Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

CHEMISTRY **9701/31**

Paper 3 Advanced Practical Skills 1 **October/November 2019**

CONFIDENTIAL INSTRUCTIONS

0117947277

This document gives details of how to prepare for and administer the practical exam.

The information in this document and the identity of any materials supplied by Cambridge International are confidential and must NOT reach candidates either directly or indirectly.

The supervisor must complete the report at the end of this document and return it with the scripts.

If you have any queries regarding these confidential instructions, contact Cambridge International stating the centre number, the syllabus and component number and the nature of the query.

email info@cambridgeinternational.org
phone +44 1223 553554
fax +44 1223 553558

This document consists of **7** printed pages and **1** blank page.

© UCLES 2019

General information about practical exams

Centres must follow the guidance on science practical exams given in the *Cambridge Handbook*.

Safety

Supervisors must follow national and local regulations relating to safety and first aid.

Only those procedures described in the question paper should be attempted.

Supervisors must inform candidates that materials and apparatus used in the exam should be treated with caution. Suitable eye protection should be used where necessary.

The following hazard codes are used in these confidential instructions, where relevant:

C	corrosive	**MH**	moderate hazard
HH	health hazard	**T**	acutely toxic
F	flammable	**O**	oxidising
N	hazardous to the aquatic environment		

Hazard data sheets relating to substances used in this exam should be available from your chemical supplier.

Before the exam

- The packets containing the question papers must **not** be opened before the exam.
- It is assumed that standard school laboratory facilities, as indicated in the *Guide to Planning Practical Science*, will be available.
- Spare materials and apparatus for the tasks set must be available for candidates, if required.

During the exam

- It must be made clear to candidates at the start of the exam that they may request spare materials and apparatus for the tasks set.
- Where specified, the supervisor **must** perform the experiments and record the results as instructed. This must be done **out of sight** of the candidates, using the same materials and apparatus as the candidates.
- Any assistance provided to candidates must be recorded in the supervisor's report.
- If any materials or apparatus need to be replaced, for example, in the event of breakage or loss, this must be recorded in the supervisor's report.

After the exam

- The supervisor must complete a report for each practical session held and each laboratory used.
- Each packet of scripts returned to Cambridge International must contain the following items:

  - the scripts of the candidates specified on the bar code label provided
  - the supervisor's results relevant to these candidates
  - the supervisor's reports relevant to these candidates
  - seating plans for each practical session, referring to each candidate by candidate number
  - the attendance register.

© UCLES 2019

Specific information for this practical exam

During the exam, the supervisor (NOT the invigilator) must do all the experiments and record the results on a spare copy of the question paper, clearly labelled 'supervisor's results'.

If chemicals are prepared in more than one batch, clearly labelled supervisor's results must be provided for each batch. The candidates using each batch must be listed on the supervisor's report.

Apparatus

The apparatus listed must be provided to each candidate.

1 × 250 cm^3 measuring cylinder
1 × 25 cm^3 measuring cylinder
1 × side-arm conical flask, labelled **X**, with bung and approximately 50 cm of plastic / rubber delivery tube to fit
or
1 × 150 cm^3 or 250 cm^3 conical flask, labelled **X**, with one-hole bung connected to approximately 50 cm of plastic / rubber delivery tube
1 × tub suitable for acting as trough (minimum capacity 1 dm^3)
2 × stand and clamp
1 × 250 cm^3 volumetric (graduated) flask
1 × 50 cm^3 burette
1 × burette clamp
1 × funnel (for filling burette)
1 × 25 cm^3 pipette
1 × pipette filler
2 × 150 cm^3 or 250 cm^3 conical flask
1 × white tile
1 × glass rod
1 × spatula
8 × test-tube*
2 × boiling tube*
1 × hard-glass test-tube
1 × test-tube rack
1 × test-tube holder
2 × teat/dropping pipette
1 × Bunsen burner
1 × heat-proof mat
1 × wash bottle of distilled water
1 × pen for labelling glassware
paper towels
access to a balance weighing to **at least** 0.1 g
red and blue litmus papers
wooden splints
apparatus normally used in the centre in testing for carbon dioxide with limewater
aluminium foil for testing nitrate/nitrite

*Candidates are expected to rinse and reuse test-tubes and boiling tubes where possible.
Additional tubes should be available.

Where the provision of balances or 250 cm^3 measuring cylinders is limited candidates should be directed to start the examination on different questions. See the current syllabus for balance : candidate ratio.

Materials

The materials listed in the table must be provided to each candidate.

