

**2017****M.Sc. 4th Semester Examination****APPLIED MATHEMATICS WITH OCEANOLOGY AND  
COMPUTER PROGRAMMING****PAPER—MTM-405 (Unit-II : OM)****(Practical)***Full Marks : 25**Time : 1 Hour**The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.**Illustrate the answers wherever necessary.***Special Paper : (Dynamical Meteorology-II)****Answer any one question from each group.****Group-A**

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1. Calculate the saturation vapor pressure near the science building by taking a set of 5 data.

*(Turn Over)*

2. Find the dew point temperature on measuring of dry bulb and wet bulb temperature near the science building taking a set of 5 data.
3. Find the mixing ratio of the air near the science building by measuring of wet and dry bulb temperatures taking a set of 5 data.
4. Find the relative humidity near the science building with a set of 5 data.
5. Calculate the wind speed and wind direction near the science building by taking a set of 5 data.
6. Calculate the vapor pressure near the science building with a set of 5 data.

**Group-B**

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7. Initially at 100 kPa air pressure has temperature  $40^{\circ}\text{C}$  and dew point temperature  $20^{\circ}\text{C}$ . It rises to a height where the pressure is 50 kPa. Precipitation reduces the total water by 5 g/kg and the parcel radiatively cools down by  $11^{\circ}\text{C}$  at the cloud top. Finally the parcel descends back to 199 kPa. What is the final relative humidity? (Using Thermo diagram)
8. Initially an air parcel is at 80 kPa pressure level where its temperature is  $20^{\circ}\text{C}$ , mixing ratio to be 4 g/kg. This

parcel ascends adiabatically. (i) At what height is the LCL and what is the state of the air parcel at this height? (ii) What is the state of the air when it reaches to a height of a pressure to a height of 40 kPa? (iii) How much liquid water has been condensed out at that final height? (Using Thermo diagram)

9. (a) An air parcel has initial temperature  $-25^{\circ}\text{C}$  and mixing ratio 4g/kg at the cloud top where pressure is 40 kPa. What is the new state of the air in cloud top after IR radiation has cooled down the air to  $-40^{\circ}\text{C}$ ? Also find the liquid water mixing ratio. (Using Thermo diagram)

(b) Demonstrate rainfall measurement.

10. (a) An air parcel initially is at 80 kPa pressure level where its temperature is  $20^{\circ}\text{C}$ , mixing ratio to be 4 g/kg. This parcel ascends dry adiabatically. What is the new state of the air after being lifted to 60 kPa?

(b) Plot the following soundings on Tephigram

Pressure (kPa)	$T_d$ ( $^{\circ}\text{C}$ )	$T$ ( $^{\circ}\text{C}$ )
40	-40	-20
50	-30	-10
60	-5	-5
70	0	0
80	-5	10
90	9	10
99	9	19
100	11	25

Field Work 5

Note Book + Viva 5

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