

國立中央大學 110 學年度碩士班考試入學試題

所別：太空科學與工程學系 碩士班 不分組(一般生)
太空科學與工程學系 碩士班 不分組(在職生)

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科目：太空物理學

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*請在答案卷(卡)內作答

Space Physics: Ionosphere (50 points)

1. Explain the generation mechanism of equatorial plasma fountain of the Earth's ionosphere. (10%)
2. Describe the technique of Ionospheric electron density deriving by FORMOSAT-3/COSMICI (10%) and Ionosonde (10%), respectively.
3. Describe the features of the Hall (10%) and Pedersen (10%) conductivity with respect to the altitude throughout the ionosphere.

Space Physics: Magnetosphere (50 points)

4. Assuming the magnetic field is a dipole field and time-independent in the inner magnetosphere, together with the uniform and time-independent electric field. If charged particles have the same kinetic energy at the equator,
 - (a) explain the possible causes of South Atlantic Anomaly (8 points), and
 - (b) discuss the spatial dependence of drift period for those particles with pitch angle of 60° (10 points).

注意:背面有試題

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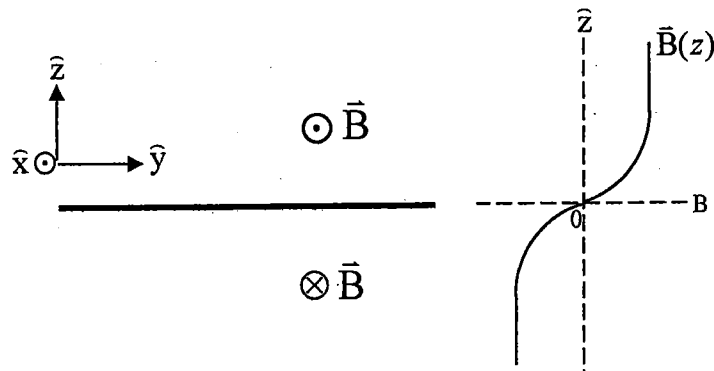
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5. Assuming the magnetic field in the magnetotail is time-independent and only has the x component varying with z, as shown below. The electric field is uniform and time-independent.

- (a) Where is the strong current? What's the direction of the current? Explain your answer by plotting the trajectories of charged particles. (8 points)
- (b) Explain the equilibrium plasma sheet based on the given magnetic field structure under the MHD condition. (8 points)
- (c) Discuss your answer in (a) with the direction of cross tail current. (8 points)



6. The solar wind density measured by a spacecraft changes from 10 cm^{-3} to 22 cm^{-3} and the strength of interplanetary magnetic field changes from 25 nT to 8 nT on average. What kinds of such a structure can be? Explain your answer in detail. (8 points)

注意:背面有試題