Warning: small amounts of NH_3 **[C][T][N]**, which can cause respiratory distress in some people, may be produced. **The laboratory must be well ventilated.**

label	per candidate	identity	notes
FA 1 [F]	0.30 g	magnesium powder	Provide 0.30 g ± 0.05 g Mg powder **[F]** in a stoppered container.
FA 2	100 cm^3	0.60 mol dm^{-3} hydrochloric acid	Dilute 50.0 cm^3 of concentrated (35–37%; approximately 11 mol dm^{-3}) HCl **[C][MH]** to 1 dm^3.
FA 3	125 cm^3	0.10 mol dm^{-3} sodium hydroxide	Prepare 2.0 mol dm^{-3} NaOH **[C]** according to the instructions in the current syllabus. Dilute 50.0 cm^3 of this solution in 1 dm^3.
FA 5 [MH]	1.5 g	aluminium ammonium sulfate	Provide 1.5 g ± 0.1 g of $AlNH_4(SO_4)_2.12H_2O$ **[MH]** in a stoppered container.
FA 8	10 cm^3	0.1 mol dm^{-3} iron(II) sulfate and 0.1 mol dm^{-3} potassium iodide	Dissolve 27.8 g of $FeSO_4.7H_2O$ **[MH]** and 16.6 g of KI in each dm^3 of solution.
distilled water	250 cm^3	distilled water	
starch indicator	5 cm^3	2% aqueous starch	For preparation instructions see the current syllabus.
methyl orange indicator [T][C][N][F][MH][HH]	10 cm^3	methyl orange indicator	For preparation instructions see the current syllabus.

© UCLES 2019

label	per candidate	identity	notes
dilute hydrochloric acid	10 cm^3	2.0 mol dm^{-3} HCl	See preparation instructions in the current syllabus. If necessary, each of these reagents can be provided as a communal supply for groups of up to 6 candidates. Invigilators must be alert to the risk of contamination and the opportunity for malpractice when using a communal supply.
dilute nitric acid **[C]**	10 cm^3	2.0 mol dm^{-3} HNO_3	
dilute sulfuric acid **[MH]**	10 cm^3	1.0 mol dm^{-3} H_2SO_4	
aqueous ammonia **[C][MH][N]**	10 cm^3	2.0 mol dm^{-3} NH_3	
aqueous sodium hydroxide **[C]**	10 cm^3	2.0 mol dm^{-3} NaOH	
aqueous barium chloride or aqueous barium nitrate	10 cm^3	0.1 mol dm^{-3} $BaCl_2$ or 0.1 mol dm^{-3} $Ba(NO_3)_2$	
limewater **[MH]**	10 cm^3	saturated aqueous calcium hydroxide, $Ca(OH)_2$	
aqueous silver nitrate	10 cm^3	0.05 mol dm^{-3} $AgNO_3$	
aqueous acidified potassium manganate(VII) **[MH]**	10 cm^3	0.01 mol dm^{-3} $KMnO_4$ in 0.5 mol dm^{-3} H_2SO_4	

- An excess of at least 10% of each material must be prepared to cover accidental loss.
- All solutions must be thoroughly mixed.
- If you are unable to source any of these chemicals, you must contact Cambridge International as far as possible in advance of the exam for advice.
- **Materials must be labelled only as specified in the 'label' column. The identities of chemicals labelled with letter codes, e.g. FA 1, may be different from their descriptions in the question paper. Candidates must use the descriptions given in the question paper.**

© UCLES 2019

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

Supervisor's report

Syllabus and component number					/		

Centre number					

Centre name .....

Time of the practical session .....

Laboratory name/number .....

Give details of any difficulties experienced by the centre or by candidates (include the relevant candidate names and candidate numbers).

You must include:

- any difficulties experienced by the centre in the preparation of materials
- any difficulties experienced by candidates, e.g. due to faulty materials or apparatus
- any specific assistance given to candidates.

If chemicals have been prepared in more than one batch, list the candidates using each batch.

Declaration

1 Each packet that I am returning to Cambridge International contains the following items:

- ☐ the scripts of the candidates specified on the bar code label provided
- ☐ the supervisor's results relevant to these candidates
- ☐ the supervisor's reports relevant to these candidates
- ☐ seating plans for each practical session, referring to each candidate by candidate number
- ☐ the attendance register

2 Where the practical exam has taken place in more than one practical session, I have clearly labelled the supervisor's results, supervisor's reports and seating plans with the time and laboratory name/number for each practical session.

3 I have included details of difficulties relating to each practical session experienced by the centre or by candidates.

4 I have reported any other adverse circumstances affecting candidates, e.g. illness, bereavement or temporary injury, directly to Cambridge International on a *special consideration form*.

Signed ..... (supervisor)

Name (in block capitals) .....

© UCLES 2019

Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

CHEMISTRY **9701/33**

Paper 3 Advanced Practical Skills 1 **October/November 2019**

CONFIDENTIAL INSTRUCTIONS

5708437488

This document gives details of how to prepare for and administer the practical exam.

