Damietta University
Faculty Of Science
Zoology Department

FINAL TERM EXAM.
Jan 2026

جامعة دمياط
Damietta University

المستوي الثاني/علوم البحار البيولوجية
علوم بحار فيزيائية(201 ع ب)

Date: 18/ 1/2026 **Time: 2 Hours** **Mark: 90**

الإمتحان في 3 صفحات

Answer the Following Questions:

Question ONE: **(25 marks)**

A- **Put ✓ or × and correct the false**

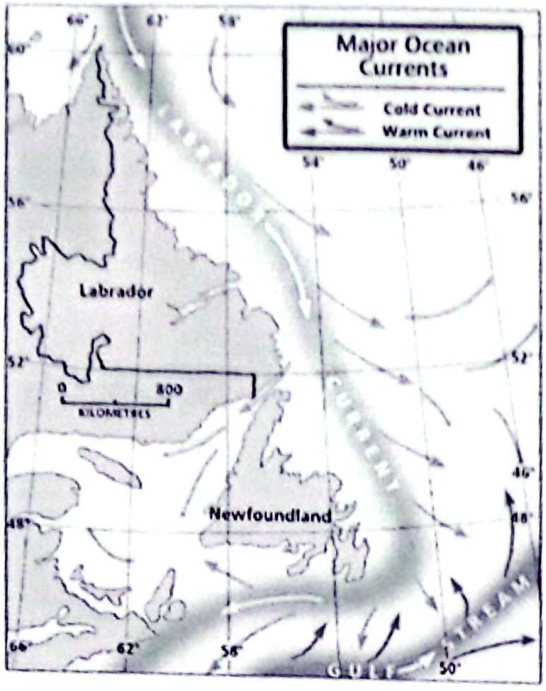
1- Physical oceanography focuses primarily on biological interactions within marine ecosystems.
2- The length of one degree of longitude decreases with increasing latitude.
3- Reflection and breaking of internal waves contribute to vertical ocean mixing.
4- Bubbles and capillary waves represent the smallest oceanic length scales.
5- The global ocean conveyor belt is driven by temperature and salinity differences
6- Surface waves typically have wavelengths of hundreds of kilometers
7- Mean oceanographic values depend on spatial and temporal averaging.
8- Mean ocean surface temperature decreases from equator to poles.
9- Vertical solar rays deliver more energy per unit area than oblique rays.
10- Polar regions receive the greatest surface heating during summer.
11- Cold currents reduce coastal sea surface temperatures in adjacent land areas.
12- Offshore winds promote upwelling of colder subsurface water.
13- Daily temperature range over oceans is smaller than over land.
14- Deep ocean temperatures are nearly uniform worldwide
15- Winter storms deepen the mixed layer at mid-latitudes.
16- Shortwave radiation is poorly absorbed by atmospheric gases.
17- Latent heat flux represents heat loss due to evaporation.
18- Sensible heat changes temperature without changing phase.
19- Ocean–atmosphere heat exchange occurs mainly at the air–sea interface.
20- Ocean heat processes play a critical role in global climate regulation.

Question TWO: **(24 marks)**

Answer the following items:

1- Prevailing winds and local weather are affecting the horizontal distribution of temperature. Discuss. (6 marks)
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? (5 marks)
3- Identify the thermocline layer, then compare with a simple labeled drawing between tropical, polar, and mid-latitude? (8 marks)

4- Comment on the following diagram? (5 marks)



Question THREE: **(21 marks)**

Complete the missing parts: .....

- Bottom roughness affects mixing through reflection and breaking of .....(1)..... off the bottom, steering of eddies
- Surface waves with very long wavelengths .....(2).....
- The variation of temperature in the southern and northern hemisphere because of .....(3).....
- With respect to temperature, there are three layers in the oceans from surface to bottom in tropics.....(4).....
- A wall made of rocks and concrete that is built outward (perpendicular) from a beach.....(5).....
- Satellites observe sea surface temperature and .....(6)..... height
- The pycnocline is related to changes in .....(7).....
- Cold currents usually originate near the .....(8).....
- Waves are mainly generated by .....(9).....
- The area with no tidal range is called an .....(10)..... point
- The thermocline is a zone of rapid .....(11).....change.
- Pressure increases with .....(12).....
- Heat from the ocean is transferred to the atmosphere by .....(13).....
- The Coriolis effect deflects motion to the right in the.....(14).....Hemisphere.

Question FOUR: **(20 marks)**

Choose the correct answer **(12 marks)**

1- More than 97% of Earth's water is stored primarily in
(glaciers) (groundwater) (oceans) (atmosphere)

2- Earth's rotation is fundamental to ocean dynamics because it defines
(density gradients) (daily time scales) (solar radiation) (evaporation)

3- The Coriolis effect arises due to
(Earth's gravity) (Earth's rotation) (solar heating) (pressure gradients)

4- Upwelling is best described as
(sinking of warm water) (horizontal flow) (rise of deep cold water) (tidal mixing)

5- Tsunamis differ from wind waves mainly because tsunamis have
(greater height offshore) (very long wavelengths) (higher frequencies) (stronger winds)

6- In oceanography, an anomaly is defined as
(an extreme event) (deviation from the mean) (measurement error) (seasonal cycle)

7- In tropical oceans, the mixed layer is present
(only in winter) (only in summer) (throughout the year) (only during storms)

8- The photic zone extends approximately to
(50 m) (100 m) (200 m) (1000 m)

9- Ocean heat budget refers to
(total ocean temperature) (balance of heat fluxes) (surface heating only) (deep ocean mixing)

10- Albedo represents the
(absorption capacity) (reflection fraction) (emission rate) (heat storage)

11- Estuaries typically show salinity that
(increases landward) (decreases seaward) (varies with mixing) (is constant)

12- Modern salinity determination is based primarily on
(evaporation) (titration) (electrical conductivity) (density)

B- Identify the following items **(8 marks)**

1. Tides
2. The ocean upper or mixed layer
3. The equinox
4. subtropical gyre

End of Questions

With Best Wishes

. Wael S. El Tahamy

Head of Department: Prof. Dr. Ola AbuSamak