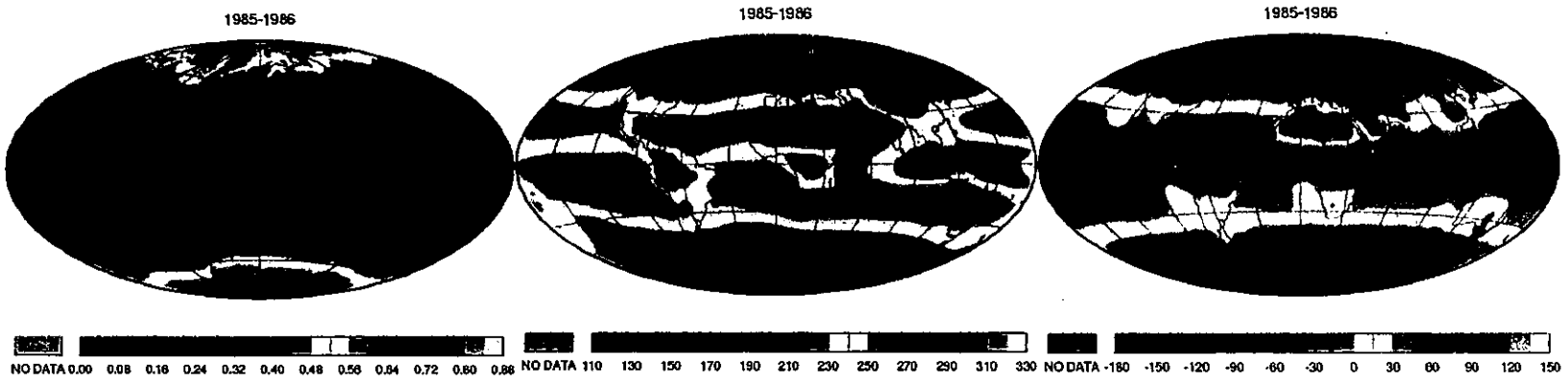
※ 注意：全部題目均請作答於試卷內之「非選擇題作答區」，請標明題號依序作答。

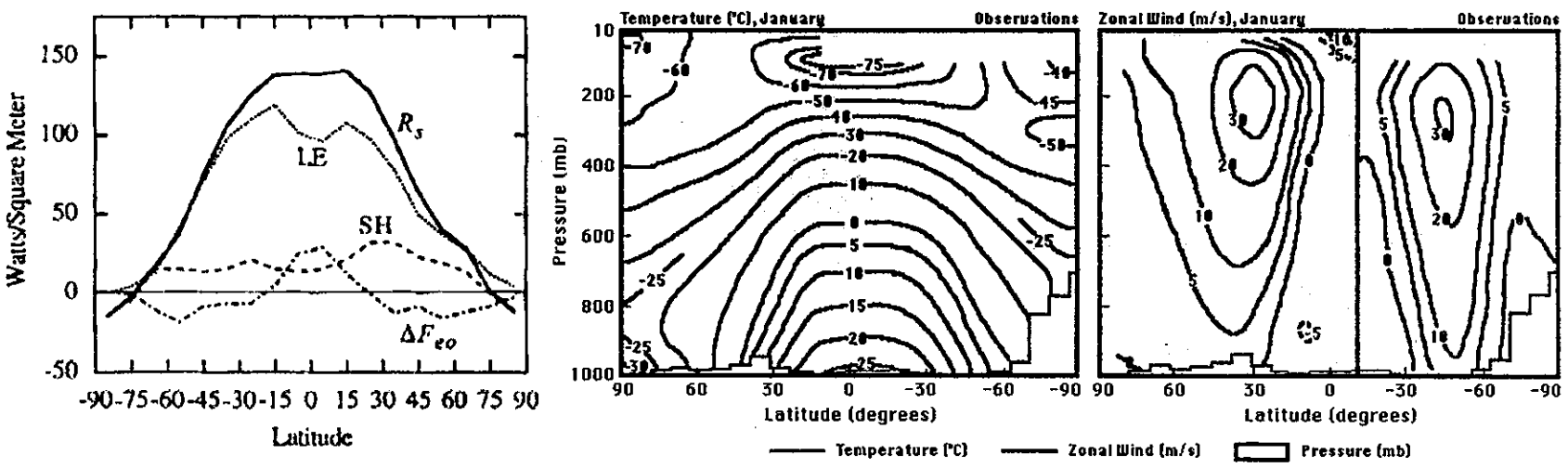
1. Use the Table below to calculate the emission temperatures for all three planets. The actual emission temperature of Jupiter is about 124 K. How must you explain the difference between the number you obtain for Jupiter and 124 K? [solar constant of Earth $S_0 = 1367 w/m^2$] (15)

Planet	D(10^6km)	S (w/m^2)	α	T_e (K)
Venus	108	2636.96	0.71	
Earth	150	1367.00	0.30	
Jupiter	778	50.81	0.34	

2. The following three maps show variables A, B, and C (from left to right) for the energy balance at the top of the atmosphere (TOA). What are the three variables ? How are they related in one equation ? What are the major causes of the spatial distributions of the three variables ? (20)



3. Based on the energy at TOA (figures above) and the climatological distribution of zonally average surface energy balance as a function of latitude (left panel below), temperature °C and zonal wind (middle and right panel below) during the month of January, as a function of latitude and height, answer the following: (a) how is the atmosphere and earth surface (land and ocean) heated by radiative convective processes? Please be sure to include the TOA and surface energy fluxes in your discussion, (b) how would you expect the pressure distribution as a function of latitude and height from the temperature distribution below ? (c) Is the pressure distribution related to the zonal wind distribution shown below ? how ? (25)



4. Why are the subtropical highs formed ? Why are they on the eastern side of the ocean basins ? (20)

5. Ocean Thermal Energy Conversion (OTEC) utilizes the temperature difference between the sea surface water and deep seawater to generate electricity. OTEC requires pumping a large amount of deep seawater, which is clean, cold and rich in nutrients. If the used OTEC seawater, i.e. a mixture of warm and cold seawater, is released to the sea surface, how are the possible influences on the local and global climate at different spatial and temporal scales ? (20)

試題隨卷繳回