The information in this document and the identity of any materials supplied by Cambridge International are confidential and must NOT reach candidates either directly or indirectly.

The supervisor must complete the report at the end of this document and return it with the scripts.

If you have any queries regarding these confidential instructions, contact Cambridge International stating the centre number, the syllabus and component number and the nature of the query.

email info@cambridgeinternational.org
phone +44 1223 553554
fax +44 1223 553558

This document consists of **7** printed pages and **1** blank page.

IB19 11_9701_33/CI/3RP
© UCLES 2019

Cambridge Assessment International Education

[Turn over

PapaCambridge

General information about practical exams

Centres must follow the guidance on science practical exams given in the *Cambridge Handbook*.

Safety

Supervisors must follow national and local regulations relating to safety and first aid.

Only those procedures described in the question paper should be attempted.

Supervisors must inform candidates that materials and apparatus used in the exam should be treated with caution. Suitable eye protection should be used where necessary.

The following hazard codes are used in these confidential instructions, where relevant:

C	corrosive	**MH**	moderate hazard
HH	health hazard	**T**	acutely toxic
F	flammable	**O**	oxidising
N	hazardous to the aquatic environment		

Hazard data sheets relating to substances used in this exam should be available from your chemical supplier.

Before the exam

- The packets containing the question papers must **not** be opened before the exam.
- It is assumed that standard school laboratory facilities, as indicated in the *Guide to Planning Practical Science*, will be available.
- Spare materials and apparatus for the tasks set must be available for candidates, if required.

During the exam

- It must be made clear to candidates at the start of the exam that they may request spare materials and apparatus for the tasks set.
- Where specified, the supervisor **must** perform the experiments and record the results as instructed. This must be done **out of sight** of the candidates, using the same materials and apparatus as the candidates.
- Any assistance provided to candidates must be recorded in the supervisor's report.
- If any materials or apparatus need to be replaced, for example, in the event of breakage or loss, this must be recorded in the supervisor's report.

After the exam

- The supervisor must complete a report for each practical session held and each laboratory used.
- Each packet of scripts returned to Cambridge International must contain the following items:

  - the scripts of the candidates specified on the bar code label provided
  - the supervisor's results relevant to these candidates
  - the supervisor's reports relevant to these candidates
  - seating plans for each practical session, referring to each candidate by candidate number
  - the attendance register.

© UCLES 2019

PapaCambridge

Specific information for this practical exam

During the exam, the supervisor (NOT the invigilator) must do all the experiments and record the results on a spare copy of the question paper, clearly labelled 'supervisor's results'.

If chemicals are prepared in more than one batch, clearly labelled supervisor's results must be provided for each batch. The candidates using each batch must be listed on the supervisor's report.

Apparatus

The apparatus listed must be provided to each candidate.

1 × 25 cm^3 pipette
1 × 10 cm^3 pipette
1 × pipette filler
1 × 50 cm^3 burette
2 × 150 cm^3 or 250 cm^3 conical flask
1 × 250 cm^3 volumetric (graduated) flask
1 × 250 cm^3 beaker
1 × burette stand and clamp
1 × funnel (for filling burette)
1 × white tile
1 × 50 cm^3 measuring cylinder
1 × spatula
2 × teat/dropping pipette
1 × glass rod
2 × foamed plastic (polystyrene) cup
1 × thermometer (–10 °C to +110 °C at 1 °C)
1 × heat-proof mat
1 × Bunsen burner
3 × boiling tube*
5 × test-tube*
1 × hard-glass test-tube
1 × test-tube rack
1 × test-tube holder
1 × wash bottle containing distilled water
1 × pen for labelling glassware
paper towels
access to a balance weighing to at least 0.1 g
red and blue litmus papers
wooden splints
apparatus normally used in the centre in testing for carbon dioxide with limewater
aluminium foil for testing nitrate/nitrite

*Candidates are expected to rinse and reuse test-tubes and boiling tubes where possible. Additional tubes should be available.

Where balance provision is limited, some candidates should be instructed to start the exam with different questions. See the current syllabus for balance : candidate ratio.

PapaCambridge

Materials

The materials listed in the table must be provided to each candidate.

