

CIVIL SERVICE COMMISSION

THIS PAPER IS TO BE RETAINED BY THE CANDIDATE, AND MUST BE PRODUCED IN THE EXAMINATION ROOM WHEN REQUIRED BY THE SUPERVISOR.

Write your Name here Keith Henry Westcott Thomas

Write here 928 your
Number which you will find on the
Order for Admission.

**APPRENTICES IN H.M. DOCKYARDS AND TORPEDO
FACTORY AT GREENOCK AND ARTIFICER AND AIR
APPRENTICES IN THE ROYAL NAVY**

TIME TABLE

OF THE

EXAMINATION OF MARCH, 1939

Tuesday, 14 March	10	to	11	...	English. Composition
	11.5	to	12.5	...	Drawing
	12.10	to	1.10	...	Arithmetic
	2.30	to	3.30	...	History and Geography. Paper 1
	3.35	to	3.55	...	English. Handwriting
	4	to	5	...	English. Literature
Wednesday, 15 March	10	to	11	...	History and Geography. Paper 2
	11.5	to	12.5	...	Mathematics. Paper 1
	12.10	to	1.10	...	Mathematics. Paper 2
	2.30	to	3.30	...	Science. Paper 1
	3.35	to	4.35	...	Science. Paper 2

Candidates must bring their own pens and ink; these may be in the form of a fountain pen or an ordinary pen with an ink bottle. For the papers in Arithmetic, Mathematics, Science and Drawing, they should also bring a flat rule divided on the edges into inches and tenths of an inch and into centimetres and millimetres, set squares, a protractor, a pair of compasses, and any other drawing instruments they may wish to use. Slide rules are not allowed. They should also bring pencils and india-rubber for the paper on Drawing and black and red pencils for the papers on History and Geography. Four-figure mathematical tables will be provided by the Commissioners for the papers in Mathematics and Science; candidates are not allowed to bring their own into the examination room.

YOU ARE ADVISED TO ATTEND NOT LATER THAN 10 MINUTES BEFORE THE TIME FIXED FOR THE COMMENCEMENT OF THE FIRST PAPER, AND YOU SHOULD ATTEND PUNCTUALLY FOR EVERY OTHER TEST TAKEN; IT MAY BE IMPOSSIBLE TO ALLOW CREDIT IF YOU ATTEND LATE.

ATTENTION IS ALSO CALLED TO THE NOTICES ON THE BACK OF THIS TIME TABLE

CIVIL SERVICE EXAMINATIONS

NOTICES

1. Candidates will be required, before proceeding to their seats, to lay aside their hats, umbrellas, and any books, papers, or other appliances, the use of which is not expressly granted to them. A separate room is usually provided for this purpose, and reasonable precautions are taken to safeguard the property of candidates; but the Civil Service Commissioners can accept no liability for loss or damage. Instructions regarding any special instruments or articles with which candidates are required to provide themselves will be found at the foot of the Time Table. If none are specified none are required. Apart from such special articles, candidates are at liberty to take to their places in the examination room such ordinary appliances as penknives, pencils, chalks, and india-rubber; but the Supervisor may, at his discretion, prohibit the use of any such article.

2. Candidates may not quit the examination room until the expiration of half an hour from the time fixed for the commencement of the paper on which they are engaged. For oral and laboratory examinations and in certain other circumstances candidates may be required, at the discretion of the Supervisor, to remain in the room until the expiration of the time allotted to the subject.

3. Candidates who have left the examination room during the hours assigned to paper work may not return to the paper which they have quitted, without special permission, obtained before they leave the room. In such cases the Commissioners will decide whether marks can be allotted.

4. Candidates must not leave any of their work on their desks when quitting the examination room, but must remain in their places until they have handed it to the Supervisor or his Assistant. Candidates are not allowed to leave the examination room during the last five minutes of the time allotted to the last paper of a session.

5. Perfect silence must be preserved in the examination room; and any candidate guilty of disorderly or improper conduct in or about the room will be liable to exclusion from the examination.

6. Candidates may not, without express permission, remove from the examination room any paper or other material supplied to them. Candidates are not allowed to mutilate or remove any portion of an answer book or form provided for their examination.

7. Candidates who, whilst engaged on any examination paper, are in possession of any book, manuscript, or other article from which they might derive irregular assistance, or who copy from the papers of any other candidate, or permit their own papers to be copied, or give or attempt to give, or obtain or attempt to obtain, irregular assistance of any description, are liable to be treated as disqualified and to be excluded from any subsequent examination held under the directions of the Civil Service Commissioners.

8. Candidates will be designated by the Number assigned to them on the Order for Admission, and they must write this Number (not their Name) on every answer book or separate sheet of paper which they hand in. This Number should be quoted in any communication addressed to this Office on the subject of the examination.

