UNIVERSITI SAINS MALAYSIA

First Semester Examination
Academic Session 2008/2009

November 2008

ZGE 360/3 – Synoptic Meteorology
[Meteorologi Sinoptik]

Duration : 3 hours
[Masa : 3 jam]

Please ensure that this examination paper contains **FOUR** printed pages before you begin the examination.

[Sila pastikan bahawa kertas peperiksaan ini mengandungi EMPAT muka surat yang bercetak sebelum anda memulakan peperiksaan ini.]

Instruction: Answer **ALL FOUR (4)** questions. Students are allowed to answer all questions in Bahasa Malaysia or in English.

[Arahan: Jawab SEMUA EMPAT (4) soalan. Pelajar dibenarkan menjawab semua soalan sama ada dalam Bahasa Malaysia atau Bahasa Inggeris.]

1. (a) What are the meteorological elements that is usually measured at any meteorological ground station and write the physical meaning for each code plotted?.

    [Apakah elemen-elemen meteorologi yang biasa diambil di stesen meteorologi bumi dan tuliskan makna fizikal bagi setiap kod yang diplotkan]

    (50/100)

    (b) Based on the convergence and divergence concept, with the help of the mathematical expression, discuss the synoptic air mass flow pattern between the upper and the lower earth free atmosphere.

    [Berdasarkan kepada konsep penumpuan dan pencapahan, dengan berbantukan perihal matematik, bincangkan corak pengaliran jisim udara di antara permukaan atas dan permukaan bawah atmosfera bumi bebas]

    (50/100)

2. (a) Explain the process of the frontal system life-cycle. This also include explaining the cross-sectional structure of the system.

    [Perjelaskan proses pembentukan putaran-hayat sistem hadapan. Ini meliputi penjelasan struktur keratin rentas sistem berkenaan.]

    (50/100)

    (b) Write the structure of the air mass flow that is involved in the low and high pressure movement for the next six hours as illustrated in figure 1.

    [Tuliskan struktur pengaliran jisim udara yang terlibat dengan pergerakan udara bertekanan rendah dan bertekanan tinggi untuk enam jam kemudian sebagai yang tertera di rajah 1.]

    (50/100)

3. (a) Based on the hydrostatic equation where p = ρgh, derive the slope (Q) of the frontal system across the atmosphere. (where p = pressure, ρ = density, g = gravity and h = high.)

   [Berasaskan persamaan hidrostatik dimana p =ρgh, terbitkan kecerunan (Q) sistem hadapan sepanjang ruang atmosfera, (dimana p = tekanan, ρ = ketumpatan, g = graviti dan h = ketinggian)]

   (50/100)

   (b) Discuss the following topics of the non-frontal system.
   [Bincangkan topik-topik berikut bagi sistem bukan hadapan]

   i. Heat Low
   [Haba Rendah]

   (20/100)

   ii. Polar Low
   [Khutub Rendah]

   (10/100)

   iii. Orographic Low
   [Orografik Rendah]

   (20/100

4. Malaysia aims to be the develop country in the year 2020. Discuss the importance of the synoptic information in various field (choose only four field) related to the world weather system.
   [Malaysia akan menjadi Negara maju pada tahun 2020. Bincangkan kepentingan maklumat sinoptik di dalam berbagai bidang (pilih hanya empat bidang)]
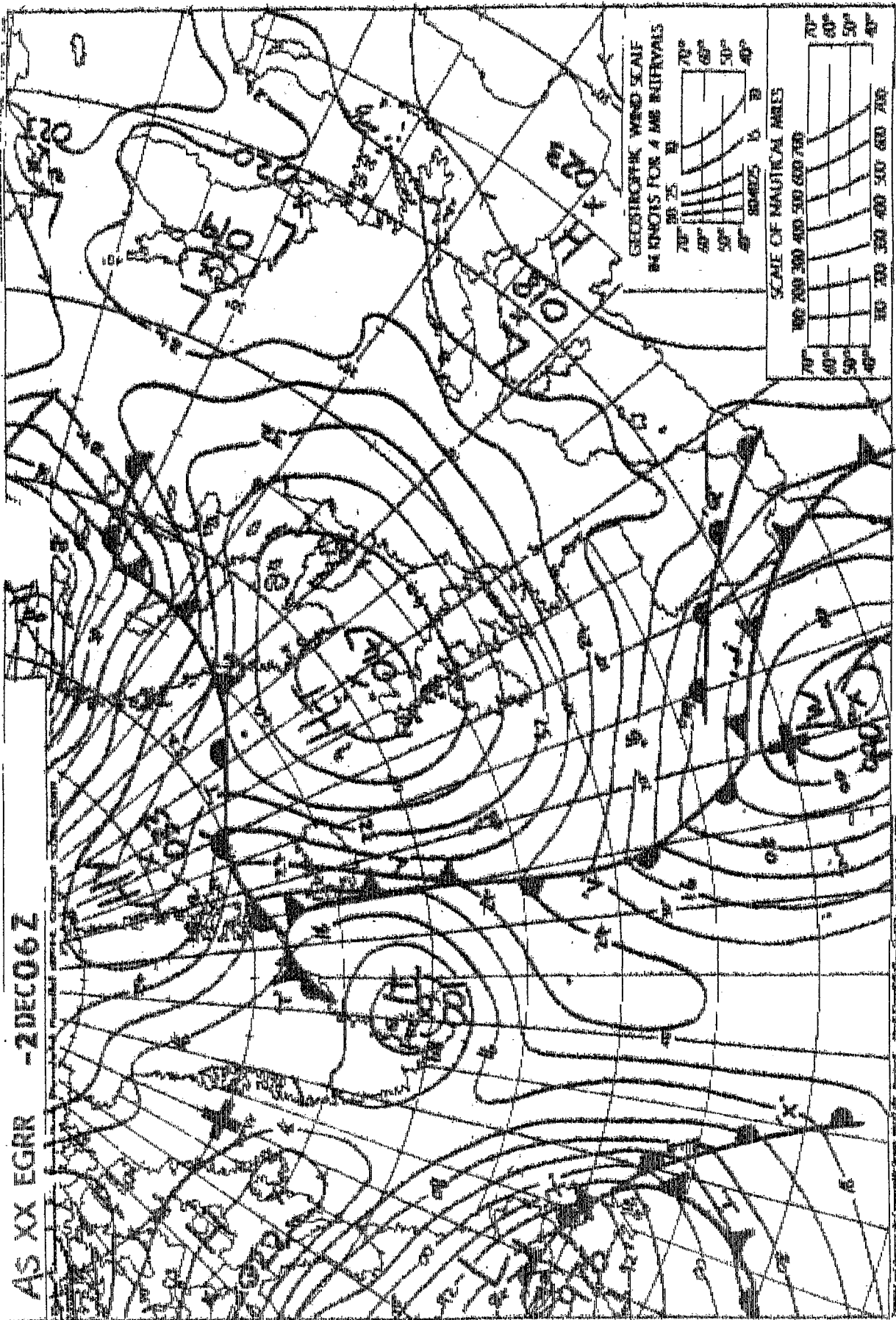
   (100/100)

Figure 1 [Rajah 1]