Warning: Small amounts of NO_2 **[C][O][T]**, which can cause respiratory distress in some people, may be produced. **The laboratory must be well ventilated**.

label	per candidate	identity	notes
FA 1 [MH]	200 cm^3	0.150 mol dm^{-3} sodium hydroxide	Dissolve 6.00 g of NaOH **[C]** in each dm^3 of solution.
FA 2 [MH]	150 cm^3	4.00 mol dm^{-3} hydrochloric acid	Dilute 340 cm^3 of concentrated (35–37%, approximately 11 mol dm^{-3}) HCl **[C][MH]** to 1.00 dm^3.
FA 4	1.9–2.0 g	magnesium oxide	1.9–2.0 g of MgO in a stoppered container
FA 5	4.0–4.1 g	magnesium carbonate	4.0–4.1 g of $3MgCO_3.Mg(OH)_2.3H_2O$ in a stoppered container Any form of 'basic' magnesium carbonate is suitable.
FA 6 [F][N]	0.9–1.0 g	zinc powder	0.9–1.0 g of Zn powder **[F][N]** in a stoppered container
FA 7 [O][MH]	1.4–1.5 g	sodium nitrate	1.4–1.5 g of $NaNO_3$ **[O][MH]** in a stoppered container
FA 9 [C]	15 cm^3	0.2 mol dm^{-3} sodium sulfite	Dissolve 25.2 g of Na_2SO_3 **[C][MH]** in each dm^3 of solution. Provide 15 cm^3 in a stoppered container. Hydrated sodium sulfite is also suitable.
distilled water	300 cm^3	distilled water	
methyl orange indicator [T][C][N][F][MH][HH]	10 cm^3	methyl orange indicator	See preparation instructions in the current syllabus.

PapaCambridge

label	per candidate	identity	notes
dilute hydrochloric acid	10 cm^3	2.0 mol dm^{-3} HCl	See preparation instructions in the current syllabus. If necessary, each of these reagents can be provided as a communal supply for groups of up to 6 candidates. Invigilators must be alert to the risk of contamination and the opportunity for malpractice when using a communal supply.
dilute nitric acid **[C]**	10 cm^3	2.0 mol dm^{-3} HNO_3	
dilute sulfuric acid **[MH]**	10 cm^3	1.0 mol dm^{-3} H_2SO_4	
aqueous ammonia **[C][MH][N]**	10 cm^3	2.0 mol dm^{-3} NH_3	
aqueous sodium hydroxide **[C]**	10 cm^3	2.0 mol dm^{-3} NaOH	
aqueous barium chloride or aqueous barium nitrate	10 cm^3	0.1 mol dm^{-3} $BaCl_2$ or 0.1 mol dm^{-3} $Ba(NO_3)_2$	
limewater **[MH]**	10 cm^3	saturated aqueous calcium hydroxide, $Ca(OH)_2$	
aqueous silver nitrate	10 cm^3	0.05 mol dm^{-3} $AgNO_3$	
aqueous acidified potassium manganate(VII) **[MH]**	10 cm^3	0.01 mol dm^{-3} $KMnO_4$ in 0.5 mol dm^{-3} H_2SO_4	

- An excess of at least 10% of each material must be prepared to cover accidental loss.
- All solutions must be thoroughly mixed.
- If you are unable to source any of these chemicals, you must contact Cambridge International as far as possible in advance of the exam for advice.
- **Materials must be labelled only as specified in the 'label' column. The identities of chemicals labelled with letter codes, e.g. FA 1, may be different from their descriptions in the question paper. Candidates must use the descriptions given in the question paper.**

© UCLES 2019

[Turn over
PapaCambridge

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

© UCLES 2019

PapaCambridge

Supervisor's report

Syllabus and component number | | | | | / | | |

Centre number | | | | | |

Centre name .....

Time of the practical session .....

Laboratory name/number .....

Give details of any difficulties experienced by the centre or by candidates (include the relevant candidate names and candidate numbers).

You must include:

- any difficulties experienced by the centre in the preparation of materials
- any difficulties experienced by candidates, e.g. due to faulty materials or apparatus
- any specific assistance given to candidates.

© UCLES 2019

PapaCambridge

If chemicals have been prepared in more than one batch, list the candidates using each batch.

Declaration

1 Each packet that I am returning to Cambridge International contains the following items:

- ☐ the scripts of the candidates specified on the bar code label provided
- ☐ the supervisor's results relevant to these candidates
- ☐ the supervisor's reports relevant to these candidates
- ☐ seating plans for each practical session, referring to each candidate by candidate number
- ☐ the attendance register

2 Where the practical exam has taken place in more than one practical session, I have clearly labelled the supervisor's results, supervisor's reports and seating plans with the time and laboratory name/number for each practical session.

3 I have included details of difficulties relating to each practical session experienced by the centre or by candidates.

4 I have reported any other adverse circumstances affecting candidates, e.g. illness, bereavement or temporary injury, directly to Cambridge International on a *special consideration form*.

Signed ..... (supervisor)

Name (in block capitals) .....

© UCLES 2019

PapaCambridge

Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

CHEMISTRY **9701/34**

Paper 3 Advanced Practical Skills 2 **October/November 2019**

CONFIDENTIAL INSTRUCTIONS

1190840526

This document gives details of how to prepare for and administer the practical exam.