CIVIL SERVICE COMMISSION,
LONDON W.1.

CIVIL SERVICE COMMISSION

[UU.—853]

English. Composition

Time allowed, 1 hour

Select *one* of the following subjects, and number it on your answer form as it is numbered here:—

1. The attractions and the drawbacks of fishing as a pastime.
2. Describe the most enjoyable holiday you have ever had.
3. In a letter to you a friend has said that a strong Air Force is far more important to Great Britain than a strong Navy. Write a reply giving your own views on this matter and sign your letter with a fictitious name.

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CIVIL SERVICE COMMISSION

[UU.—853]

English. Literature

(OLIVER TWIST)

Time allowed, 1 hour

All the questions are to be answered. Question 1 carries higher marks than the others.

1. What can be learnt from this book about the treatment of children under the poor law about a century ago?
2. Describe what happened to Oliver from the time when he left Mr. Brownlow's house until he was befriended by the Maylies.
3. Outline the part taken in the story by *either* Nancy *or* Monks.

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[UU.—853 : Drawing paper]

Drawing

Time allowed, 1 hour

Answer ONE, and only one, of the following questions. For making your drawing, place the drawing paper so that the printed heading is at the top. Candidates who have not received instruction in design are advised not to attempt the second question.

1. Make a pencil drawing from memory of *one* of the following, the objects being placed in such a way that the general shape and construction are shown to the best advantage. Your drawing should not give a direct front view or side view of any of the objects ; it should be at least 6 inches in height or width and finished in light and shade, giving the effect of a good side light. You must not use a ruler or other mechanical aid in this test. You may, if you like, make one or two small experimental sketches on the back of the paper before starting the finished work.
 - (a) An Association (or Rugby) football, and a football boot beside it.
 - (b) A filled sack (*e.g.*, a sack of coal or flour) leaning against a wall with a wooden packing-case of moderate size beside it.
 - (c) An india-rubber hot-water bottle lying on a flat surface with a candlestick beside it.

2. Using ruler and compasses draw a semi-circle with a radius of $3\frac{1}{2}$ inches (see diagram overleaf). Within this outline make a design based upon *either* two *or* three of the ornamental units given overleaf ; you may alter the units according to your fancy, provided you keep a resemblance to the types of ornament given. Units may be repeated if you wish.

Sketch in the whole of your pattern, and finish carefully as much of it as time allows.

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[UU.—853]

Arithmetic

Time allowed, 1 hour

You are not restricted to arithmetical methods. For full credit your work must be fully shown and easily intelligible.

1. The "Coronation Scot," by completing the journey of 188.2 miles from King's Cross to York in 2 hours 37 minutes, has wrested the British railway speed record from the "Cheltenham Flyer" which completes the 77.3 miles from Swindon to Paddington in 1 hour ³/₄ minutes. What is the difference in their average speeds in miles an hour? Give the result to two decimal places. .57-44

2. A lawn-tennis court is 78 ft. long and 36 ft. wide; in addition there should be 18 ft. behind each end as run-back and a strip 9 ft. wide at each side.

A tennis club is offered land at ~~£100~~²⁰⁰ an acre. What will be the cost, to the nearest shilling, of a rectangular plot of sufficient area to construct four courts side by side? Each court must have its own side strips; there is no sharing between two courts. 56-11

3. A rectangular container has a base of the same dimensions as the cover of your answer book when closed and a height of 28.8 cm., all measurements being made internally. 6-4

How many litres of water, to the nearest tenth, will be required to fill it two-thirds full, and what will be the weight of this water? Write the measurements you make in your answer book.

4. A substance which, when weighed in air in the ordinary way, weighs 1 gm., would, if weighed in a vacuum, weigh approximately

$$1 + d(1/D - 1/d') \text{ gm.}$$

where d is the density of the air at the particular time when the substance is weighed in it, D the density of the substance, and d' the density of the weights used for the weighing. 92163
2437

Find the weight in a vacuum of a piece of bees' wax which weighs 1 gm. in air, given that in this particular case $d' = 8.10$ gm. per c.cm., $d = 0.001205$ gm. per c.cm., and $D = 0.96$ gm. per c.cm.

What percentage error should I make by taking the weight in air instead of the weight in a vacuum in a calculation where, strictly, I ought to use the latter?

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[UU.—853 : Time-Chart C]

History and Geography. Paper 1

Time allowed, 1 hour.

Answer QUESTION 1 and any THREE of the remaining questions. Questions 2—9 carry equal marks. Before attempting to answer any question, read it through carefully and find out exactly what you are asked to do.

Give up the Time-Chart separately from the answer form.

