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2015

CHEMISTRY

PAPER 3

MARKING SCHEME

FOR EXAMINER'S USE ONLY

The marking scheme consists of 19 printed pages

MARKING GUIDELINES
SPM TRIAL EXAMINATION 2015
PAPER 3

Symbol		Meaning
//	-	replace the whole sentence
( )	-	replace the previous word
[ ]	-	can be summarized from explanation
# #	-	if given it must be correct, not panelized if not given is
___ or bold	-	key word
a.d.p	-	avoid double penalty
WCR	-	wrong cancel right
a.	-	accept
r.	-	reject
e.c.f	-	error carry forward
/	-	or

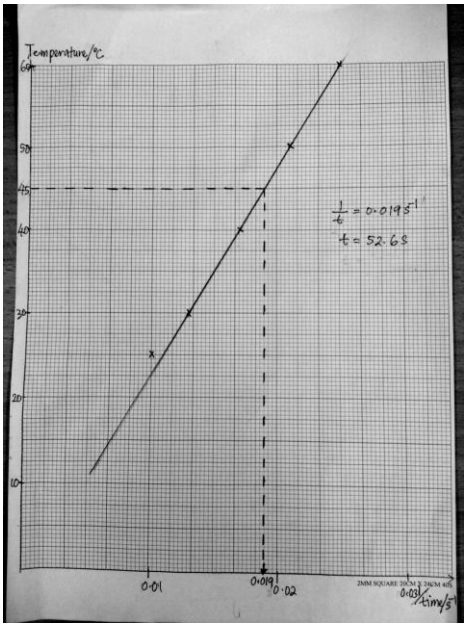
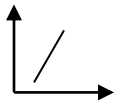
1(*a*) KK0503 – Measuring and using number

<table>
<tr><th>Question</th><th>Mark Scheme</th><th>Mark</th></tr>
<tr><td rowspan="4">1(a)</td><td>Able to record all the time taken at five different temperatures correctly with one decimal place.
Answers:
<table>
<tr><td>Temperature / ^{0}C</td><td>25.0</td><td>30.0</td><td>40.0</td><td>50.0</td><td>60.0</td></tr>
<tr><td>Time /s</td><td>95.0</td><td>80.0</td><td>60.0</td><td>47.0</td><td>40.0</td></tr>
</table></td><td>3</td></tr>
<tr><td>Able to record the time taken correctly with no or two decimal places // Able to record the time taken in at least 3 experiments with one decimal place correctly.</td><td>2</td></tr>
<tr><td>Able to record the time taken in two experiments correctly.</td><td>1</td></tr>
<tr><td>No response given OR wrong response</td><td>0</td></tr>
</table>

1(*b*) KK0506 – Communicating

<table>
<tr><th>Question</th><th>Mark Scheme</th><th>Mark</th></tr>
<tr><td rowspan="4">1(b)</td><td>Able to construct a table correctly with the following aspects :
(i) Three column with correct quantities and units ;Temperature/ ^{0}C , Time taken / s , 1/time / s^{-1}
(ii) Correct all reading of time taken with one decimal place
(iii) Correct all reading of 1/ time to 3 decimal places.
Suggested answer:
<table>
<tr><td>Temperature / ^{0}C</td><td>25.0</td><td>30.0</td><td>40.0</td><td>50.0</td><td>60.0</td></tr>
<tr><td>Time /s</td><td>95.0</td><td>80.0</td><td>60.0</td><td>47.0</td><td>40.0</td></tr>
<tr><td>$\frac{1}{\text{Time}}$ / s^{-1}</td><td>0.011</td><td>0.013</td><td>0.017</td><td>0.021</td><td>0.025</td></tr>
</table></td><td>3</td></tr>
<tr><td>Able to construct a table correctly with 2 following aspects
#If any of the time taken in 1(a) is wrong but transferred correctly in the table</td><td>2</td></tr>
<tr><td>Able to construct a table correctly with 1 following aspect</td><td>1</td></tr>
<tr><td>No response given OR wrong response</td><td>0</td></tr>
</table>

