

Date: 16/ 1/2025

Time: 2 Hours

Mark: 90

الإمتحان في 3 صفحات

Answer the Following Questions:

Question ONE:

(22 marks)

Put ✓ or × and correct the false

- 1- The earth's rotations around its axis is a fundamental space scale for geophysical fluid dynamics.
- 2- The oblique rays cover a smaller distance in the atmosphere than the vertical rays before reaching the earth's surface.
- 3- Everywhere on earth oceans have uniform temperature decreases from the ocean surface with increasing depth.
- 4- The horse latitudes are subtropical regions known for calm winds and little precipitation.
- 5- In the regions of the Tropic of Cancer and the tropic of Capricorn, the amount of solar radiation incidents on the earth exceeds that reaching the equatorial regions.
- 6- Below 200m, change in sea temperature is significant.
- 7- Over a short period, radiant energy is unequally distributed over the Earth.
- 8- The ocean's first layer (surface layer) is always 500 m thick.
- 9- The shorter wavelengths (infra-red) are absorbed before reaching deep water.
- 10- The annual temperature range is higher in the open enclosed seas than in the enclosed sea.
- 11- The albedo values of snow and grass are different.

Question TWO:

(24 marks)

Answer the following items:

- 1- Prevailing winds, local weather and latitude are affecting the horizontal distribution of temperature, **discuss**.
- 2- The two poles of the earth have the longest days during their respective summers; the polar areas are permanently under the snow cover, **comment?**
- 3- Identify the thermocline layer then compare with a simple labeled drawing between tropical, polar, and mid-latitude.

Question THREE:

(16 marks)

Complete the missing parts:

- Bottom roughness affects mixing through reflection and breaking of(1)..... off the bottom, steering of eddies
- The sum of the changes in heat fluxes into or out of a volume of water is known as(2).....
- The variation of temperature in the southern and northern hemispheres because of(3).....
- The difference between a year's maximum and minimum temperature is called as(4).....
- Oceans are divided into two zones.(5).....

- The heat that changes a substance's temperature without changing its phase is called.....(6).....
- Water's extremely high heat capacity, latent heat of fusion, and latent heat of vaporization are all important because.....(7)...
- Heat that changes a substance's temperature without changing its phase is called.....(8).....

Question FOUR:

(28 marks)

A- Identify the following items

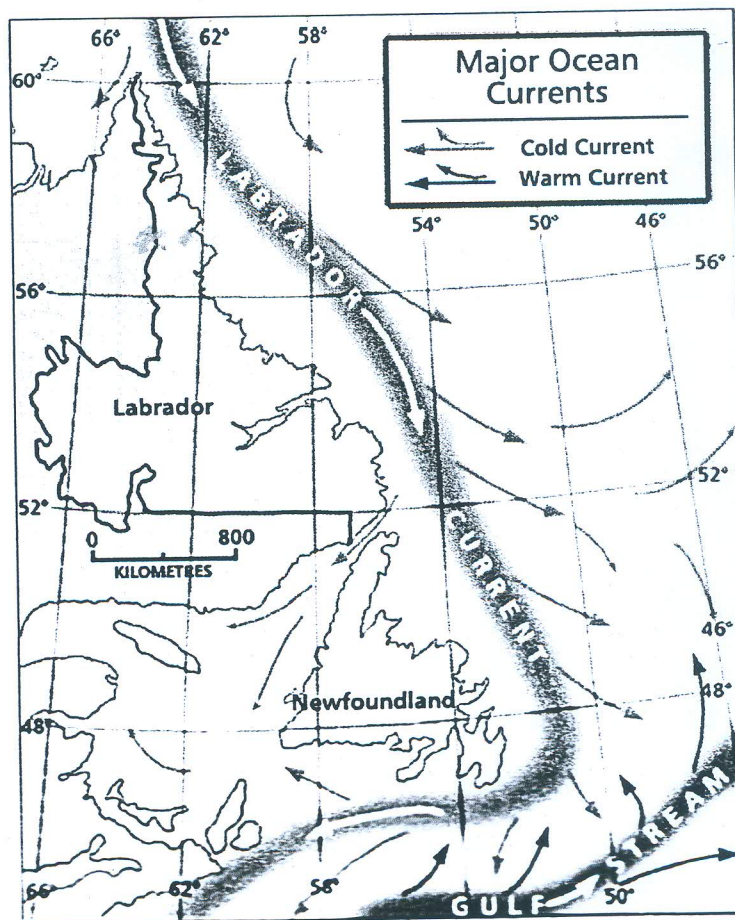
(10 marks)

