SOUTH EASTERN KENYA UNIVERSITY

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN HYDROLOGY AND WATER RESOURCE MANAGEMENT

WRM 207: CLIMATOLOGY

**DATE:**   **TIME:**

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INSTRUCTIONS
Answer <u>ALL</u> Questions in Section A and ONLY THREE Questions from Section B

<u>SECTION A</u>: Answer all Questions in this Section   40 Marks

1. Explain the meaning of the following terms   **10 Marks**
    a. Climate
    b. Coriolis force
    c. Atmospheric window
    d. Mean heat balance
    e. Jet stream
2. Discuss sun's energy from its origin to the top of earth's atmosphere   **10 Marks**
3. The line below represents a front.   **10 Marks**
   a) Indicate the position of the cold and warm air masses
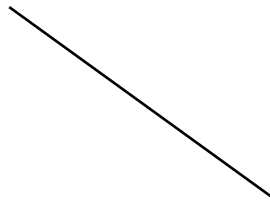
    b) If the line represents a cold front, show how it would appear on a weather chart and with an arrow indicate its direction of motion.
    c) Identify the weather feature that would first signal to you that a cold front was approaching?
4. Differentiate colour temperature from effective temperature of the sun. Explain why the two are different   **10 Marks**

<u>SECTION B</u>: Answer only THREE Questions from this Section   **60 Marks**

5. a) With the help of a diagram, describe the fate of solar radiation in the atmosphere   **14 Marks**
    b) How is the energy absorbed at the earth's surface utilized?   **6 Marks**

6. Describe, with the help of a diagram where necessary:
    a) The greenhouse effect, clearly highlighting its consequences   **16 Marks**
    b) The likely effects of El Nino in Kenya   **4 Marks**

7. Briefly discuss the following:
   a) Monsoon circulation   10 Marks
   b) Air mass source regions   10 Marks

8. a) Identify the instruments and units of measurement for the following parameters
      i)   Diffuse radiation   4 Marks
      ii)   Wind direction   4 Marks

   b)   Describe how the following parameters are measured
      i)   Maximum Temperature   4 Marks
      ii)   Evaporation on a rainy day   4 Marks

   c) Given the sunshine card below, determine the sunshine for the day 4 Marks
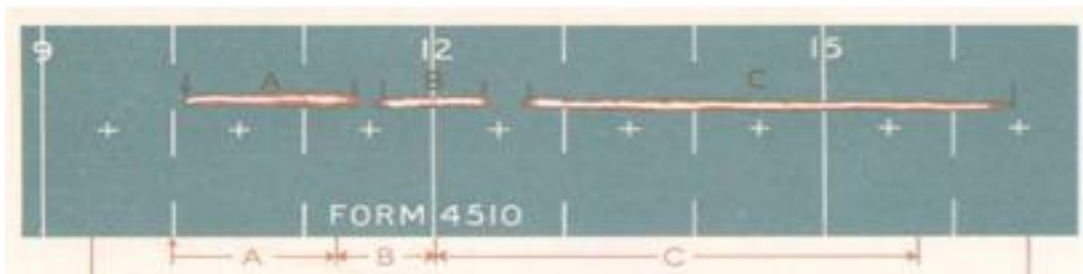
9. a) A water catchment area has information as provided in the table
      below. Use the Thiessen method to compute its weighted rainfall.
                                                             12 Marks

Rain gauge	Area represented by rain gauge Polygon (km^2)	Rainfall (mm)
a	87	550
b	163	635
c	167	600
d	151	649
e	236	625
f	221	655
g	122	510
h	41	500
i	173	690

   b) Why do we sometimes have missing rainfall data?   4 Marks
   c) Under what circumstances would a weather station be required to have a new
      identification number?   4 Marks