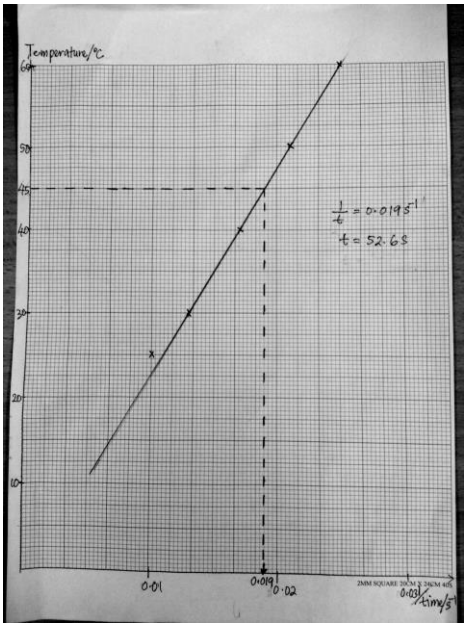
1(c)(i) KK0506 – Communicating

Question	Mark Scheme	Mark
1*(c)(i)*	**Able to plot the graph with the following criteria :** (i) Both axes with correct labels and units Y- axis : Temperature/ ^{0}C [#Scale not necessary begin from 0] X-axis : 1/ time / s^{-1} [#Scale must begin from 0] (ii) Correct scale and all points are transferred correctly. # size of the graph at least half of graph paper #adp data from 1(a) (iii)Best fit line  	**3**
	Able to plot the graph with the following criteria : (i) reverse position of axes (ii) 2 points are transferred correctly (iii)Line	**2**
	Able to give an idea to plot the graph (i) Label at least one axis without unit (ii) Line 	**1**
	No response or wrong response	**0**

1(c)(ii) KK0506 – Communicating

Question	Mark Scheme	Mark
1(c)(ii)	**Able to state the relationship between temperature and the rate of reaction correctly** Sample answer When the temperature increases, the rate of reaction increases// The rate of reaction increases when temperature increases.// When the temperature is higher, the rate of reaction is higher	**3**
	Able to state the relationship between the rate of reaction and temperature less correctly Sample answer The rate of reaction increases // Rate of reaction is directly proportional to temperature// The higher the rate , the higher the temperature	**2**
	Able to give an idea of rate of reaction Sample answer The rate of reaction changes // increase	**1**
	No response or wrong response Sample answer Temperature increases	**0**

1(c)(iii)KK0505 – Predicting

Question	Mark Scheme	Mark
1(c)(iii)	**Able to predict the time taken to collect 30 cm^3 of hydrogen gas at 45.0 ^{0}C correctly with the following aspects :** (i) Show on the graph (extrapolate) (ii) Show the calculation step (iii) Time taken with correct unit and one decimal place  <u>Answer</u> 1/ time = 0.019 s^{-1} [value in range 0.018 → 0.020 s^{-1}] .: time = 52.6 s [*value in range 50.0 -55.6 s*]	**3**
	Able to predict the time taken to collect 30 cm^3 of hydrogen gas at 45.0 ^{0}C with correct unit <u>Answer</u> Value in range: $0.016 < 1/t < 0.018$ s^{-1} and $0.020 < 1/t < 0.022$ s^{-1} , $55.6 < t < 62.5$ s and $45.5 < t < 50.0$ s	**2**
	Able to give an idea in prediction Any value other than Score 3 and Score 2 // more than 48.0 s // less than 60.0 s	**1**
	No response or wrong response	**0**

1 (d) KK0509 – Defining operationally

Question	Mark Scheme	Mark
1(d)	**Able to describe the following criteria :** (i) What should be done : (ii) What should be observed <u>Sample answer</u> Time taken to collect hydrogen gas when hydrochloric acid is reacted with zinc powder // When hydrochloric acid is reacted zinc powder, time taken to collect gas is recorded.	**3**
	Able to describe the either criterion (i) or (ii) <u>Sample answer</u> Time taken to collect hydrogen gas // hydrochloric acid is reacted with zinc powder// The speed at which reactants are converted to products// Rate of reaction = <u>change in selected quantity</u> time taken	**2**
	Able to give an idea for the rate of reaction <u>Sample answer</u> Time taken // Volume of hydrogen gas collected	**1**
	No response or wrong response	**0**

