

Question Paper 1

MALAYSIAN EARTH SCIENCE
OLYMPIAD 2023



Name :

Student ID :

- Instructions -

Do not open this booklet until you are instructed by the invigilator.

Time allowed : 1 hour 30 minutes
Languages : English

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This Question Paper contains:

- 30 multiple choice questions

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Answer the questions in the provided MCQ Answer Sheet. Choose ONLY 1(one) answer for each question:

- Write your Name and field your Student ID
- Use 2B PENCIL to shade your answers

Good Luck!



Answers all the following questions.

1. The following are planets within our solar system that have one or more natural satellites, EXCEPT?

- A. Earth
- B. Venus
- C. Mars
- D. Saturn

2. Which of the following is not true about the earthquake?

- A. An earthquake is a sudden vibration or trembling in the Earth.
- B. Earthquake motion is caused by the quick release of kinetic energy of motion into the stored potential energy.
- C. Most earthquakes are produced along faults, tectonic plate boundary zones, or along the mid-oceanic ridges.
- D. The sudden release of energy causes the seismic waves that make the ground shake.

3. What is a the characteristic of a mineral?

- A. It can be in any form of solid, liquid or gas
- B. It is inorganic
- C. It form through natural and chemical process
- D. It has specific weight with different variation of hardness

4. Which one below is the most dominant gases in the modern atmosphere?

- A. Nitrogen
- B. Helium
- C. Water Vapour
- D. Carbon Dioxide

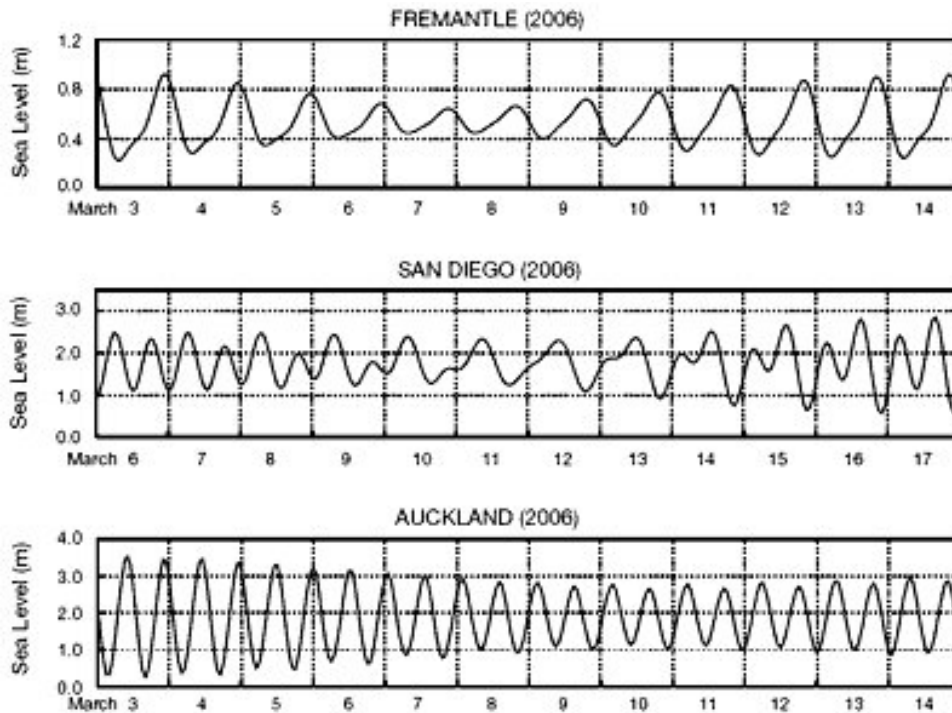


Figure Q5 : Sea level from different coast of Fremantle, San Diego and Auckland in March 2006. (Figure adopted from Andrew, (2010)).

5. The ocean forms layers because the water has different density throughout its water column. From Figure Q1, define the type of tide in sequence Fremantle, San Diego and Auckland.

