BLAKEHURST HIGH SCHOOL

YEAR 12 HALF YEARLY EXAM CHEMISTRY
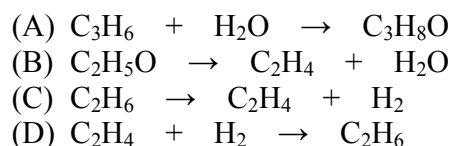
2006

1½ HOURS

NAME: _____

Part A

Total marks 10
Attempt Questions 1 – 10
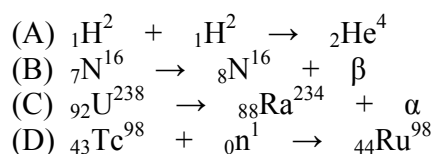Allow about 20 minutes for this part

1.   The process of **Steam Cracking** can be written as follows?

(A) C_3H_6 + H_2O → C_3H_8O
(B) C_2H_5O → C_2H_4 + H_2O
(C) C_2H_6 → C_2H_4 + H_2
(D) C_2H_4 + H_2 → C_2H_6

2.   The process of **polymerisation** is most likely to involve:

(A) Crude oil
(B) Biomass
(C) Esters
(D) Ethylene (ethene)

3.   The reaction that is fully **balanced and correct** is most likely to involve:

(A) $_1H^2$ + $_1H^2$ → $_2He^4$
(B) $_7N^{16}$ → $_8N^{16}$ + β
(C) $_{92}U^{238}$ → $_{88}Ra^{234}$ + α
(D) $_{43}Tc^{98}$ + $_0n^1$ → $_{44}Ru^{98}$

4.   An example of **oxidation** is:

(A) Iron rusting in a car.
(B) Heating a mixture of salt water in air to obtain crystals of sodium chloride.
(C) Precipitating lead iodide from potassium iodide and lead nitrate solutions.
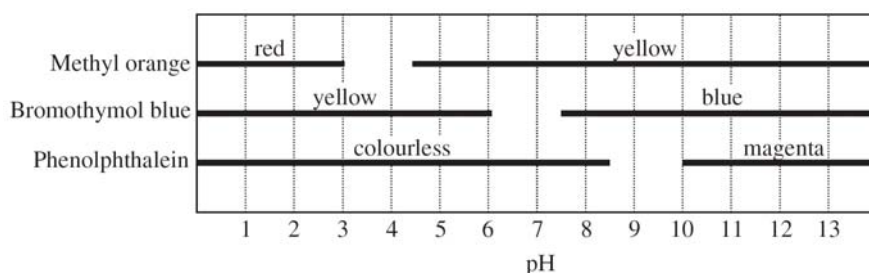(D) Adding sodium hydroxide solution to hydrochloric acid solution.

5.   The correct molecular formula for 3-ethyl pent-1-ene is:

(A) C_7H_{14}
(B) C_6H_{12}
(C) C_5H_{12}
(D) C_6H_{14}

6.   Which of the following substances is acidic?

(A) Ammonia
(B) Vinegar
(C) Laundry detergents
(D) Alcohol

7.   The graph below shows the colour ranges of three indicators.

An unknown solution turns bromothymol blue <u>blue</u>, methyl orange <u>yellow</u>, and phenolphthalein stays <u>colourless</u>. What is the most likely pH range of this solution?

(A) 2.0 – 3.5
(B) 4.5 – 5.0
(C) 8.0 – 8.5
(D) 10.0 – 10.5
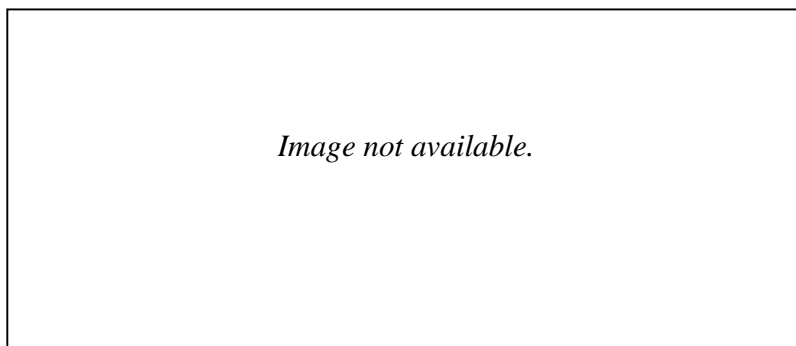

