Ministry of Education and Technical Education
Central Administration for General Education
Science Consultant office





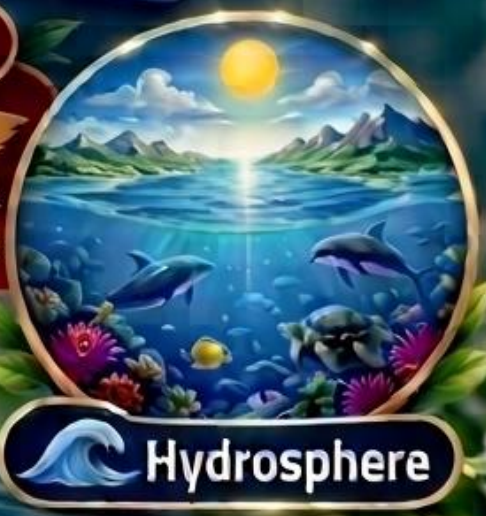
INTEGRATED SCIENCE

2026/2027

First Academic Term

1st Year of Secondary stage





Review

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Preparation

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رئيس الإدارة المركزية التعليم العام
والمشرف على مستشاري المواد الدراسية
د/ هالة عبد السلام خفاجي

مستشار العلوم
د/ عزيزة رجب خليفة

Homework

First: Choose the correct answer

1) The transitional boundary region where the stratosphere layer ends at an altitude of 50 km is called the ….. 1 mark

A) Mesopause
B) Ionosphere
C) Tropopause
D) Stratopause

2) Carbon dioxide gas CO_2) constitutes approximately 0.04% of the atmosphere's volume. What is the direct physiological and physical consequence of a significant increase in this percentage? 1 mark

A) Increased penetration of ultraviolet radiation and a decrease in Earth's temperature
B) Trapping heat and delaying its escape into space, enhancing the global warming phenomenon
C) Ionization of nitrogen atoms in the troposphere layer and the formation of the aurora
D) Increasing the escape velocity rate for all atmospheric gases

3) What is the direct biological hazard resulting from harmful ultraviolet (UV) radiation reaching the Earth's surface in the event of Ozone depletion? 1 mark

A) Stiffening of cell membranes due to unsaturated fatty acids
B) A decrease in Earth's escape velocity
C) Causing severe damage to DNA in the cells of living organisms
D) Disruption of radio waves and wireless communications

4) **When is a specific planet able to retain a particular gas on its surface and within its atmosphere?** **2 marks**

A) When the escape velocity is zero

B) When the effective speed of molecules is greater than or equal to the escape velocity ($V_{rms} \geq V_e$)

C) When temperature is completely absent

D) When the effective speed of gas molecules is less than the planet's gravitational escape velocity ($V_{rms} < V_e$)

5) **The vertical thickness range of the exosphere layer equals ……..** **2 marks**

A) 300 km **B)** 500 km

C) 700 km **D)** 1000 km

6) **The ionosphere layer combines a vital protective function and a technological function, which are ……** **2 marks**

	Protective	Technological
A)	burning meteors	providing rainwater
B)	absorbing high-risk gamma rays	reflecting radio waves for wireless communications
C)	preventing temperature drops	operating aircraft engines
D)	reducing escape velocity	producing oxygen

7) **Light photons of various spectral colors are emitted during the aurora phenomenon. Explain this diversity of colors?** **2 marks**

A) Due to the difference in the types of excited atoms and ions and the variation in their excitation energy levels upon returning to the ground state

B) As a result of light passing through spatial glass prisms

C) Due to the difference in the angle of incidence of infrared radiation

D) Due to the reflection of polar city lights

8) **The temperature increases with altitude throughout the stratosphere layer Due to ……** **2 marks**

A) the burning of meteors and meteorites coming from space

B) the reflection of radio waves in this layer

C) the presence of the aurora phenomenon in it

D) the absorption of ultraviolet (UV) radiation from solar radiation by Ozone gas (O_3)

Second: Essay Questions:

Q9: Give reasons for: The ionosphere layer is used for long-distance wireless communications across the Earth's surface? **1 mark**

Q10: Compare between the Stratosphere layer and the Mesosphere layer in terms of (Temperature behavior, stating the reason) **2 marks**

Point of comparison	Stratosphere layer	Mesosphere layer
Temperature behavior		
the reason		

Q11: Determine the factors upon which the effective speed of gas molecules (V_{rms}) depends, clarifying the relationship between them **2 marks**

Q12: Give reasons for: The stratosphere layer is considered a preferred layer for safe and stable aircraft navigation **1 mark**

Q13: Explain why: Temperatures rise in the thermosphere layer to exceed 2000 °C **2 marks**

Q14: **What are the environmental consequences for planet Earth if the mesosphere layer disappeared from the atmospheric structure?** **3 marks**

Q15: **Give reasons for: The exosphere layer is considered the ideal zone for placing satellites and spacecraft** **3 marks**

