

國立高雄大學一百學年度研究所碩士班招生考試試題

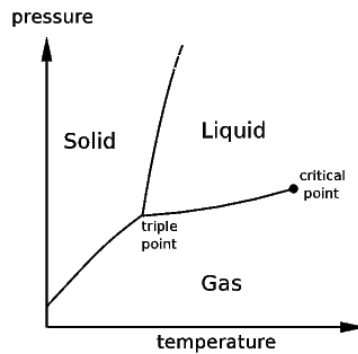
科目：專業英文  
考試時間：100 分鐘

系所：生物科技研究所  
本科原始成績：100 分

是否使用計算機：否

共有三部分共含 10 小題，請盡量按照題號順序作答。

**Part A**



As the pressure of a gas increases, its density increases. As the temperature of a liquid increases, its density decreases. At the critical point, the liquid and gas phases have exactly the same density, and only a single phase exists. This single phase is called a supercritical fluid, which exhibits many of properties of a gas but has a density more typical of a liquid.

In the last few years, supercritical fluids (SCFs) have evolved from laboratory curiosities to substances with important commercial applications. For example, carbon dioxide has a low critical temperature ( $31^{\circ}\text{C}$ ), a comparatively low critical pressure (73 atm), and low toxicity, making it easy to contain and relatively safe to manipulate. Because many substances are quite soluble in supercritical  $\text{CO}_2$ , commercial processes that use it as a solvent are now well established in the oil industry, the food industry, and others. Supercritical  $\text{CO}_2$  is pumped into oil wells that are no longer producing much oil in order to dissolve the residual oil in the underground reservoirs. The less-viscous solution is then pumped to the surface, where the oil can be recovered by evaporation (and recycling) of the  $\text{CO}_2$ .

- (1) 請翻譯第一段中畫線句子。(10 分)
- (2) 請用中文說明文中所提及何以超臨界流體 $\text{CO}_2$ 可被廣泛使用之原因。(10 分)
- (3) 請以中文說明文中所提及超臨界流體 $\text{CO}_2$ 在oil industry應用之流程。(10 分)

**Part B**

London, England (CNN) -- Evidence of man-made warming has increased in the past year, according to one of the world's leading climate research centers.

The UK's Met Office Hadley Center says data from a range of climate indicators continues to make an "overwhelming" case for long-term man-made global warming. "It is clear from the observational evidence across a wide range of indicators that the world is warming," Matt Palmer,

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an oceans expert at the Met Office, said in a statement. "As well as a clear increase in air temperature observed above both the land and sea we see observations which are all consistent with increasing greenhouse gases." The Met Office brought together evidence from over 20 institutions worldwide -- including NOAA's National Climatic Data Center and NASA -- in making its assessment. Datasets were taken from a variety of sources including satellites, weather balloons, ships and ocean buoys, all of which strengthen the case of human-influenced climate change, the Met Office said.

Increases were reported in sea water temperature, higher levels of humidity, rising sea levels as land-ice melts, and shrinking glaciers and Arctic sea-ice. "Our analysis confirms that the signals of warming are as strong as they ever have been. Improving our understanding of the factors that affect short and long term trends is helping us to improve our predictions of the future," Vicky Pope, the Met Office's head of climate change advice, said in a statement.

Although the warming trend is continuing there is evidence that the rate has slowed in the last ten years. Since the end of the 1970s, the rate of surface temperature warming has, on average, risen 0.16 degrees Celsius per decade, according to the Met Office. But from 2000 to 2009 that decreased to between 0.05 and 0.13 degrees Celsius, despite CO<sub>2</sub> emissions continuing to rise. Scientists don't know yet why the slowdown has occurred, but say "natural variability within the climate system" could be to blame. Stratospheric water vapor (a greenhouse gas) has slightly reduced in the past decade and could be a factor, scientists say. Another possible reason could be the increase in aerosols emissions from Asia -- aerosols reflect sunlight and have a cooling effect on the Earth. Despite these short term trends slowing the warming rate, the Met Office says it is satisfied that it fits in with the overall picture on warming.

It says that a decrease in the warming rate is "frequently seen in climate model predictions" and further increases in warming are expected. But they concede more research is needed to improve the modeling and monitoring of the climate. The report was released three days before governments, climate scientists and activists are due to assemble in Cancun, Mexico for COP16, the 16th edition of Conference of the Parties of the United Nations Framework Convention on Climate Change. The U.N. talks will focus on climate finance and deforestation as well as continuing to debate national and international strategies to reduce carbon emissions.

- (4) 請翻譯 Matt Palmer 所說的句子。(10 分)
- (5) 請用中文舉出文中所提及數據說明「全球暖化速率已在近十年內減慢」。(10 分)
- (6) 請用中文說明針對「全球暖化速率已在近十年內減慢」所推測之可能原因。(10 分)
- (7) 請翻譯第一段中畫線句子。(10 分)

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**Part C**

A grain-based vegetarian diet helps chronic kidney disease patients avoid accumulating toxic levels of phosphorous in their bodies, according to new research from the US. Dr Sharon Moe, of the Indiana University School of Medicine and Roudebush Veterans' Affairs Medical Center in Indianapolis, and colleagues, write about their findings in a study due to be published this week in the *Clinical Journal of the American Society of Nephrology*.

If your body can't get rid of phosphorous, it builds up and causes heart disease and eventually death. Healthy kidneys filter toxic minerals like phosphorous so they don't build up toxic levels in the bloodstream. This blood cleaning process doesn't work so well in people with chronic kidney disease (CKD) who have to find other ways to compensate.

One way is to follow medical guidelines that recommend low phosphorous diets for people with CKD, but since food labels don't list phosphorous content, that is easier said than done, so Moe and colleagues decided to compare a vegetarian diet against a meat diet to see how they affected phosphorous levels in patients with CKD. They recruited nine volunteers with CKD and got them to follow a vegetarian or meat-based diet for a week, and then two to four weeks later, got them to follow the opposite diet. The volunteers gave blood and urine samples at the end of each week on both diets.

Moe and colleagues found that despite the two diets offering equivalent protein and phosphorous concentrations, when they were on the vegetarian diet, the patients had significantly lower levels of phosphorous in their blood and urine samples, than when they were on the meat-based diet. Although the study was not designed to examine the reason for this difference, we already know that a grain-based diet has a lower ratio of phosphate to proteins and much of it comes from phytate, which is not absorbed in the human body.

Moe and colleagues concluded that these findings show that where protein comes from in a diet has a significant effect on phosphorous levels in CKD patients. If these findings are confirmed by larger studies, then it provides a good reason for recommending that patients with CKD follow a diet where most of the protein comes from grain-based vegetarian sources of protein, they added. Such a diet "would allow increased protein intake without adversely affecting phosphorus levels," they wrote. They also recommended that when patients with CKD receive counseling about food and diets, they should be told about phosphorous and its effects and the sources of protein from which it derives.

(8) 請翻譯第一段中畫線句子。(10 分)

(9) 請用中文詳述 Moe 團隊所設計的實驗流程和發現。(10 分)

(10) 請用中文詳述 Moe 團隊實驗結論。(10 分)