1. Subtropical gyre.
2. The total incoming solar radiation or insolation.
3. The ocean's upper or mixed layer.
4. The equinox.
5. Diffuse radiation

B- Comment on the following diagrams

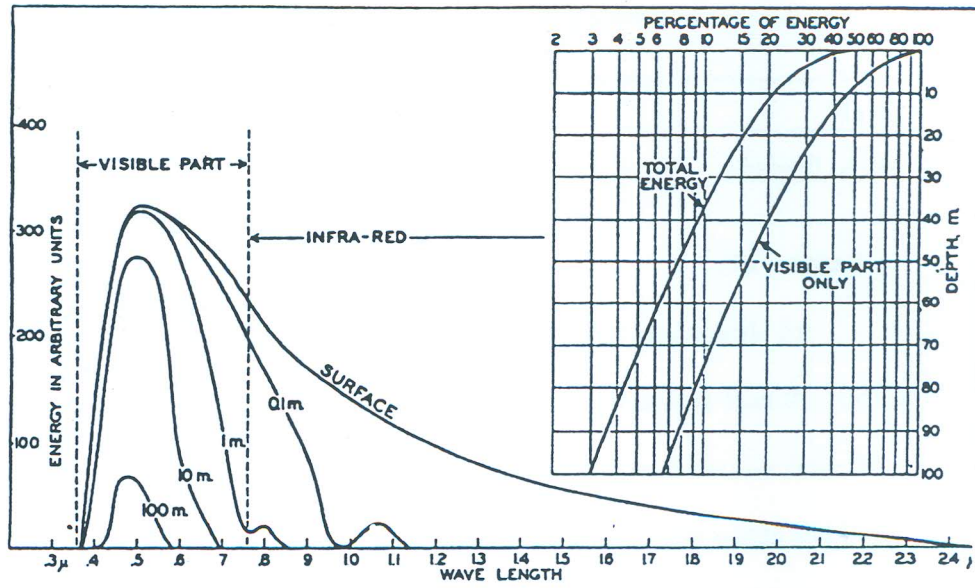
(18 marks)

- 1- The ocean currents.

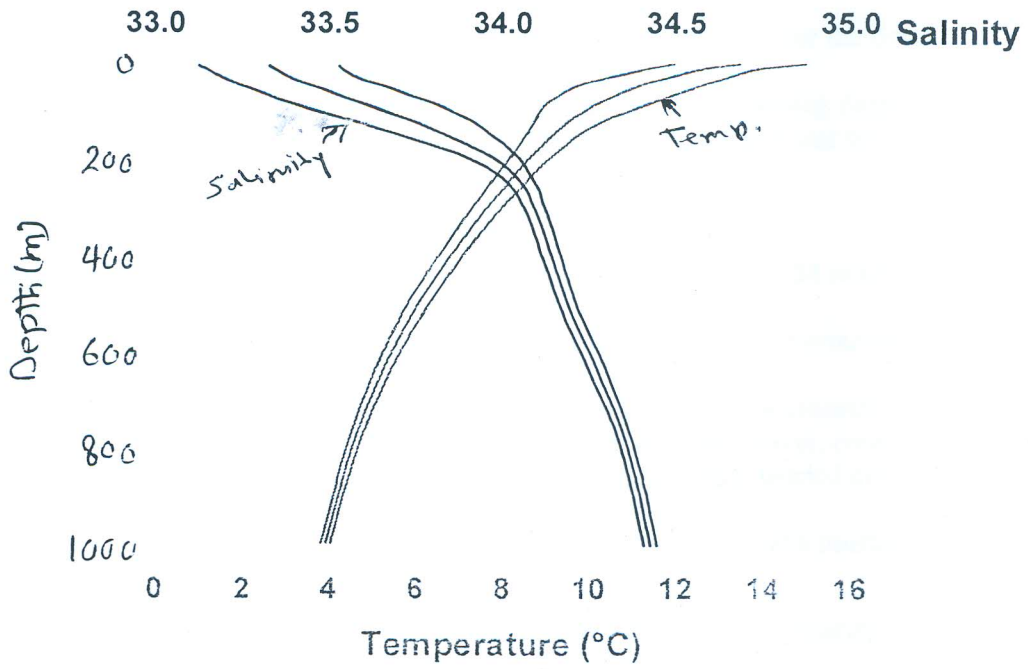


2- Light in the sea.

(5 marks)



3- Salinity and temperature profiles



With Best Wishes

Dr. Wael El Tahawy

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