UNIVERSITY OF RUHUNA

Faculty of Engineering

End-Semester 4 Examination in Engineering: September 2023

Module Number: MN4210 **Module Name: Meteorology**

[Three Hours]

[Answer **Five** questions, each question carries **20** marks]

Q1 (a) What is Meteorology and explain the importance of meteorology for mariners.

[06 Marks]

(b) Write short notes on following;

i) Relative humidity

ii) Insolation

iii) Mist

iv) Tropical Revolving Storm

[08 Marks]

(c) With the help of sketch describe the term Backing and Veering.

[06 Marks]

Q2 (a) What is atmosphere and describe the layers of atmosphere.

[07 Marks]

(b) Describe the Green House Effect.

[07 Marks]

(c) List out the major adverse effects of greenhouse effect

[06 Marks]

Q3 (a) Specify how the clouds are grouped.

[05 Marks]

(b) List out Meteorological instruments with relevant applications.

[05 Marks]

(c) From a vessel on a course of 243° at 12 knots, the apparent wind was observed to be 120° at 15 knots. Find the direction and speed of the true wind.

Note: All intermediate steps taken in reaching your answer should be clearly shown in a diagram.

[10 Marks]

Q4 (a) What is visibility and how it can be reduced?

[05 Marks]

(b) What are the types of fog? Explain briefly.

[05 Marks]

(c) A vessel is streaming 267° at 14 knots through a true wind blowing from SE at 11 knots. Find the direction and speed of the apparent wind experienced.

Note: All intermediate steps taken in reaching your answer should be clearly shown in a diagram.

[10 Marks]

Q5 (a) Describe Buys and Ballots law.

[07 Marks]

(b) What is meant by Beaurtfort Scale.

[07 Marks]

(c) Elaborate the forces that determine the strength and direction of wind

[06 Marks]

Q6 (a) Explain what is hydrological cycle and its stages.

[07 Marks]

(b) What are the four main types of clouds classified according to their appearance?

[07 Marks]

(c) Find the relative humidity when the dry bulb temperature is 28 °C and wet bulb temperature is 24 °C.

Note: Figure Q6 (c) can be used for this question.

[06 Marks]

Relative Humidity (%)

Dry-Bulb Temperature (°C)	Difference Between Wet-Bulb and Dry-Bulb Temperatures (°C)															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
-20	100	28														
-18	100	40														
-16	100	48														
-14	100	55	11													
-12	100	61	23													
-10	100	66	33													
-8	100	71	41	13												
-6	100	73	48	20												
-4	100	77	54	32	11											
-2	100	79	58	37	20	1										
0	100	81	63	45	28	11										
2	100	83	67	51	36	20	6									
4	100	85	70	56	42	27	14									
6	100	86	72	59	46	35	22	10								
8	100	87	74	62	51	39	28	17	6							
10	100	88	76	65	54	43	33	24	13	4						
12	100	88	78	67	57	48	38	28	19	10	2					
14	100	89	79	69	60	50	41	33	25	16	8	1				
16	100	90	80	71	62	54	45	37	29	21	14	7	1			
18	100	91	81	72	64	56	48	40	33	26	19	12	6			
20	100	91	82	74	66	58	51	44	36	30	23	17	11	5		
22	100	92	83	75	68	60	53	46	40	33	27	21	15	10	4	
24	100	92	84	76	69	62	55	49	42	36	30	25	20	14	9	4
26	100	92	85	77	70	64	57	51	45	39	34	28	23	18	13	9
28	100	93	86	78	71	65	59	53	47	42	36	31	26	21	17	12
30	100	93	86	79	72	66	61	55	49	44	39	34	29	25	20	16

Figure Q6 (c)