The information in this document and the identity of any materials supplied by Cambridge International are confidential and must NOT reach candidates either directly or indirectly.

The supervisor must complete the report at the end of this document and return it with the scripts.

If you have any queries regarding these confidential instructions, contact Cambridge International stating the centre number, the syllabus and component number and the nature of the query.

email info@cambridgeinternational.org
phone +44 1223 553554
fax +44 1223 553558

This document consists of **7** printed pages and **1** blank page.

IB19 11_9701_34/CI/3RP
© UCLES 2019

Cambridge Assessment International Education

[Turn over

PapaCambridge

General information about practical exams

Centres must follow the guidance on science practical exams given in the *Cambridge Handbook*.

Safety

Supervisors must follow national and local regulations relating to safety and first aid.

Only those procedures described in the question paper should be attempted.

Supervisors must inform candidates that materials and apparatus used in the exam should be treated with caution. Suitable eye protection should be used where necessary.

The following hazard codes are used in these confidential instructions, where relevant:

C	corrosive	**MH**	moderate hazard
HH	health hazard	**T**	acutely toxic
F	flammable	**O**	oxidising
N	hazardous to the aquatic environment		

Hazard data sheets relating to substances used in this exam should be available from your chemical supplier.

Before the exam

- The packets containing the question papers must **not** be opened before the exam.
- It is assumed that standard school laboratory facilities, as indicated in the *Guide to Planning Practical Science*, will be available.
- Spare materials and apparatus for the tasks set must be available for candidates, if required.

During the exam

- It must be made clear to candidates at the start of the exam that they may request spare materials and apparatus for the tasks set.
- Where specified, the supervisor **must** perform the experiments and record the results as instructed. This must be done **out of sight** of the candidates, using the same materials and apparatus as the candidates.
- Any assistance provided to candidates must be recorded in the supervisor's report.
- If any materials or apparatus need to be replaced, for example, in the event of breakage or loss, this must be recorded in the supervisor's report.

After the exam

- The supervisor must complete a report for each practical session held and each laboratory used.
- Each packet of scripts returned to Cambridge International must contain the following items:

  - the scripts of the candidates specified on the bar code label provided
  - the supervisor's results relevant to these candidates
  - the supervisor's reports relevant to these candidates
  - seating plans for each practical session, referring to each candidate by candidate number
  - the attendance register.

© UCLES 2019

PapaCambridge

Specific information for this practical exam

During the exam, the supervisor (NOT the invigilator) must do all the experiments and record the results on a spare copy of the question paper, clearly labelled 'supervisor's results'.

If chemicals are prepared in more than one batch, clearly labelled supervisor's results must be provided for each batch. The candidates using each batch must be listed on the supervisor's report.

Apparatus

The apparatus listed must be provided to each candidate.

1 × 250 cm^3 measuring cylinder
2 × stand and clamp (for clamping measuring cylinder and flask)
1 × 50 cm^3 measuring cylinder
1 × funnel (for filling burette)
1 × 250 cm^3 side-arm conical flask (labelled **X**) with bung and approximately 50 cm of plastic/rubber tube to fit
or
1 × 250 cm^3 conical flask (labelled **X**) with 1-hole bung connected to approximately 50 cm of plastic/rubber tube to fit
1 × tub suitable for acting as trough (for collecting gas over water)
1 × stop-clock
1 × 50 cm^3 burette
1 × burette clamp
1 × 25 cm^3 pipette
1 × pipette filler
2 × 150 cm^3 or 250 cm^3 conical flask
1 × white tile
1 × spatula
1 × heat-proof mat
8 × test-tube*
3 × boiling tube*
1 × test-tube rack
1 × test-tube holder
2 × teat/dropping pipette
1 × Bunsen burner
1 × wash bottle of distilled water
1 × pen for labelling glassware
paper towels
red and blue litmus papers
wooden splints
apparatus normally used in the centre in testing for carbon dioxide with limewater
aluminium foil for testing nitrate/nitrite

*Candidates are expected to rinse and reuse test-tubes and boiling tubes where possible. Additional tubes should be available.

