Mark Scheme (Results)

Summer 2017

Pearson Edexcel Advanced Level Unit 7: Chemistry Practical Examination

General marking guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than be penalised for omissions.

- Examiners should mark according to the mark scheme, not according to their perception of where the grade boundaries may lie.

- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.

- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.

- Crossed-out work should be marked UNLESS the candidate has replaced it with an alternative response.

- Mark schemes will indicate within the table where, and which strands of Quality of Written Communication, are being assessed. The strands are as follows:

    i) ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear

    ii) select and use a form and style of writing appropriate to purpose and to complex subject matter

    iii) organise information clearly and coherently, using specialist vocabulary when appropriate.

Using the mark scheme

Examiners should NOT give credit for incorrect or inadequate answers, but allow candidates to be rewarded for answers showing correct application of principles and knowledge. Examiners should therefore read carefully and consider every response: even if it is not what is expected, it may still be creditworthy.

The mark scheme gives examiners:

- an idea of the types of response expected
- how individual marks are to be awarded
- the total mark for each question
- examples of responses that should NOT receive credit.

/	Means that the responses are alternatives and either answer should receive full credit.
()	Means that a phrase/word is not essential for the award of the mark, but helps the examiner to get the sense of the expected answer.
Bold	Phrases/words in **bold** indicate that the meaning of the phrase or the actual word is **essential** to the answer.
ecf/TE/cq	(error carried forward)(transfer error)(consequential) means that a wrong answer given in an earlier part of a question is used correctly in answer to a later part of the same question.

Candidates must make their meaning clear to the examiner to gain the mark. Do not give credit for correct words/phrases which are put together in a meaningless manner. Answers must be in the correct context.

Question number	Answer	Mark
1 Table 1	All masses recorded **(1)** To at least 2 dp **and** subtraction correct **(1)**	**(2)**

Question number	Answer	Mark
1 Table 2	All initial and final volumes recorded to 2 dp where the 2nd dp is either 0 or 5 (allow one slip) **(1)** Subtractions correct **(1)** Allow omission of 2nd dp in titre if zero	**(2)**

Question number	Answer	Mark
1 Choice of titres	Chooses two or more concordant titres to calculate mean within $\pm$ 0.20cm^3	**(1)**

Question number	Answer	Mark
1 Mean titre	Correct averaging of chosen titres to 2 dp or to nearest 0.05 cm^3	**(1)**

Question number	Answer	Mark
1 Accuracy	Calculate the expected titre for the candidate = candidate's mass **A** × supervisor's titre / supervisor's mass **A**	**(6)**

d/cm^3	$\pm$ 0.20	$\pm$ 0.40	$\pm$ 0.60	$\pm$ 0.80	$\pm$ 1.00	$\pm$ 2.00
Mark	6	5	4	3	2	1

Calculate the difference (d) between the expected titre and the mean titre

If the candidate has averaged inappropriate titres or has made a subtraction error in Table 2 then the examiner must calculate a corrected mean before awarding accuracy marks

Question number	Answer	Mark
1 Range	Range (r) is difference between outermost titres used by the candidate (or examiner) to calculate mean. r/cm^3 ±0.20 ±0.30 ±0.40 Mark **3** **2** **1**	**(3)**

Question number	Answer	Mark
1(a)	In (a) to (d) award the mark for a correct answer to 3 significant figures following any clearly set out method Only penalise SF once in (a) to (d) Moles = mean titre × $\frac{0.025}{1000}$	**(1)**

Question number	Answer	Mark
1(b)	Moles = answer to (a) × 5	**(1)**

Question number	Answer	Mark
1(c)	Moles = answer to (b) × 10	**(1)**

Question number	Answer	Mark
1(d)	Formula mass = mass **A** from **table 1** / Answer to (c)	**(1)**

Question number	Answer	Mark
1(e)	(Formula mass)would appear higher/greater	**(1)**

(Total for Question 1 = 20 marks)

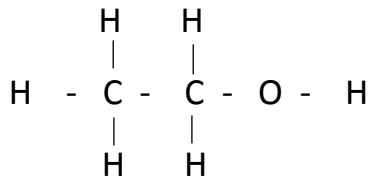
Question number	Answer	Reject	Mark
2(a)	Steamy fumes/white fumes/misty fumes **(1)** IGNORE effervescence (Damp blue) litmus turns red **(1)**	White smoke	**(2)**

Question number	Answer	Reject	Mark
2(b)	Turns green/blue		**(1)**

Question number	Answer	Reject	Mark
2(c)	Alcohol IGNORE Primary/ secondary	OH Tertiary	**(1)**

Question number	Answer	Reject	Mark
2(d)	(pale) yellow precipitate /solid /crystals **ALLOW** Antiseptic smell		**(1)**

Question number	Answer	Reject	Mark
2(e)	CH_3 CHOH(R) Or Could be ethanol or a secondary alcohol with the OH group on carbon atom 2	Aldehydes Ketones	**(1)**

Question number	Answer	Reject	Mark
2(f)	**Displayed formula** of ethanol  **(1)** **Explanation** Three peaks so three hydrogen environments **(1)** Splitting 4:1:3 **(1)** Identification of any 2 peaks Quartet C**H**$_2$,Singlet O**H** , triplet C**H**$_3$, **(1)**		**(4)**

Question number	Answer	Reject	Mark
2(g)	Yellow/red/orange **and** precipitate/solid/crystals		**(1)**

Question number	*Answer*	*Reject*	*Mark*
***2*(h)**	Silver **and** mirror **ALLOW** Grey or black precipitate/ solid		**(1)**

Question number	Answer	Reject	Mark
2(i)	Aldehyde Or CHO	 COH	**(1)**

Question number	Answer	Reject	Mark
2(j)	Ethanal Or CH_3CHO		(1)

Question number	Answer	Reject	Mark
2(k)	**Observation** Yellow/ orange **(1)** **Inference** Na^+ **(1)** IGNORE Na ion/sodium ion **ALLOW** TE on wrong flame colour eg red (0) Li^+(1)	Na	(2)

Question number	Answer	Reject	Mark
2(l)(i)	**Observation** White **and** precipitate/solid/crystals		(1)

Question number	Answer	Reject	Mark
2(l)(ii)	**Observation** Precipitate dissolves **(1)** **Inference** Cl^- /chloride ion **(1)**	Cl	(2)

Question number	Answer	Reject	Mark
2(m)	NaCl **ALLOW** TE on wrong ions from (k) and (m)		(1)

(Total for Question 2 = 20 marks)

Question number	Answer	Mark
3 **Table 3**	All temperatures recorded to 0.5°C **(1)** Correct mean **(1)** Correct temperature change **(1)** Difference between student temperature change and the supervisor's value. **Temp /°C** | ± 1.0 | ± 2.0 | ± 3.0 **Mark** | 3 | 2 | 1 Recorded temperature change of actual experiment **(3)**	**(6)**

Question number	Answer	Mark
3	In ethanol and water the intermolecular forces are: hydrogen bonding, London forces and permanent dipoles **ALLOW** For London forces: dispersion forces, van der Waals **(1)** Hydrogen bonds are most significant **(1)** Stronger / more intermolecular forces are formed between water and ethanol (than the individual forces) **(1)** (Hence) temperature increases/exothermic **(1)**	**(4)**

(Total for Question 3 = 10 marks)

TOTAL FOR PAPER = 40 MARKS

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com

Order Code

For more information on Edexcel qualifications, please visit our website
www.edexcel.com

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom