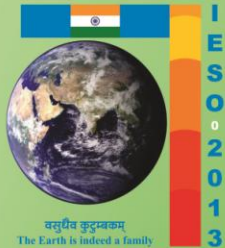






7th INTERNATIONAL EARTH SCIENCE OLYMPIAD




HYDROSPHERE 

+

ATMOSPHERE 

PRACTICAL TEST



Student's Name and Code:



Instructions:

1. Please write your name and nationality in English on the cover page.
2. The time allocated for this examination is 30 minutes.
3. Please write your answer legibly, illegible answer will be counted as incorrect.
4. Please write your answer only on this test booklet.
5. You may respond to questions in English.
6. Read the entire question carefully before starting to answer. Marks for each question are indicated on the right.
7. Any inappropriate examination behavior will result in disqualification.



Two sets of data pertaining to profiles of temperature, salinity and (density-1000) from two locations on from the north Indian Ocean are given below. Draw the vertical distribution of temperature and salinity. Use **one graph sheet each** to draw the Data SET-1 and Data SET-2 and answer the following questions.

Data – **SET-1**

Depth (m)	Temperature (°C)	Salinity (PSU) (also parts per mil)	Density-1000 (kg m ⁻³)
0	29.03	31.04	19.09
-10	28.99	31.05	19.10
-20	28.98	31.06	19.11
-30	28.96	32.56	20.35
-40	28.97	33.41	21.80
-50	28.96	34.38	22.98
-75	23.54	34.69	23.94
-90	23.21	34.73	24.56
-100	19.79	34.79	24.98
-125	17.85	34.86	25.57
-150	15.87	34.91	25.71
-200	13.43	34.99	26.30



Data – SET-2

Depth (m)	Temperature (°C)	Salinity (PSU) (also parts per mil)	Density-1000 (kg m ⁻³)
0	26.00	36.54	24.20
-10	25.98	36.53	24.20
-20	25.95	36.53	24.21
-30	25.92	36.53	24.22
-40	25.90	36.51	24.21
-50	25.89	36.52	24.22
-75	25.87	36.5	24.21
-90	23.91	36.3	24.65
-100	21.78	36.14	25.15
-125	20.33	36.03	25.46
-150	18.97	35.94	25.75
-200	17.17	35.93	26.19

Questions:

- a) Plot the vertical profiles of temperature and salinity for SET-1 & SET-2 in the two graph sheets provided. **5 marks**



b) Determine the Mixed layer depth (in m) in SET-1& SET-2? 2 marks

SET-1	
SET-2	

c) Using the plots you made and the (density-1000) values from the tables, if needed, determine the thickness of the barrier layer (in m) in SET-1& SET-2? (barrier layer refers to the depth zone within the isothermal layer where the salinity increases rapidly). Circle the correct option. 2 marks

- A. 30 m for SET-1 and 0 m for SET-2
- B. 20 m for SET-1 and 75 m for SET-2
- C. 50 m for SET-1 and 75 m for SET-2
- D. 10 m for SET-1 and 0 m for SET-2

d) What are the temperature and salinity gradients in the barrier layer for SET-1 & SET-2 data? 4 marks

- A. 0 per m in salinity for SET-1 and 0 per m in temperature for SET-2
- B. 0.09 per m in salinity for SET-1 and 0 per m in temperature for SET-2
- C. 0.09 per m in salinity for SET-2 and 0 per m in temperature for SET-1
- D. 0.09 per m in temperature for SET-1 and 0.09 per m in salinity for SET-2

e) Identify which SET pertains to the Arabian Sea (less river discharge), and which SET the Bay of Bengal (more river discharge): Write AS for Arabian Sea and BB for Bay of Bengal, in the appropriate row. 2 marks

SET-1	
SET-2	