Q16: **What happens to satellites if they are placed in orbits within the troposphere or stratosphere layers instead of the exosphere?** **3 marks**

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***** End of Questions *****

Assessment

Model (A)

First: Choose the correct answer

1) **All atmospheric phenomena related to weather and climate (such as clouds, rain, and winds) occur in the troposphere. Explain why these phenomena do not extend into the stratosphere layer.** — 2 marks

A) Because the troposphere contains water vapor, most of the air mass, and density, while the tropopause acts as a separating barrier
B) Because the stratosphere is completely free of nitrogen
C) Because the temperature of the stratosphere reaches -93°C, instantly freezing all clouds
D) Due to the absence of gravity above an altitude of 10 km

2) **The lower part of the thermosphere is called the ionic layer (Ionosphere):** — 2 marks

A) Because it contains solid space iron ions
B) Because it secretes freshwater ions to Earth
C) Due to the presence of most gases in the form of electrically charged ions
D) Named in reference to the inert gas neon

3) **Hydrogen gas (H_2) is considered the lightest gas by mass. Explain its scarcity in Earth's lower atmosphere?** — 2 marks

A) Because hydrogen combines with argon to form saltwater
B) Because the ozone layer completely consumes hydrogen
C) Because Earth's gravity pulls hydrogen into the Earth's core
D) Because the small mass of the hydrogen molecule makes its effective speed very high, approaching or exceeding the escape velocity, making it easy to escape to the upper layers and space

Second: Essay Questions

Q4: Give reasons for : Temperature decreases in the troposphere layer as altitude increases above the Earth's surface **3 marks**

Q5: The Ozone layer represents an indispensable shield for protecting life and sustaining the biosphere. Explain this radiative and biological role **3 marks**

Q6: The Ozone layer in the stratosphere complements the mesosphere layer in protecting the biosphere. Explain this statement? **3 marks**

Model (B)

First: Choose the correct answer

1) **The result of horizontal air movement in the stratosphere layer is ...** **2 marks**

A) It is considered a preferred layer for aircraft navigation due to the lack of atmospheric and vertical turbulence

B) It is utilized exclusively for placing communication satellites

C) It completely prevents aircraft movement and causes them to burn

D) It leads to the horizontal formation of rain and thunder

2) **The minimum velocity at which a space rocket departing Earth must launch in order to permanently escape Earth's gravitational field equals ....** **2 marks**

A) 2.2 km/s B) 7.2 km/s

C) 11.2 km/s D) 1000 m/s

3) **Temperature rises significantly on Mercury during the day and cools very rapidly at night. Explain these massive thermal fluctuations** **2 marks**

A) Due to the eruption of nitrogen volcanoes at night only

B) Because Mercury's rotation speed equals the light speed

C) Due to the presence of vast navigable oceans on Mercury

D) Due to the absence of an atmosphere that retains thermal radiation and insulates the planet

Second: Essay Questions

Q4: Give reasons for : Biodiversity in the troposphere layer is the richest and most biologically active on planet Earth? 3 marks

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Q5: What is the relationship between the ionosphere and the aurora? Why is this layer essential for the occurrence of this phenomenon? 3 marks

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Q6: Compare between the Tropopause and the Stratopause in terms of: (Altitude and Temperature Behavior) 3 marks

Point of comparison	Tropopause	Stratopause
Altitude		
Temperature Behavior		

Model (C)

First: Choose the correct answer

1) **Which of the following statements describing the atmosphere as a dynamic system?** **2 marks**

A) Because it consists of only one layer
B) Because its components are fixed and do not change
C) Because it consists of nitrogen only
D) Because the proportions of its gases constantly change due to natural processes

2) **Thermal behavior in the troposphere and stratosphere is characterized by ....** **2 marks**

A) In the troposphere, temperature increases with altitude, while in the stratosphere, it decreases
B) In the troposphere, temperature decreases with altitude, whereas in the stratosphere, it first remains constant and then increases with altitude
C) Both are characterized by complete constancy in temperatures
D) Temperature in both reaches 2000 °C

3) **If the effective speed of a particular gas molecule on a planet is 12 km/s, and the escape velocity for this planet is 11 km/s, what is the expected fate of this gas?** **2 marks**

A) It will increase the planet's pressure by 50 atm
B) The gas will settle in the troposphere layer at a concentration of 78%
C) The gas will escape from the planet's gravity into outer space, becoming rare or non-existent on the planet
D) The gas will instantly convert into Ozone gas (O_3)

Second: Essay Questions

Q4: **Give reasons for : The troposphere layer is considered the densest layer among atmospheric layers. What is the relationship between this and atmospheric pressure?** **3 marks**

Q5: **Calculate the temperature at a passenger aircraft cruising altitude of 6000 m within the troposphere layer if the surface temperature is 20 °C.** **3 marks**

Q6: **Explain: Why do excited atoms in the ionosphere emit bright lights of different colors at the poles?** **3 marks**

***** End of Questions *****