2021

Applied Mathematics with Oceanology and Computer Programming

[P.G.]

(CBCS)

(M.Sc. Third Semester End Examinations-2021)

MTM – 306 A

Full Marks: 50 ***Time: 02 Hrs***

The figures in the right hand margin indicate marks
Candidates are required to give their answers in their own words as far as practicable
Illustrate the answers wherever necessary

[DYNAMICAL METEOROLOGY - I]

1. Answer any FOUR questions. 2x4=8

a) Define dew-point temperature.

b) Calculate the work done when an ideal gas expands isothermally at 27^0C from a initial pressure 1000 kilo Pascal to the final pressure 100 kilo Pascal.

c) Show that the adiabatic process is more steeper than the isothermal process.

d) An air parcel that has a temperature 20^0C at 1000 mb level is lifted dry adiabatically. What is its density when it reaches at 500 mblevel ?

e) The surface pressure decreases by 0.3 kPa per 180 km in the eastward direction. A ship steaming eastward at 10 km/hr measures a pressure fall of 0.1 kPa per her. What is the pressure change. On an island that the slip is passing away ?

f) What is 'auto convective lapse rate' ?

2. Answer any FOUR questions. 4x8=32

a) Discuss the fundamental forces which have the role to creak the air motion in the atmosphere. 8

b) Derive the thermodynamic equation of a moist air parcel.

c) i) Derive the state of moist air in the atmosphere. 8

ii) Find the relation between the specific humidity and mixing ratio. 6+2

d) Derive the equation of motion of an air parcel is the atmosphere in spherical Co-ordinate system. 8

e) i) State the difference between absolute and relative vorticity.

ii) Discuss the vorticity in terms of natural co-ordinates horizontally. 3+5

f) Show that the sum of K. E., P. E and enthalpy of an air parcel in the atmosphere remains constant when the flow is steady, adiabatic and frictionless.

[Internal Marks – 10]