

OLLSCOIL NA hEIREANN, GAILLIMH  
NATIONAL UNIVERSITY OF IRELAND, GALWAY  
SPRING EXAMINATIONS 2001  
FINAL YEAR DIPLOMA IN NURSING EXAMINATIONS (Repeat)  
BIOLOGICAL SCIENCES  
CHEMISTRY/PHYSICS (CP101)

(TOTAL MARKS 100)

Prof. D.L.H. Williams  
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**Time Allowed: One Hour**

**Use a separate answer book for each section i.e. Chemistry and Physics**

**SECTION ONE  
CHEMISTRY  
(50 Marks)**

**Please answer ten of the following questions. Each question carries equal marks.**

1. Write Formulae for the following ionic compounds: sodium chloride, lithium fluoride, potassium sulfate and magnesium bromide.
2. Define both (a) atomic weight (mass) and (b) atomic number.
3. Give an example of (a) ionic bonding and (b) covalent bonding.
4. Write out the electronic structure of (a) boron and (b) oxygen.
5. State Boyle's Law for an ideal gas.
6. Complete and balance the following equations:



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7. Calculate the number of moles present in 51.5 grams of sodium bromide (NaBr).
8. Calculate the pH of (a) 0.01 M HCl and (b) 0.1 M NaOH.  
[Hint: in (b) calculate the pOH first]
9. What is a buffer system used for, and give an example of a buffer system.
10. What is the order with respect to (a) hydrogen ( $\text{H}_2$ ) (b) nitrogen monoxide (NO) and (c) overall for the reaction:  
$$2\text{H}_2 + 2\text{NO} \longrightarrow 2\text{H}_2\text{O} + \text{N}_2$$
  
Whose rate is given by:  $\text{Rate} = k[\text{H}_2][\text{NO}]^2$ ?
11. Write the basic structure of an amino acid. What is the structure of alanine?
12. What are the general structures of (a) an ether (b) an amine (c) a carboxylic acid and (d) a ketone?  
[Example: An alcohol would be R-OH]

**SECTION TWO**  
**PHYSICS**  
**(50 Marks)**

Please answer the following questions. Each question carries equal marks.

1. Which of the following is a vector and which a scalar: speed, acceleration, mass, weight, force, height.
2. Give S.I. units for length, weight and force.
3. Describe, on a molecular level, the difference between a gas, a liquid and a solid.
4. The amount of gas in a container is halved while the volume of the container is increased by a factor three. What is the final pressure of the gas compared to the initial pressure?
5. A patients' temperature was noted as following:  
9.00am : 37 C, 3.00pm : 40 C, 5.00pm : 39 C, 8.00pm : 38 C, midnight: 37 C.  
Plot this data in a suitable graph for display. What do you think was the approximate temperature of the patient at noon?

6. Describe what is meant by the period, wavelength and frequency of a wave. How are frequency and velocity of a wave related?
7. What happens to the mass of an astronaut when she moves from earth to space.
8. Illustrate in a sketch bad lifting technique. Describe why this is bad for you.
9. An electrical heater (2000 Watt), an electric blanket (500 Watt) and a blood warmer (500 Watt) are plugged into the same extension socket. A doctor decides to plug a ventilator (750 Watt) into the same socket. What happens and Why? (assume standard sockets with 13 A fuse).
10. Is the practice described in Question 9 safe? Explain your answer.