PapaCambridge

Materials

The materials listed in the table must be provided to each candidate.

label	per candidate	identity	notes
FB 1	50 cm^3	5 vol hydrogen peroxide	Dilute 50 cm^3 of 100 vol H_2O_2 **[C]** to each dm^3 of solution.
FB 2 [MH]	0.5 ± 0.1 g	manganese(IV) oxide	Provide 0.5 ± 0.1 g powdered MnO_2 **[MH]** in a stoppered container.
FB 3	150 cm^3	0.05 mol dm^{-3} hydrogen peroxide	Dilute 60 cm^3 of 10 vol H_2O_2 in each dm^3 of solution.
FB 4	150 cm^3	0.02 mol dm^{-3} potassium manganate(VII)	Dissolve 3.16 g of $KMnO_4$ **[O][MH][N]** in each dm^3 of solution.
FB 5 [MH]	150 cm^3	1.0 mol dm^{-3} sulfuric acid	Prepared according to the current syllabus.
FB 6	20 cm^3	0.2 mol dm^{-3} iron(II) sulfate	Dissolve 55.6 g of $FeSO_4.7H_2O$ **[MH]** and 50 cm^3 of 1.0 mol dm^{-3} sulfuric acid **[MH]** in each dm^3 of solution. This solution should be freshly prepared.
FB 7 [C]	20 cm^3	0.2 mol dm^{-3} sodium sulfite	Dissolve 25.2 g of Na_2SO_3 **[C][MH]** in each dm^3 of solution.
FB 8	20 cm^3	0.2 mol dm^{-3} sodium nitrate	Dissolve 17.0 g of $NaNO_3$ **[O][MH]** in each dm^3 of solution.

© UCLES 2019

PapaCambridge

label	per candidate	identity	notes
dilute hydrochloric acid	10 cm^3	2.0 mol dm^{-3} HCl	See preparation instructions in the current syllabus. If necessary, each of these reagents can be provided as a communal supply for groups of up to 6 candidates. Invigilators must be alert to the risk of contamination and the opportunity for malpractice when using a communal supply.
dilute nitric acid **[C]**	10 cm^3	2.0 mol dm^{-3} HNO_3	
dilute sulfuric acid **[MH]**	10 cm^3	1.0 mol dm^{-3} H_2SO_4	
aqueous ammonia **[C][MH][N]**	10 cm^3	2.0 mol dm^{-3} NH_3	
aqueous sodium hydroxide **[C]**	20 cm^3	2.0 mol dm^{-3} NaOH	
aqueous barium chloride or aqueous barium nitrate	10 cm^3	0.1 mol dm^{-3} $BaCl_2$ or 0.1 mol dm^{-3} $Ba(NO_3)_2$	
limewater **[MH]**	10 cm^3	saturated aqueous calcium hydroxide, $Ca(OH)_2$	
aqueous silver nitrate	10 cm^3	0.05 mol dm^{-3} $AgNO_3$	
aqueous acidified potassium manganate(VII) **[MH]**	10 cm^3	0.01 mol dm^{-3} $KMnO_4$ in 0.5 mol dm^{-3} H_2SO_4	

- An excess of at least 10% of each material must be prepared to cover accidental loss.
- All solutions must be thoroughly mixed.
- If you are unable to source any of these chemicals, you must contact Cambridge International as far as possible in advance of the exam for advice.
- **Materials must be labelled only as specified in the 'label' column. The identities of chemicals labelled with letter codes, e.g. FB 1, may be different from their descriptions in the question paper. Candidates must use the descriptions given in the question paper.**

© UCLES 2019

PapaCambridge

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

© UCLES 2019

PapaCambridge

Supervisor's report

Syllabus and component number | | | | | / | | |

Centre number | | | | | |

Centre name .....

Time of the practical session .....

Laboratory name/number .....

Give details of any difficulties experienced by the centre or by candidates (include the relevant candidate names and candidate numbers).

You must include:

- any difficulties experienced by the centre in the preparation of materials
- any difficulties experienced by candidates, e.g. due to faulty materials or apparatus
- any specific assistance given to candidates.

© UCLES 2019

PapaCambridge

If chemicals have been prepared in more than one batch, list the candidates using each batch.

Declaration

1 Each packet that I am returning to Cambridge International contains the following items:

- ☐ the scripts of the candidates specified on the bar code label provided
- ☐ the supervisor's results relevant to these candidates
- ☐ the supervisor's reports relevant to these candidates
- ☐ seating plans for each practical session, referring to each candidate by candidate number
- ☐ the attendance register

2 Where the practical exam has taken place in more than one practical session, I have clearly labelled the supervisor's results, supervisor's reports and seating plans with the time and laboratory name/number for each practical session.

3 I have included details of difficulties relating to each practical session experienced by the centre or by candidates.

4 I have reported any other adverse circumstances affecting candidates, e.g. illness, bereavement or temporary injury, directly to Cambridge International on a *special consideration form*.

Signed ..... (supervisor)

Name (in block capitals) .....

© UCLES 2019

PapaCambridge

Cambridge International AS & A Level

Cambridge Assessment International Education
Cambridge International Advanced Subsidiary and Advanced Level

CHEMISTRY **9701/35**

Paper 3 Advanced Practical Skills 1 **October/November 2019**

CONFIDENTIAL INSTRUCTIONS

0767763046

This document gives details of how to prepare for and administer the practical exam.

