4	List the ironmongery used.
	1.15.5	Explain methods of scribing to floor & wall, levelling & fixing.
	1.15.6	State types of finish coatings.
	1.15.7	Describe the construction of a simple shelving unit.
	1.15.8	State methods of fixing to solid & hollow walls.
	1.15.9	Describe methods of levelling.
	1.15.10	Explain methods of adjustable shelving.
	1.15.11	List ironmongery used.
	1.15.12	State types of finish coatings.

## 1.4 Wood trades calculations

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- **1.4.7** Determine areas of a circle, triangle and trapeziums.
  - **1.4.8** Calculate areas of a square and rectangle to include indents, i.e. floors with fireplaces etc.
  - **1.4.9** Determine perimeters of a circle, rectangle & square.
  - **1.4.10** Calculate floor coverings, i.e. carpet tiles, floor boarding, sheeting etc with given costings for materials.

## 1.16 Timber flooring

19	1.16.1	Explain the construction of a timber ground floor to include trimming for hearths.
	1.16.2	State the positioning and need for dpc and air bricks.
	1.16.3	Describe the purpose of the wall-plate.
	1.16.4	State the purpose of the Building regulations relating to ground floors.
	1.16.5	Describe the positioning & fixing of the floor joists & types.
20	1 16 6	Describe the types of floor boarding used
20	1.10.0	Describe the types of noor boarding used.
	1.16.7	Explain the cramping & fixing of the floor boarding.
	1.16.8	Describe the use of sheet boarding and fixing.
	1.16.9	Describe the protection of the floor during construction.

1.18	Roofs	
21	1.18.1	Identify components of the roof.
	1.18.2	Explain current building regulations.
	1.18.3	State the purpose of the wallplate.
	1.18.4	Describe the terms ridge, eaves, verges, abutments, gable ladder, barge board and soffit board.
	1.18.5	Explain the difference between a single and double roof.

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Week No
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22	1.18.6	Describe the difference between lean-to, couple, close couple & collar.
	1.18.7	Explain methods of trimming for openings.
	1.18.8	Describe methods of ventilation.
	1.18.9	Explain methods of weathering the roof.
23	1.18.10	Describe the construction of a flat roof.
	1.18.11	Understand current building regulations.
	1.18.12	Explain the construction of a flat roof.
	1.18.13	Describe the construction of the eaves.
	1.18.14	Explain the trimming around openings etc.
	1.18.15	Describe the roof at abutments.
	1.18.16	Explain the fixing of roof covering & guttering.

#### **1.19** Formwork (timber only)

Week No

25

1.19.1	Understand the terms in-situ & pre-cast.
1.19.2	Explain the need for proper support.
1.19.3	Explain the influence of fluid pressure on design.
1.19.4	Describe the formwork for simple lintels, posts & cills in-situ & pre-cast.
1.19.5	Explain the types, function and methods of application of release agents.
1.19.6	Describe the erection, support, easing & striking for single & multi-use formwork.
	1.19.1 1.19.2 1.19.3 1.19.4 1.19.5 1.19.6

#### 1.4 Wood trades calculations

1.4.11	Calculate quantities in linear lengths, i.e. skirting, architrave
	etc.

- **1.4.12** Determine cost of linear lengths from given price to include VAT & % for waste.
- **1.4.13** Calculate superficial & cubic measurements from given examples.
- **1.4.14** Determine cost of superficial & cubic measurement from given price to include VAT & % for waste.

1.20 Access equipment (trestle, hop-ups, ladders & stepladders)

26	1.20.1	Recognise & state the function of commonly used components.
	1.20.2	Explain the safe use and current safety legislation associated with trestles, hop-ups, ladders & stepladders.
	1.20.3	Understand the need for inspection & safe storage of the above.
	1.20.4	Understand the need for regular checks for defects.

1.21	Setting-out & Levelling	
27	1.21.1	Explain the purpose of setting-out a site.
	1.21.2	Describe the function of Bench Marks.
	1.21.3	State the use & function of a datum line.
	1.21.4	Describe the use of a water level, including checking prior to use.
28	1.21.5	Describe the use of a spirit level, including checking prior to use.
	1.21.6	State other methods of checking for level including the plumb- bob.
	1.21.7	Describe the use of a straight edge, i.e. door linings etc.
	1.21 8	Describe the methods of setting-out right angles on site.

1.16 Floors

29	1.16.10	Describe the construction of an upper floor.
	1.16.11	Understand the use of joist hangers.
	1.16.12	Describe trimming for openings.
	1.16.13	Describe the use of strutting to upper floors.
	1.16.14	List different materials used for floor coverings.
	1.16.15	Describe cramping methods used to ensure tight fitting joints.
30 - 36		Preparation and revision for Foundation Examination to include past papers
February or May		Foundation Examination.