8.   Identify the CORRECT statement about oxides.

(A) Non-metals tend to form acidic oxides
(B) Calcium oxide is an acidic oxide
(C) Acidic oxides neutralise acidic solutions
(D) Metals tend to form acidic oxides

9.   The conjugate acid of HSO_4^- is:

(A) SO_4^{2-}
(B) H_2SO_4
(C) SO_4^-
(D) SO_3^{2-}

10.   Diagram A shows a dry cell. Diagram B shows a lead-acid cell.

Image not available.

Which of the following shows the correctly labelled parts?

	LABELS		
	1	2	3
(A)	anode	cathode	negative terminal
(B)	cathode	anode	negative terminal
(C)	anode	cathode	positive terminal
(D)	cathode	anode	positive terminal

Part B.
Total marks 40.
Allow about 1 hour and 10 minutes for this part.

11.   (a) Outline the steps involved in the production of polyethylene as a commercially
and industrially important polymer.   (4)

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11.   (b) Polymers can be made from vinyl chloride and styrene. Choose **one** only,
show its structural formula and describe one use in terms of its properties.   (2)

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12.   Identify a **polymer** made or obtained from biomass.   (1)

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Evaluate the potential for this polymer to replace polymers produced from fossil fuels. (3)

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13.   (a) Draw the geometric (expanded) structure of ethanol and indicate the polarity of the molecule.   (1)

        (b) Explain why ethanol is regarded as a useful solvent.   (1)

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        (c) Write the balanced reaction for the fermentation of glucose ($C_6H_{12}O_6$).   (2)

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        (d) State two conditions required for the fermentation to occur.   (1)

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(e) Calculate the mass of ethanol produced in a fermentation if 1.50 L carbon dioxide gas was released at 25°C and 100kPa. (2)

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14.   (a) Draw a neat labelled diagram of the apparatus you would use to determine the heat of combustion of butanol, C_4H_9OH (2)

(b) Write the reaction for the complete combustion of butanol. (1)

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(c) Calculate the final temperature if a student burnt 0.15g butanol to heat 100mL water at 21°C. The specific heat of the water is 4.18 J $°C^{-1}g^{-1}$, and the molar heat of combustion of butanol is 2675.5 kJmol^{-1}. (3)

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15. (a) Draw a labelled diagram to show how you would construct a working galvanic cell consisting of a chromium metal electrode in 1.0 M chromium (III) nitrate and a copper metal electrode in 1.0 M copper (II) nitrate. Indicate the cathode on your diagram and the direction of electron flow. (3)
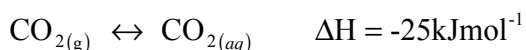
(b) Write the overall equation and calculate the expected voltage from your cell. (2)

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16.   (a) Name one radio isotope and give and industrial or medical use for it.   (1)

_____   Use: _____

       (b) Identify one method of detecting radiation.   (1)

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17.   An equilibrium exists between gaseous and dissolved carbon dioxide in water as shown by the following equation:

$$CO_{2(g)} \leftrightarrow CO_{2(aq)} \qquad \Delta H = -25kJmol^{-1}$$

With reference to Le Chatelier's principal explain the following:

       (a) Fizzing occurs more when a bottle of a carbonated drink is opened warm than cold.   (2)

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18.   Use net ionic equations to explain the amphiprotic nature of sodium hydrogen carbonate in acidic and basic conditions.   (2)

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19.   Explain how you can distinguish between an alkene and an alkane in the school laboratory.   (2)

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20. Calculate the pH of a solution of 0.75 g barium hydroxide dissolved in 2.0 L water. (2)

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21. Write the reaction to show how you would make the ester ethyl propanoate. Use structural formulae. (2)

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Year 12 CHEMISTRY
HALF YEARLY, 2006

NAME: _____

Answer Sheet Part A

	A	B	C	D
1				
2				
3				
4				
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6				
7				
8				
9				
10				

Year 12 CHEMISTRY
HALF YEARLY, 2006
Answers – Part A

	A	B	C	D
1			X	
2				X
3	X			
4	X			
5	X			
6		X		
7			X	
8	X			
9		X		
10		X		