1. Place each of the following in its proper place on the accompanying Time-Chart, and write on your answer form short notes on any *two* of them :—

The abolition of the Corn Laws ; the Dissolution of the Monasteries ; the death of Queen Victoria ; Cabot's discovery of Newfoundland ; the Act of Settlement ; the opening of the Suez Canal ; the Petition of Right ; the French Revolution ; Drake's voyage round the world ; Monmouth's Rebellion.

2. Choose *three* of the following, describe where they are, and explain their importance in British History :—Calcutta, Ulster, Blenheim, Botany Bay, Malta, Antwerp, the Crimea.
3. For what reasons did Henry VIII break away from the Church of Rome ?
4. Why were the people of England so glad to welcome back Charles II ?
5. Describe the life and work of Robert Walpole.
6. What changes took place in farming in eighteenth-century England ?
7. Describe the part played by Wellington in bringing about the downfall of Napoleon.
8. Explain the need for parliamentary reform in the nineteenth century, and indicate briefly the stages in its progress during that century.
9. Say what you know about any *one* of the following :—the Factory Acts ; the establishment and work of the League of Nations ; the provision of education by the State since 1870.

CIVIL SERVICE COMMISSION

[UU.—853]

English. Handwriting

Time allowed, 20 minutes

Write out the following passage in ink. Failure to complete the passage will lead to loss of marks.

The chief engineer of the "Queen Mary" has under his control, apart from his technical staff, 61 greasers, 42 boiler attendants, 6 plumbers, and 54 cleaners; though the work carried out by them covers a wider range than is suggested by these names. In addition he has 2 writers or clerks, who have the full-time job of keeping pace with all the typing work necessary in connection with the duties of this staff.

To look after the ship's enormous electrical installation the chief engineer has no less than 21 electrical engineer officers under him. Of these, 15 are occupied on routine work, in 3 watches of 8 hours each, and 6 do day work only; 2 of these are concerned entirely with the cinemas on the boat. This large staff is necessary because the chief engineer is responsible for keeping in good order everything that "moves" or "works", whether it be a lift, one of the ship's 650 clocks, an electric bell, a bath plug, or any of the details of the cooking equipment down to the mechanism of an egg-boiler or an electric toaster. Moreover, there are 520 motors in the "Queen Mary", ranging from $\frac{1}{4}$ to 300 horse-power, some 30-odd miles of electric cable, and over 30,000 electric lamps. It is not unknown for 3,000 lamps to fail and require replacement in a single voyage, and much time is spent in putting to rights electrical gear that has been mishandled by passengers and non-technical members of the crew.

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[UU.—853 ; British Isles, No. 15]

History and Geography. Paper 2

Time allowed, 1 hour

Answer any FOUR of the questions. All the questions carry equal marks. Give up the map separately from your answer form whether you use it or not.

1. On the accompanying map of the British Isles mark and name Limerick, Liverpool, Cardiff, Londonderry, Dundee, Southampton.

Name Milford Haven, Cork Harbour, the Solent ; Skye, Anglesey ; Flamborough Head, Beachy Head ; the rivers Trent and Clyde ; Loch Lomond, Lough Neagh.

For each of the following industries shade in black pencil *one* area where it is important and write the name of the industry across the area :—Herring curing, linen manufacture, tinned plate manufacture, shipbuilding.

2. Choose any *three* of the following districts and describe a kind of farming which is important in each of the three :—
- (a) Kent,
 - (b) Central Wales,
 - (c) East Anglia,
 - (d) Central Ireland.

In each of the three cases you select describe the climate and the relief of the land and show that the particular type of farming is specially suited to the area.

3. Select *three* towns in the British Empire: one in Australia, one in India, and one in Africa. Describe the position and importance of each, illustrating your answer with sketch maps.
4. Give the position of (a) one region in the world where it is always hot and always dry, (b) one where it is always hot and always wet, and (c) one which has hot dry summers and warm showery winters.

In each case describe the principal occupation of the people who live there, and show that the occupation is well suited to the climate.

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5. Name *two* ports on the eastern side of North America and *one* on the western side from which you would expect different commodities to be exported on a large scale, and for each name an important article of export. For each of the commodities you name mention an area where it is produced and give the advantages of the area for its production.
6. Describe briefly the following steamship routes :—
- (a) from Bombay to Genoa,
 - (b) from Marseilles to Stockholm,
 - (c) from New York to Valparaiso.

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[UU.—853 : C.S.C. tables]

Mathematics. Paper 1

Time allowed, 1 hour

For full credit your work must be fully shown and easily intelligible, and approximate answers must be given only to the degree of accuracy that is asked for or is justified by the data.