1 (e) KK0507 – Space time relationship

Question	Mark Scheme	Mark
1(e)	**Able to explain correctly with the following aspects.** (i) Zinc strip has bigger size (ii) Smaller total surface area (iii)The rate of reaction is lower <u>Sample answer</u> P1. Zinc strip has bigger size. P2. Smaller total surface area of zinc that exposed P3. The rate of reaction decreases/lower // Reaction is slow	**3**
	Able to give 2 aspects correctly	**2**
	Able to give one aspect correctly or an idea <u>Sample answer</u> Big size // Smaller total surface area // Rate of reaction is low	**1**
	No response or wrong response	**0**

2 (a) KK0510 – Controlling variables

Question	Mark Scheme	Mark
2 (a)	**Able to state the three variables correctly** Sample answer **Manipulated variable** Type of metal // Copper , zinc and silver **Responding variable** Displacement reaction// displacement silver // solid formed // grey solid formed **Fixed variable** Silver nitrate solution // Volume/concentration of silver nitrate solution // Type of solution	**3**
	Able to state any two variables correctly	**2**
	Able to state any one variable correctly	**1**
	No response or wrong response	**0**

2 (b) KK05011- Hypothesizing

Question	Mark Scheme	Mark
2 (b)	**Able to state the relationship between the manipulated variable and the responding variable and state the direction correctly** <u>Sample answer</u> A more electropositive metal can displace silver from silver nitrate solution // More electropositive metal will displaced less electropositive metal from its salt solution // Zinc and copper can displace silver from silver nitrate solution// A metal higher in position in Electrochemical Series will displace a metal lower in position in Electrochemical Series from its solution	**3**
	Able to state the relationship between the manipulated variable and the responding variable without stating the direction// * RV → MV <u>Sample answer</u> A more electropositive metal can displace silver // More electropositive metal will displaced less electropositive metal // Zinc / copper can displace silver from silver nitrate solution// *Metal will be displaced from its salt solution by a more electropositive metal	**2**
	Able to state the idea of hypothesis <u>Sample answer</u> Metal will be displaced // Silver is displaced // Silver ion is displaced	**1**
	No response or wrong response	**0**

2(c) KK0508 – Interpreting data

Question	Mark Scheme	Mark
2(c)	**Able to arrange the three metals correctly.** Answer Silver , Copper , Zinc // Ag , Cu , Zn *# Skor 1 : If fully stated in reverse*	**3**
	Able to arrange any two metals in sequence correctly. Sample answers Zinc , Silver , Copper // Zn , Ag , Cu Copper , Zinc , Silver // Cu , Zn , Ag	**2**
	Able to arrange the three metals in reverses sequence. Answer Zinc , Copper , Silver // Zn , Cu , Ag	**1**
	No response or wrong response	**0**

2(d)KK0502 – Classification

<table>
<tr><th>Question</th><th>Mark Scheme</th><th>Mark</th></tr>
<tr><td rowspan="4">2(d)</td><td>Able to classify all the six metals correctly

<u>Sample answer</u>
<table><tr><th>Metal which are more electropositive than lead</th><th>Metal which are less electropositive than lead</th></tr><tr><td>Magnesium // Mg
Zinc // Zn
Aluminium // Al
Iron // Fe</td><td>Copper // Cu
Silver // Ag</td></tr></table>
#Score 1 : If classification is reverse</td><td>3</td></tr>
<tr><td>Able to classify at least 5 metals correctly</td><td>2</td></tr>
<tr><td>Able to classify at least 3 metals correctly</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
</table>

Question 3– Experimenting

Question	Mark Scheme	Mark
3(a)	**Able to give the problem statement correctly** Sample answer Is detergent more / less effective in cleansing action in sea water compared to soap? // Is soap more / less effective in cleansing action in sea water compared to detergent? // Is detergent more effective as cleansing agent in sea water compared to soap?	**3**
	Able to give the problem statement Sample answer Which one is more effective in sea water, detergent or soap?// To investigate the effectiveness of soap and detergent in sea water // Does detergent and soap show different effectiveness in sea water? // Detergent has more ability to removes stain compared to soap	**2**
	Able to give an idea of the problem statement Sample answer Detergent is more effective // Soap is more effective // Detergent cleans better	**1**
	No response or wrong response	**0**

