## 國立中央大學八十三學年度研究所碩士班入學試題卷

系所別: 大空科學研究所 知 科目: 大空物理及電離層物理 共 2 頁 第 1 頁



- [ . Briefly describe Brookhaven solar neutrino experiment.
- $\rm I\!I$  . If a planet is surrounded by plasma. How will the temperature of the plasma affect the behavior of the plasma escaping from the planet.
- Note are the relative variations of solar electromagnetic radiation during quiet and active times. (10%)
- IV. (a) What is the physical meaning of "adiabatic invariant"? (5%)
  - (b) if one gradually shortens (or lengthens) the length of a single pendulum (單擺), such that  $\|\triangle t/T\| \le \|\triangle L/L\|$ , where T is the pendulum period and L is the length. The adiabatic invariant is found to be  $T/\{L$ . Why? (10%)
- V. (a) What is Vis-visa equation? (5%)
  - (b) What are its unique features different from those of electrical and magnetic forces. (5%)

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<u>\$13</u>

科目: 太空物理及電離層物理。

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I. Please explain the following terminology

(20%)

quasi-equilibrium distribution

(2) conjugate point

(3) the magneto ionic theory

(4) true height analysis

(5) seasonal anomaly

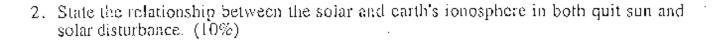
(6) sporadic-E layer

(7) polar cap absorption

(8) Irayeling ionospheric disturbance (TID)

(9) equatorial electrojet

(10) the second law



3. In a collisionless ionosphere, the geomagnetic filed is 0.3 gauss and the electron density profile is expressed as

$$N(z) = 0$$
 for  $z \le b$   
 $N(z) = a (z-b)/H$  for  $z \ge b$ 

where  $a = 10^4$  #/cm<sup>3</sup>, H = 10 km and b = 80 km. (1) For a probing frequency, f = 3.6 MHz, (i) derive the reflection heights for O-, X-, and Z-wave of vertical incidence; and (ii) evaluate the refractive index and height at the reflection point of the O-wave of oblique sounding (elevation angle,  $el = 60^{\circ}$ ). (2) For vertical sweeping probing frequencies, please calculate the reflection frequencies of O-, X-, and Z-wave at  $N_{\rm H} = 10^6$  #/cm<sup>3</sup>. (20%)