## FOUNDATION ASSOCIATED SUBJECTS

year & syllabus reference

## The course content will cover:-

1.1	Materials.
1.2	Craft related drawing.
1.3	Timber related science.
1.5	Safety.
1.6	Protection, storage & safe handling.
1.9	Fixings.
1.10	Hardware & ironmongery.

**1.22** Industrial Studies.

## 1.1 Materials

1	1.1.1	Explain the growth of a tree.
	1.1.2	Describe the different parts of a tree & their purposes.
	1.1.3	Explain the difference between hard & soft woods.
	1.1.4	Describe the identification & characteristics of softwoods to include Scots pine, European softwood, Douglas fir, Parana pine, Norway spruce, Hemlock, & Red cedar.
2	1.1.5	Describe the identification & characteristics of hardwoods to include Ash, Elm, Oak, Mahogany, Utile, Sapele, Teak, Iroko, Ramin, Afroromosia, & Beech.
	1.1.6	State uses for both hard & soft woods.
1.2	Craft relat	ed drawing
3 - 4	1.2.1	Exercise in use of British Standard Specification drawing practice.
1.1	Materials	
5	1.1.7	Describe & illustrate different methods of timber conversion.
	1.1.8	State which methods are used to obtain surface grain patterns.
	1.1.9	Briefly describe the machines used.

#### **1.3** Timber related science

Week No

7

9

6	1.3.1	State the reasons for seasoning timber.
	1.3.2	Describe the processes of air & kiln seasoning.
	1.3.3	Explain different methods to obtain correct moisture contents.
	1.3.4	State moisture content for different situations.

## 1.2 Craft related drawing

1.2.2	Describe the use & purpose of scale rules.
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- **1.2.3** State BS recommended scales for types of drawings.
- **1.2.4** Exercise in the use of scales.

#### **1.3** Timber related science

- 8 1.3.5 Describe the terms "Equilibrium Moisture Content" & "Fibre Saturation Point".
  - **1.3.6** Identify defects & degrading of timber resulting from seasoning.

## 1.2 Craft related drawing

- **1.2.5** Describe 1st & 3rd orthographic angle projection.
  - **1.2.6** Exercise in 1st angle orthographic projection of a small house.

1.3	Timber related science	
Week No		
10	1.3.7	Identify common timber growth defects & state the effects on usage & strength.
11	1.3.8	List the common types of woodworking adhesives in use to include PVA, Synthetic, Casein, Animal & Contact.
	1.3.9	Describe the ingredients of the above adhesives.
	1.3.10	Describe a use for each.
	1.3.11	Understand the need for safety precautions when using.
	1.3.12	Describe methods of application.
	1.3.13	Explain the terms "Pot life" & "shelf Life"

12	1.2.7	Describe the terms isometric & oblique.

- **1.2.8** Explain & show examples where used.
- **1.2.9** Exercise in isometric & oblique drawing using timber mouldings etc.

## 1.3 Craft related science

Week No

13	1.3.14	Explain the terms wet rot & dry rot.
	1.3.15	Describe the conditions required for wet & dry rot.
	1.3.16	Describe the life cycle of wet & dry rot.
	1.3.17	Identify wet & dry rot.
	1.3.18	Describe the treatment & eradication of wet & dry rot.

## 1.22 Industrial Studies

14	1.22.1	Describe the role of the Architect and their relationship with the client.
	1.22.2	Identify the duties and responsibilities of the Quantity Surveyor.
	1.22.3	Explain the duties of the Estimator.
	1.22.4	Describe the responsibilities of the Site Agent, General Foreperson/Supervisor.
	1.22.5	Explain the role of the Clerk of Works.

## 1.2 Craft related drawing

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<b>1.2.10</b> Identify types of construction drav
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**1.2.11** Exercise in location, component & assembly drawings.

1.5	Safety	
Week No		
16	1.5.1	Understand the need for a safe working environment on site & in the workshop.
	1.5.2	Describe the purpose & use of R.I.D.D.O.R. 1996, Construction (Design & Management) Regs 1994, Management of Health & Safety at Work Regs 1992, Workplace (Health, Safety & Welfare) Regs 1992, Health & Safety (Display Screen Equipment) Regs 1992, Manual Handling Operations Regs 1992. PUWER, COSHE.
	1.5.3	Understand the duties of employer & employees with relation to the Health & Safety At Work Act.
1.9	Fixings	
17	1.9.1	Describe & illustrate types of proprietary screws, bolts, plugs etc, used for fixing to wood, metal, plastics, manufactured sheet, brickwork, blockwork, concrete & stone.