Question	Mark Scheme	Mark
3(b)	**Able to state all the three variables correctly** Sample answer **Manipulated variable** Detergent and soap // Type of cleansing agent **Responding variable** Effectiveness of cleansing // Absence / presence of oily stains // Formation of scum // Ability to remove stain **Fixed variable** Sea water // Size of oily stains	**3**
	Able to state any two variables correctly	**2**
	Able to state any one variable correctly	**1**
	No response or wrong response	**0**

Question	Mark Scheme	Mark
3(c)	**Able to state the hypothesis correctly** Sample answer Detergent is more effective in cleansing action in sea water while soap is less effective // When detergent is used, the oily stains is removed while when soap is used , the oily stains remains// When detergent is used ,no scum is formed while when soap is used , scum is formed.	**3**
	Able to state the hypothesis Sample answer Detergent is more effective in cleansing action in sea water // When detergent is used, the oily stains is removed// When detergent is used ,no scum is formed while when soap is used , scum is formed// Detergent is more effective in cleansing action in sea water than soap// Effectiveness of cleaning action is higher in sea water when used detergent compared to soap// The oily stains is removed when detergent is used while the oily stains remains when soap is used// No scum will formed when detergent is used while scum will formed when soap is used// Effectiveness of detergent and soap in sea water are different	**2**
	Able to give an idea of the hypothesis Sample answer Different cleansing agent have different effectiveness in sea water// No scum formed in detergent // Scum will formed in soap // Effectiveness of detergent and soap in sea water are different	**1**
	No response or wrong response	**0**

Question	Mark Scheme	Mark
3(d)	**Able to list the materials and apparatus completely** Sample answer **Materials** 1. Soap 2. Detergent 3. Sea water 4. Cloth with oily stains // Dirty cloth **Apparatus** 1. Measuring cylinder 2. Beaker 3. Stirrer / glass rod	**3**
	Able to list the materials and apparatus Sample answer **Materials** 1. Soap solution 2. Detergent 3. Sea water 4. Cloth with oily stains // Dirty cloth **Apparatus** 1. Measuring cylinder 2. Any suitable container	**2**
	Able to give an idea of materials and apparatus Sample answer **Materials** 1. Soap solution / 2. Detergent 3. Sea water 4. Cloth with oily stains // Dirty cloth **Apparatus** 1.[Any suitable container]	**1**
	No response or wrong response	**0**

Question	Mark Scheme	Mark
3(e)	**Able to list all the steps of procedure correctly** Sample answer √1 1. Measure [20-100]cm^3 of sea water by using measuring cylinder and pour into a beaker. √2 2. Add [10-50] cm^3 of soap solution √3 3. Put a piece of cloth with oily stain into the beaker √4 4. Shake / Stir the mixture √5 5. Record the observations after 10 minutes √6 6. Repeat steps 1 to 5 using detergent to replace soap solution	**3**
	Able to state the steps 1 , 2 , 3 , 5 and 6 less correctly Sample answer √1 1. Measure sea water by using measuring cylinder and pour into a beaker √2 2. Add soap solution √3 3. Put a piece of cloth with oily stain into the beaker √5 5. Record the observations √6 6. Repeat the experiment	**2**
	Able to state steps 1 , 2 and 3	**1**
	No response or wrong response	**0**

<table>
<tr><th>Question</th><th>Mark Scheme</th><th>Mark</th></tr>
<tr><td rowspan="3">3(f)</td><td>Able to construct a table that consists of :

1. Headings for manipulated and responding variables
2. List of cleansing agent : detergent and soap

<u>Sample answer</u>

<table>
<tr><th>Cleansing agent</th><th>Observation</th></tr>
<tr><td>Soap</td><td></td></tr>
<tr><td>Detergent</td><td></td></tr>
</table>
</td><td>2</td></tr>
<tr><td>Able to construct a table that consists of :

1. Headings for manipulated or responding variables

<u>Sample answer</u>

<table>
<tr><th>Type of cleansing agent</th><th>Observation</th></tr>
<tr><td></td><td></td></tr>
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<tr><th>Observation</th></tr>
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</table>
<table>
<tr><th>Type of cleansing agent</th></tr>
<tr><td></td></tr>
<tr><td></td></tr>
</table>
</td><td>1</td></tr>
<tr><td>No response or wrong response</td><td>0</td></tr>
</table>

HAPPY MARKING