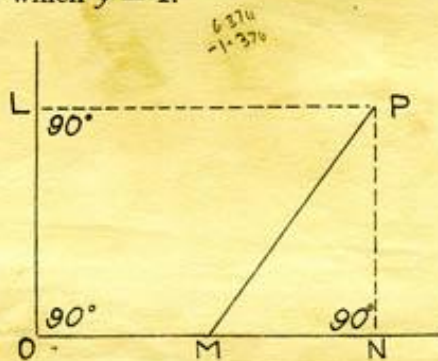
1. On an unruled page of your answer book construct a convex polygon ABCDE in which $AB = 5$ cm., $BC = 8.1$ cm., $DE = 6.6$ cm., $EA = 8.1$ cm., diagonal $AD = 12.2$ cm. and angles ABC ACD are 120° and 70° . Find in any way the area of the polygon, explaining your method. 74

2. See the figure below.

OL ON are two fixed perpendicular straight lines. M is a fixed point on ON, 2.5 cm. from O; P is a point which moves so that $PM = 4$ cm. If $PL = x$ cm. and $PN = y$ cm., where $\angle PLO = \angle PNO$ are right angles, show that $4(x^2 - 5x + y^2) = 39$.

Calculate the values of x when $y = 1$.

Draw the figure to scale; show the locus of P, and mark on it the two positions of P for which $y = 1$.



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[UU.—853 : C.S.C. tables]

Mathematics. Paper 2

Time allowed, 1 hour

For full credit your work must be fully shown and easily intelligible, and approximate answers must be given only to the degree of accuracy that is asked for or is justified by the data.

1. A cylindrical tank, open at the top, is to be made from sheet metal. If A is the area of the metal used, d the diameter and h the height of the tank, express A in terms of d and h . Calculate to the nearest ten pounds the total weight of such a tank when full of water, if $d = 3.4$ feet, $h = 8.5$ feet, and the weight of the sheet metal per square foot is 1.4 lb.

6880 $\pi d \left(2 + \frac{d}{4} \right)$

2. If the base angles of an isosceles triangle are each twice as large as the angle at the vertex, what is the size in degrees of each base angle?

Draw such an isosceles triangle on a base 10 cm. long. Inscribe a circle in it and explain your construction.

Calculate the radius of the circle and check your result by measurement. 3.67.

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[UU.—853 : C.S.C. tables]

Science. Paper 1

Time allowed, 1 hour

Answer any THREE questions. All the questions carry equal marks.

1. One litre of a liquid of density 1.4 gm. per c.cm. is mixed with two litres of a liquid of density 0.96 gm. per c.cm., and the mixture occupies nine-tenths of the volume occupied by the two liquids separately. Calculate the density of the mixture.

Describe in detail how would you check the result with the aid of a density bottle.

2. A wall bracket consists of two light arms AB, BC hinged together at B ; the ends A, C are hinged to a vertical wall, A being vertically above C ; AB is horizontal and one foot long ; BC makes an angle of 34° with AB. A fire bucket weighing 25 lb. is hung at B. Find either graphically or by calculation the pull in AB and the thrust in BC. Draw a diagram showing the forces that act on the bracket.
3. Describe an experiment to show that the time of oscillation of a simple pendulum depends on the length of the pendulum. State the result you would expect to obtain. Compare the times of oscillation of two pendulums, one 9 ft. long, and the other 16 ft. long.
4. Explain the following, giving diagrams in each case :—
(a) A vacuum flask will keep hot tea warm and will also keep ice cream cold.
(b) A space is left between sections of railway lines but not between tramway lines.
5. By what tests would you distinguish between chalk, quicklime, and slaked lime ? Explain why chalk, though insoluble in pure water, is found deposited inside kettles and boilers when water from certain sources has been boiled in them.



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[UU.—853 : C.S.C. tables]

Science. Paper 2

Time allowed, 1 hour

Answer any THREE questions. All the questions carry equal marks.

1. Describe how to determine as accurately as possible
 - (a) the diameter of a piece of fine wire,
 - (b) the diameter of a glass tube of narrow bore.
2. Distinguish between work and power and explain the units used for the measurement of each.

A ladder 20 feet long rests against a vertical wall and is inclined at an angle of 30° to the wall. How much work is done by a man weighing 10 stones in ascending it? If he takes one minute to ascend the ladder, calculate the horse-power he exerts.
3. Describe the construction of a mercury barometer, pointing out how the atmospheric pressure is measured by the instrument.
 - (a) Is it essential to tap the barometer before taking a reading? Give reasons.
 - (b) How would the readings of such a barometer compare in the basement and on the roof of a tall building?
 - (c) How would they compare in a warm room and in the cold air outside?
4. State *three* reasons why water is not used as a thermometric substance.

How would you test the accuracy of the markings for 0° C. and for 100° C. on a mercury thermometer?
5. Give a large labelled diagram of the apparatus used in making gaseous hydrogen chloride from common salt.

Describe an experiment to show strikingly that this gas is extremely soluble in water.