The information in this document and the identity of any materials supplied by Cambridge International are confidential and must NOT reach candidates either directly or indirectly.

The supervisor must complete the report at the end of this document and return it with the scripts.

If you have any queries regarding these confidential instructions, contact Cambridge International stating the centre number, the syllabus and component number and the nature of the query.

email info@cambridgeinternational.org
phone +44 1223 553554
fax +44 1223 553558

This document consists of **7** printed pages and **1** blank page.

IB19 11_9701_35/CI/4RP
© UCLES 2019

Cambridge Assessment International Education

[Turn over

PapaCambridge

General information about practical exams

Centres must follow the guidance on science practical exams given in the *Cambridge Handbook*.

Safety

Supervisors must follow national and local regulations relating to safety and first aid.

Only those procedures described in the question paper should be attempted.

Supervisors must inform candidates that materials and apparatus used in the exam should be treated with caution. Suitable eye protection should be used where necessary.

The following hazard codes are used in these confidential instructions, where relevant:

C	corrosive	**MH**	moderate hazard
HH	health hazard	**T**	acutely toxic
F	flammable	**O**	oxidising
N	hazardous to the aquatic environment		

Hazard data sheets relating to substances used in this exam should be available from your chemical supplier.

Before the exam

- The packets containing the question papers must **not** be opened before the exam.
- It is assumed that standard school laboratory facilities, as indicated in the *Guide to Planning Practical Science*, will be available.
- Spare materials and apparatus for the tasks set must be available for candidates, if required.

During the exam

- It must be made clear to candidates at the start of the exam that they may request spare materials and apparatus for the tasks set.
- Where specified, the supervisor **must** perform the experiments and record the results as instructed. This must be done **out of sight** of the candidates, using the same materials and apparatus as the candidates.
- Any assistance provided to candidates must be recorded in the supervisor's report.
- If any materials or apparatus need to be replaced, for example, in the event of breakage or loss, this must be recorded in the supervisor's report.

After the exam

- The supervisor must complete a report for each practical session held and each laboratory used.
- Each packet of scripts returned to Cambridge International must contain the following items:

  - the scripts of the candidates specified on the bar code label provided
  - the supervisor's results relevant to these candidates
  - the supervisor's reports relevant to these candidates
  - seating plans for each practical session, referring to each candidate by candidate number
  - the attendance register.

© UCLES 2019

PapaCambridge

Specific information for this practical exam

During the exam, the supervisor (NOT the invigilator) must do all the experiments and record the results on a spare copy of the question paper, clearly labelled 'supervisor's results'.

If chemicals are prepared in more than one batch, clearly labelled supervisor's results must be provided for each batch. The candidates using each batch must be listed on the supervisor's report.

Apparatus

The apparatus listed must be provided to each candidate.

1 × 250 cm^3 measuring cylinder
1 × 25 cm^3 measuring cylinder
1 × side-arm conical flask, labelled **X**, with bung and approximately 50 cm of plastic / rubber delivery tube to fit
or
1 × 150 cm^3 or 250 cm^3 conical flask, labelled **X**, with one-hole bung connected to approximately 50 cm of plastic / rubber delivery tube
1 × tub suitable for acting as trough (minimum capacity 1 dm^3)
2 × stand and clamp
1 × 250 cm^3 volumetric (graduated) flask
1 × 50 cm^3 burette
1 × burette clamp
1 × funnel (for filling burette)
1 × 25 cm^3 pipette
1 × pipette filler
2 × 150 cm^3 or 250 cm^3 conical flask
1 × white tile
1 × glass rod
1 × spatula
8 × test-tube*
2 × boiling tube*
1 × hard-glass test-tube
1 × test-tube rack
1 × test-tube holder
2 × teat/dropping pipette
1 × Bunsen burner
1 × heat-proof mat
1 × wash bottle of distilled water
1 × pen for labelling glassware
paper towels
access to a balance weighing to **at least** 0.1 g
red and blue litmus papers
wooden splints
apparatus normally used in the centre in testing for carbon dioxide with limewater
aluminium foil for testing nitrate/nitrite

*Candidates are expected to rinse and reuse test-tubes and boiling tubes where possible.
Additional tubes should be available.

Where the provision of balances or 250 cm^3 measuring cylinders is limited candidates should be directed to start the examination on different questions. See the current syllabus for balance : candidate ratio.

PapaCambridge

Materials

The materials listed in the table must be provided to each candidate.

