

# 國立臺灣師範大學 105 學年度碩士班招生考試試題

科目：地球科學概論

適用系所：地球科學系、科學教育研究所

注意：1.本試題共 4 頁，請依序在答案卷上作答，並標明題號，不必抄題。2.答案必須寫在指定作答區內，否則依規定扣分。

## 地質學

說明下列名詞(每題 4 分；共 20 分):

1. Plate Tectonics
2. Epicontinental Sea
3. Antiformal Syncline
4. Blocking Temperature
5. Index Fossil

## 地球物理學

6. 由普通物理常識知道  $v(\text{波速})=f(\text{頻率}) \cdot \lambda(\text{波長})$ 。請問震波在介質(如地層)中傳播時，高頻波或長波長的波是否有較快的波速？反之是否波速較慢？換言之，震波的波速是否由頻率和波長決定？請說明理由。(20 分)

## 大氣科學

一、單選題 (每題 1 分；共 5 分)

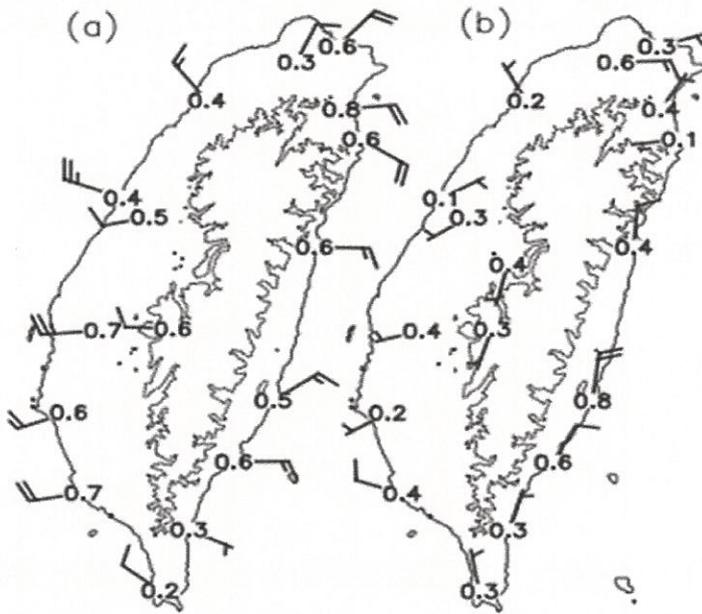
7. 假使濕絕熱降溫率高於環境降溫率，此大氣為：  
(A) 條件性不穩定 (B) 絕對穩定 (C) 絕對不穩定 (D) 中性穩定。
8. 由雷達站所接收到的雷達回波資料，其發射脈衝和接收到回波的時間差可以推知雲雨的  
(A) 降雨強度 (B) 雨滴大小 (C) 風速大小 (D) 所在的位置。
9. 絕對溫度 0 度約等於：  
(A) 攝氏溫度 0 度 (B) 攝氏溫度 +273 度 (C) 攝氏溫度 -273 度 (D) 華氏溫度 0 度。
10. 下列敘述，何者為誤：  
(A) 氣象學上將大氣運動空間和時間的變化範圍，定義為尺度 (B) 伴隨梅雨鋒面的中尺度對流系統的水平尺度為數十到數百公里 (C) 小尺度的天氣系統中，谷風較山風的風速為強 (D) 大氣運動系統的空間尺度大致和時間尺度成正比。
11. 以下那兩種壓力層之間具有最大的高度差 (即厚度):  
(A) 1001-1010 hPa (B) 501-510 hPa (C) 101-110 hPa (D) 1-10 hPa。

二、問答題 (每題 5 分；共 15 分)