**1.9.2** Explain factors effecting item choice.

18	1.9.3	Describe & illustrate types of proprietary nails used for fixing to the above situations.
	1.9.4	Explain factors effecting item choice.
	1.9.5	Describe other methods of fixing, i.e. chemical fixing etc.

1.2	Craft related drawing	
Week No		
19	1.2.12	Show examples of auxiliary projections.
	1.2.13	Exercise in auxiliary projection.
1.3	Timber rel	ated science
20	1.3.19	Describe common types of wood-boring insects found in this country.
	1.3.20	Describe the life cycle.
	1.3.21	Understand at which point in the cycle the most damage occurs.
	1.3.22	From examples identify the four main types.
	1.3.23	Describe the treatment & eradification of insect attack.
1.6	Protection, Storage & Safe Handling	
21	1.6.1	State the need for safe storage of timber, sheet materials, hardware and ironmongery.
	1.6.2	Describe factors affecting the handling of components on-site and in the workshop.

Understand the factors affecting the storage of components on-site and in the workshop. 1.6.3

Week No

22	1.2.14	Understand the purpose of setting-out rods.
	1.2.15	Show examples of setting-out rods.
	1.2.16	Describe how they are used for the marking out of components.
	1.2.17	Describe the use of broken-line rods.
	1.2.18	Briefly describe the use of cutting sheets.
	1.2.19	Set out a simple height and width rod for a door frame or window.

1.3	Timber related science	
23	1.3.24	Describe the two ways in which sound travels.
	1.3.25	State the use of sheet, quilt and granular materials.
	1.3.26	Explain the use of secondary, double and triple glazing.
	1.3.27	Describe construction methods to increase sound insulation in new and existing situations.

## 1.6 Protection, Storage & Safe handling

- **24 1.6.4** Describe and illustrate safe methods of handling materials and components during manufacture and on completion on-site and in the workshop.
  - **1.6.5** During transport.

Week No

26

25	1.2.20	State the purpose of pictorial projection.
	1.2.21	Show examples of pictorial projections.
	1.2.22	Produce a drawing showing pictorial projections, i.e. mouldings, buildings etc.

1.3	Timber	related	science

- **1.3.28** Describe the three ways in which heat travels.
  - **1.3.29** State the need to prevent heat loss or gain.
  - **1.3.30** Describe the use of sheet, quilt and granular materials.
  - **1.3.31** Describe the construction methods to improve thermal insulation in new and existing buildings.

#### **1.10** Hardware and ironmongery

- **27 28 1.10.1** Explain the factors affecting the choice of hardware and ironmongery.
  - **1.10.2** Describe types and fitting of ironmongery for use with doors and door frames for interior and exterior use.
  - **1.10.3** Describe types and fitting of ironmongery for use with casement windows.
  - **1.10.4** Explain the need for regular maintenance of ironmongery.

Week No

29	1.2.23	Understand the term surface development.
	1.2.24	State the need for surface developments.
	1.2.25	Produce a drawing showing surface developments of a cylinder, cone, pyramid and rectangular cylinder with the top cut at an angle.

1.3	Timber re	Timber related science	
30	1.3.32	Understand the term condensation.	
	1.3.33	State the causes and effects of condensation.	
	1.3.34	Describe methods to prevent condensation.	

#### 1.6 Protection, Storage & Safe handling

- **31 1.6.6** Describe and illustrate the safe method of providing care and safe storage of glass in the workshop and on site.
  - **1.6.7** Describe and illustrate the safe method of providing care and safe storage for inflammable liquids on-site and in the workshop.
  - **1.6.8** Explain the use of warning signs and information sheets etc.

## Week No

32	1.2.26	Understand the terms quadrilaterals and triangles.	
	1.2.27	Set out various examples of quadrilaterals and triangles to include square, rectangle, rhombus, trapezium, rhomboid, trapezoid, and with triangles construct equilateral, right angled, isosceles and scalene.	

#### 1.22 Industrial Studies

33	1.22.6	Describe the careers available in the wood based industries and the work undertaken by each.
	1.22.7	Describe the relationship with other trades in relation to house construction.
	1.22.8	Identify the main elements of a domestic dwelling and state the operational sequence.

## 1.1 Materials

36

34 - 35	1.1.10	Describe the composition and manufacture of Plywood, Chipboard, Blockboard, Hardboard and Waferboard.
	1.1.11	State situations where these boards would be used.
	1.1.12	Explain methods of fixing, safety precautions and methods of finishing.

## Foundation Examination

## <u>NOTES</u>

Past papers and information on all the exams can be obtained by visiting the Institute of Carpenters examinations web page on www.iocexams.co.uk. Or alternatively contact :-

Institute of Carpenters Central Office 35 Hayworth Road Sandiacre Nottingham NG10 5LL

Telephone : 0115 949 0641 Fax : 0115 949 1664

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Chief Examiner