Warning: small amounts of NH_3 **[C][T][N]**, which can cause respiratory distress in some people, may be produced. **The laboratory must be well ventilated.**

label	per candidate	identity	notes
FA 1 [F]	0.30 g	magnesium powder	Provide 0.30 g ± 0.05 g Mg powder **[F]** in a stoppered container.
FA 2	100 cm^3	0.60 mol dm^{-3} hydrochloric acid	Dilute 50.0 cm^3 of concentrated (35–37%; approximately 11 mol dm^{-3}) HCl **[C][MH]** to 1 dm^3.
FA 3	125 cm^3	0.10 mol dm^{-3} sodium hydroxide	Prepare 2.0 mol dm^{-3} NaOH **[C]** according to the instructions in the current syllabus. Dilute 50.0 cm^3 of this solution in 1 dm^3.
FA 5 [MH]	1.5 g	aluminium ammonium sulfate	Provide 1.5 g ± 0.1 g of $AlNH_4(SO_4)_2.12H_2O$ **[MH]** in a stoppered container.
FA 8	10 cm^3	0.1 mol dm^{-3} iron(II) sulfate and 0.1 mol dm^{-3} potassium iodide	Dissolve 27.8 g of $FeSO_4.7H_2O$ **[MH]** and 16.6 g of KI in each dm^3 of solution.
distilled water	250 cm^3	distilled water	
starch indicator	5 cm^3	2% aqueous starch	For preparation instructions see the current syllabus.
methyl orange indicator [T][C][N][F][MH][HH]	10 cm^3	methyl orange indicator	For preparation instructions see the current syllabus.

PapaCambridge

label	per candidate	identity	notes
dilute hydrochloric acid	10 cm^3	2.0 mol dm^{-3} HCl	See preparation instructions in the current syllabus. If necessary, each of these reagents can be provided as a communal supply for groups of up to 6 candidates. Invigilators must be alert to the risk of contamination and the opportunity for malpractice when using a communal supply.
dilute nitric acid **[C]**	10 cm^3	2.0 mol dm^{-3} HNO_3	
dilute sulfuric acid **[MH]**	10 cm^3	1.0 mol dm^{-3} H_2SO_4	
aqueous ammonia **[C][MH][N]**	10 cm^3	2.0 mol dm^{-3} NH_3	
aqueous sodium hydroxide **[C]**	10 cm^3	2.0 mol dm^{-3} NaOH	
aqueous barium chloride or aqueous barium nitrate	10 cm^3	0.1 mol dm^{-3} $BaCl_2$ or 0.1 mol dm^{-3} $Ba(NO_3)_2$	
limewater **[MH]**	10 cm^3	saturated aqueous calcium hydroxide, $Ca(OH)_2$	
aqueous silver nitrate	10 cm^3	0.05 mol dm^{-3} $AgNO_3$	
aqueous acidified potassium manganate(VII) **[MH]**	10 cm^3	0.01 mol dm^{-3} $KMnO_4$ in 0.5 mol dm^{-3} H_2SO_4	

- An excess of at least 10% of each material must be prepared to cover accidental loss.
- All solutions must be thoroughly mixed.
- If you are unable to source any of these chemicals, you must contact Cambridge International as far as possible in advance of the exam for advice.
- **Materials must be labelled only as specified in the 'label' column. The identities of chemicals labelled with letter codes, e.g. FA 1, may be different from their descriptions in the question paper. Candidates must use the descriptions given in the question paper.**

PapaCambridge

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.

© UCLES 2019

PapaCambridge

Supervisor's report

Syllabus and component number | | | | | / | | |

Centre number | | | | | |

Centre name .....

Time of the practical session .....

Laboratory name/number .....

Give details of any difficulties experienced by the centre or by candidates (include the relevant candidate names and candidate numbers).

You must include:

- any difficulties experienced by the centre in the preparation of materials
- any difficulties experienced by candidates, e.g. due to faulty materials or apparatus
- any specific assistance given to candidates.

© UCLES 2019

PapaCambridge

If chemicals have been prepared in more than one batch, list the candidates using each batch.

Declaration

1 Each packet that I am returning to Cambridge International contains the following items:

- ☐ the scripts of the candidates specified on the bar code label provided
- ☐ the supervisor's results relevant to these candidates
- ☐ the supervisor's reports relevant to these candidates
- ☐ seating plans for each practical session, referring to each candidate by candidate number
- ☐ the attendance register

2 Where the practical exam has taken place in more than one practical session, I have clearly labelled the supervisor's results, supervisor's reports and seating plans with the time and laboratory name/number for each practical session.

3 I have included details of difficulties relating to each practical session experienced by the centre or by candidates.

4 I have reported any other adverse circumstances affecting candidates, e.g. illness, bereavement or temporary injury, directly to Cambridge International on a *special consideration form*.

Signed ..... (supervisor)

Name (in block capitals) .....

© UCLES 2019

PapaCambridge