# SOUTH EASTERN KENYA UNIVERSITY

## UNIVERSITY EXAMINATIONS 2014/2015

**SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN DRYLAND AGRICULTURE**

**DAS 207: WEATHER AND AGROCLIMATOLOGY**

**DATE: 13TH APRIL 2015** **TIME: 2 HOURS**

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**INSTRUCTIONS**
**Answer ALL Questions in Section A and ONLY THREE Question from Section B**

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**SECTION A: Answer all Questions in this Section** 40 Marks

1. Explain the meaning of the following terms 10 Marks
   a. Agroclimatology
   b. Relative humidity
   c. Emissivity
   d. Lapse rate
   e. Vigra
2. a) Differentiate solar radiation from terrestrial radiation 4 Marks
   b) Identify two processes by which rainfall is formed. Clearly explain the differences 6 Marks
3. a) Describe how you would measure evapotranspiration of a maize crop 6 Marks
   b) Highlight the significance of evapotranspiration in the growth of a crop 4 Marks
4. Describe what happens to sun's energy from the time it reaches the top of the atmosphere to the time it reaches the earth 10 Marks

**SECTION B: Answer any three (3) Questions in this Section**

5. With the help of a diagram, describe how radiation, temperature and relative humidity in the course of a day. Explain the trends in the curves. 20 Marks
6. a) Discuss the importance of the following climatic factors in agricultural production
   i) Radiation 3 Marks
   ii) Temperature 3 Marks
   iii) Relative humidity 3 Marks
   b) Describe the relationship between solar radiation and seasonal rainfall in Kenya. 11 Marks

a) Discuss the development of the Asian monsoon in summer and winter 14 Marks

ii) Identify three factors that contribute to the intensity of the Asian monsoon 6 Marks

7. A weatherman made observations as shown in the table below on day 1 and day 2 at 9 am:

| Sno | Parameter | Observation day I | Observation day 2 |
|---|---|---|---|
| 1 | Rainfall | 14 mm | 19 mm |
| 2 | Maximum temperature | 31°C | 33°C |
| 3 | Minimum temperature | 15°C | 17°C |
| 4 | Dry bulb Temperature | 29°C | 31°C |
| 4 | Wet bulb temperature | 21°C | 22°C |
| 6 | Evaporation | 15 cups removed from the pan | 10 cups added to the pan |
| 6 | Wind run (reading of anemometer) | 113 km | 225 km |
| 7 | Wind direction | 90° | 225° |

a. Using the information in the table above, compute:

i. Temperature range for day 1 2 Marks

ii. Wind speed between the two days 2 Marks

iii. Relative humidity for day 1 (relevant table is attached) 3 Marks

b. In which day was the atmosphere drier? Give reason your 3 Marks

c. Given 1cup=0.5 mm, calculate evaporation for day 2 6 Marks

d. Give the wind direction in campus points for both days 4 Marks

8. a) Identify three source regions for airmasses 6 Marks

b) An airmass is designated as mPk

i) Identify the airmass 4 Marks

ii) Briefly discuss its likely origin and characteristics 8 Marks

iii) How would be its temperature to a person on the ground 2 Marks

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......Relative Humidity Table.......
Dry Bulb
Temperature ........Wet Bulb reads °C lower than Dry
Bulb
°C      1  2  3  4  5  6  7  8  9  10 12 14 16 18 20
 2 >>>> 84 68 52 37 22 8
 4 >>>> 85 70 56 42 29 26 3
 6 >>>> 86 73 60 47 34 22 11
 8 >>>> 87 75 63 51 39 28 18 7
10 >>>> 88 76 65 54 44 33 23 14 4
12 >>>> 89 78 67 57 47 38 29 20 11 3
14 >>>> 89 79 69 60 51 42 33 25 17 9
16 >>>> 90 80 71 62 54 45 37 29 22 14
18 >>>> 91 81 73 64 56 48 41 33 26 19 6
20 >>>> 91 82 74 66 58 51 44 37 30 24 11
22 >>>> 91 83 75 68 60 53 46 40 34 27 16 5
24 >>>> 92 84 76 69 62 55 49 43 37 31 20 9
26 >>>> 92 85 77 70 64 57 51 45 39 34 23 14 4
28 >>>> 92 85 78 72 65 59 53 47 42 37 26 17 8
30 >>>> 93 86 79 73 67 61 55 49 44 39 29 20 12 4
32 >>>> 93 86 80 74 68 62 56 51 46 41 32 23 15 8  1
34 >>>> 93 87 81 75 69 63 58 53 48 43 34 26 18 11 5
36 >>>> 93 87 81 75 70 64 59 54 50 45 36 28 21 14 8
38 >>>> 94 88 82 76 71 65 60 56 51 47 38 31 23 17 11
40 >>>> 94 88 82 77 72 66 62 57 52 48 40 33 26 19 13
42 >>>> 94 88 83 77 72 67 63 58 54 50 42 34 28 21 16
44 >>>> 94 89 82 78 73 68 64 59 55 51 43 36 29 23 18
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