

國立中山大學 104 學年度轉學考招生考試試題

科目名稱：微積分【海科系二年級】

題號：758001

※本科目依簡章規定「不可以」使用計算機(問答申論題)

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請詳細回答下列問題。

1. (a) Find the limit $\lim_{x \rightarrow 2} \frac{\sqrt{x+2}-x}{x^2-2x}$ if it exists. (10%)
(b) Find all relative extreme values of $f(x) = 4x^3 - 6x^2 - 24x + 5$. (10%)
2. Determine the radius of convergence of $\sum_{n=1}^{\infty} 2^n(x-1)^{n+1}$. (10%)
3. (a) Evaluate the integral $\int_0^1 \frac{3}{x^2+5x+4} dx$. (10%)
(b) Evaluate the integral $\int_0^1 x\sqrt{1-x^2} dx$. (10%)
(c) Evaluate the integral $\int_1^e \frac{\ln x}{x^2} dx$. (10%)
4. (a) Find $f_x(1,0)$, $f_y(1,0)$ and $f_{xy}(1,0)$, where $f(x,y) = xe^{x+y}$. (10%)
(b) Find all relative extreme values of $f(x,y) = 3x^2 - 9xy + 3y^2 + 4$ if they exist. (10%)
5. (a) Let $R = \{(x,y) | 0 \leq x \leq 2, 0 \leq y \leq 3\}$. Evaluate the double integral $\iint_R (2x-y) dA$. (10%)
(b) Let $R = \{(x,y) | 0 \leq x \leq 2, 0 \leq y \leq 2, 0 \leq x^2 + y^2 \leq 4\}$. Evaluate the double integral $\iint_R xy dA$. (10%)

國立中山大學 104 學年度轉學考招生考試試題

科目名稱：英文【海科系二年級】

題號：758002

※本科目依簡章規定「不可以」使用計算機

共 1 頁 第 1 頁

翻譯 英翻中 每題十分

1. Ocean acidification could pose a threat to some marine species.
2. Excess carbon dioxide caused by burning fossil fuels is released into the atmosphere.
3. Carbon dioxide molecules are dissolved into water gradually. The products of this process are hydrogen ions (H^+) and bicarbonate ions (HCO_3^-), and thus excess carbon dioxide in the atmosphere can decrease pH of water bodies.
4. Development of some marine species such as corals and bivalves could be altered in low pH.
5. The first vessel to measure depth of the ocean using sonar waves was the German ship Meteor.
6. The instrument measures water depth by measuring the time taken for a sound it emits to echo back from the sea floor.
7. Seawater contains various metals including iron, aluminum, nickel, tin, copper, zinc, lead, gold, silver, and mercury.
8. The distribution of nutrients in the seawater is not even. Surface seawater usually contains less nutrients than deep seawater.
9. Biological nitrogen fixation is an important part in the ecosystems. Some cyanobacteria can fix nitrogen and convert it into ammonium, and then incorporates it into amino acids.
10. The temperature of surface seawater in the tropical areas is between 26 and 30 degree Celsius through out a year. At a depth of 1000 meters, the temperature is 4 to 5 degree Celsius at the same areas all year round.