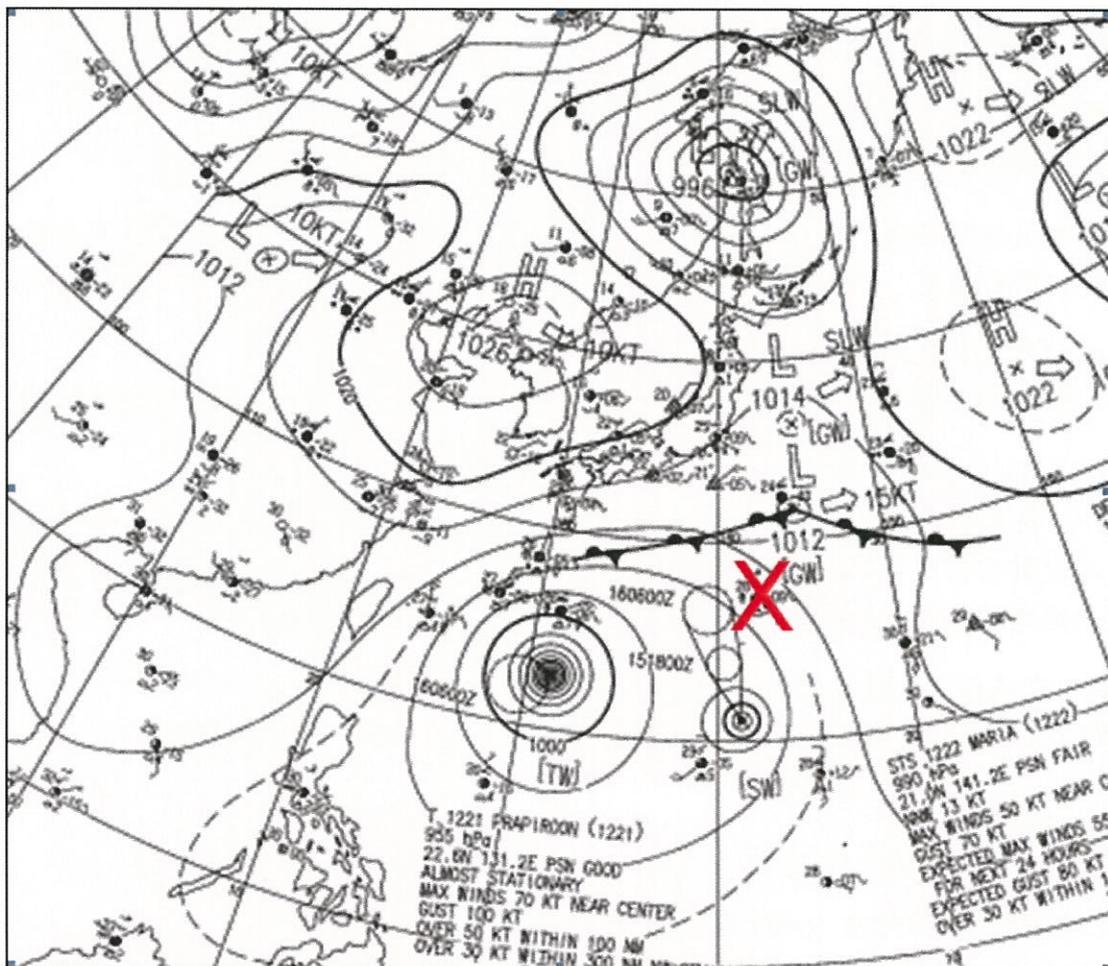
12. 請說明何謂極鋒理論 (polar front theory)。

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13. 請判別以下那一個 (a 圖 或 b 圖) 為下午 14:00 吹的風，並說明判別的理由。



14. (a) 請描述下面天氣圖中出現的天氣系統有那些。(b) 請判斷下圖中 X 處所量測到的風應為那一種風向，並說明判別的理由。



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## 天文學

選擇題（單選，每題 2 分；共 20 分）

15. A comet is moving westward along the celestial equator toward the summer solstice. The changing position of the comet on the celestial sphere can be described to have its (A) declination decreases with time (B) declination increases with time (C) right ascension decreases with time (D) right ascension increases with time.
16. Which physical parameter, more than any other, most probably controlled the early evolution of the Solar System and dictated the characteristics of the planets that eventually formed? (A) the temperature distribution within the Solar Nebula (B) the overall rotation of the Solar Nebula (C) the mixture of chemical constituents within the Solar Nebula (D) the density of molecular hydrogen gas in the Solar Nebula.
17. Which statement below about the solar day is FALSE? (A) the solar day is defined with respect to the position of the Sun in the sky (B) the length of a solar day is constant (C) The Sun's apparently eastward daily progress in the sky varies seasonally (D) a solar day is slightly longer than a sidereal day
18. Stellar parallax is mainly due to the fact that (A) stars are not really point sources (B) stars actually move in space (C) Earth does rotate about its own axis (D) Earth orbits around the Sun
19. A space probe was launched on 2004 March 2 to rendezvous with the Jupiter-family comet 67P/Churyumov-Gerasimenko in 2014 August to study the nucleus of the comet and its environment. After a 10-year long journey, the spacecraft reached the comet and dropped a lander to the surface of the cometary nucleus on 2014 November 12. What is the name of the space probe? (A) Dawn (B) Cassini (C) Rosetta (D) Philae
20. According to the 2006 new definition of planet by the International Astronomical Union (IAU), a dwarf planet is a non-satellite body fulfilling all requirements for being a planet except the condition that it (A) has cleared the neighborhood around its orbit (B) has sufficient mass so that it has nearly round shape (C) assumes a hydrostatic equilibrium state (D) is in orbit around the Sun
21. The gravitational wave predicted by Albert Einstein's General Relativity 100 years ago was finally detected on 2015 September 14 by LIGO (Laser Interferometer Gravitational-wave Observatory) after a lengthy search for nearly 25 years. In the following statements about the gravitational wave, which one is INCORRECT? (A) In Einstein's theory, gravity results from the curvature of spacetime and spacetime is caused by the presence of mass (B) gravitational waves are ripples in the curvature (or fabric) of spacetime travelling outward from the source (C) gravitational waves transport energy as gravitational radiation (D) gravitational waves can also exist in the Newtonian theory of gravitation, which hypothesizes that physical interactions propagate at the speed of light
22. Solar wind is mainly composed of (A) hot and warm molecular gas (B) cosmic ray and X-ray (C) atoms and dust particles (D) ionized atoms and electrons
23. New Horizons is an interplanetary space probe launched on 2006 January 19 with its primary mission to perform a flyby study of a major target in 2015. After a long journey of 9.5 years, the spacecraft flew by this celestial body at its closest approach of 12,500 km on 2015 July 14. What is the name of this primary target of New Horizons? (A) Ceres (B) Pluto (C) Vesta (D) Titan
24. The places most likely to find life in our Solar System other than Earth are (A) Mars, Pluto, Enceladus and Triton (B) Mars, Europa, Enceladus and Titan (C) Pluto, Ceres, Europa and Vesta (D) Ceres, Vesta, Titan and Triton

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## 海洋學

25. 請說明影響某海域之潮差高低之主要因素有哪些?(6分)
26. 說明出現於陸海介面間之海陸風之主要成因?(6分)
27. 根據您的瞭解，列出三種量測海水鹽度之方法，並簡單說明其運作原理。(8分)