- A. Semidiurnal, Mixed, Diurnal
- B. Diurnal, Mixed, Semidiurnal**
- C. Mixed, Diurnal, Semidiurnal
- D. Semidiurnal, Semidiurnal, Diurnal

6. Body waves are seismic waves that travel through the lithosphere. Two kinds of body waves exist are:

- A. P wave and S wave**
- B. P wave and Rayleigh wave
- C. S wave and Rayleigh wave
- D. S wave and Love wave

7. Which of the following is an example of a detrital sedimentary rock?

- A. Conglomerate
- B. Slate**
- C. Limestone
- D. Chalk

8. Which layer in the earth's atmosphere reflects radio waves from the Earth and helping radio communication?

- A. Thermosphere
- B. Stratosphere
- C. Troposphere
- D. Mesosphere**

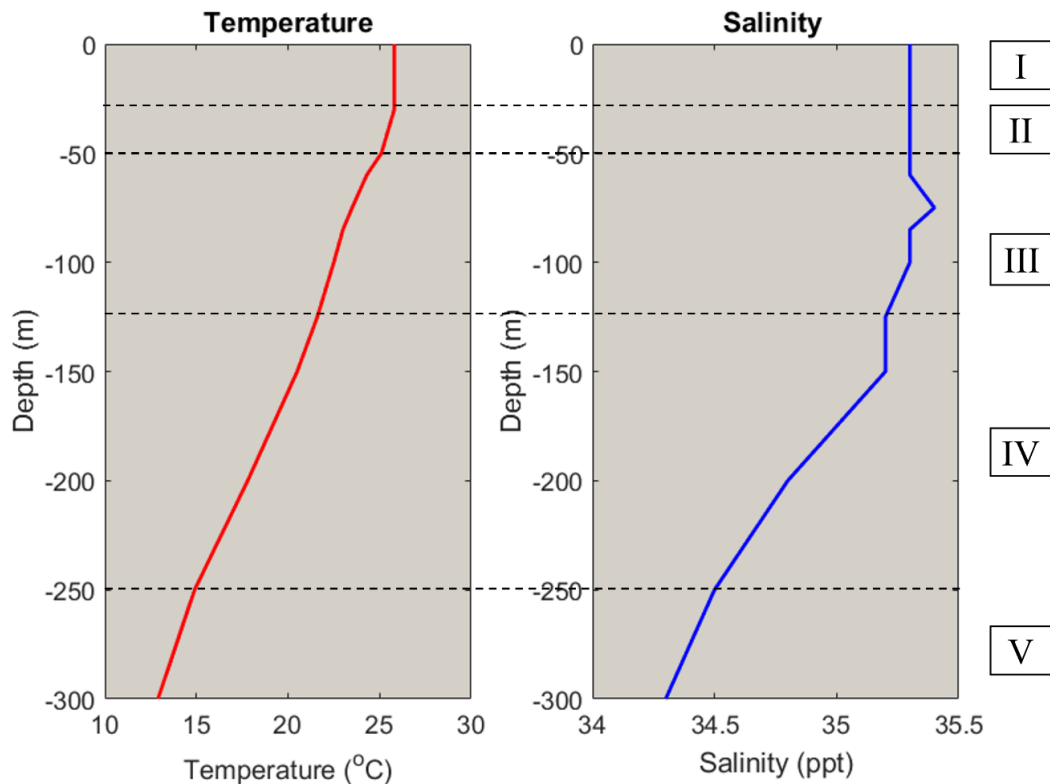


Figure Q9 : The temperature and salinity of ocean layers

9. The ocean water masses are defined from temperature or salinity differences where the ocean forms layers because of density differences. From Figure Q2, define the thermocline and halocline layer.

- A. Layer II is thermocline and Layer IV is halocline
- B. Layer III is thermocline and halocline layer
- C. Layer II is thermocline and Layer III is halocline**
- D. Layer IV is thermocline and halocline layer.

10. Which of the following show planets arrangement of increasing size?

- A. Mercury, Earth, Mars, Saturn
- B. Mercury, Venus, Mars, Saturn
- C. Mercury, Mars, Venus, Saturn**
- D. Mercury, Venus, Saturn, Uranus

11. Which plate is subducting beneath the South American Plate to form the Andes mountain range?

- A. North American
- B. African
- C. Indo-Australian
- D. Nazca

12. When warm water is poured into a glass of ice cubes, cold water is formed. Why?

- A. The slow molecular motion from warm water is added.
- B. The evaporation process occurred.
- C. The surrounding water loses energy to the ice and cools.
- D. The atomic size of ice is larger than the water.

13. The ocean currents system consists of warm and cold currents where it forms the global ocean conveyor belt. Which ocean where the high salinity water cools and sinks to ocean bottom.

- A. South Atlantic Ocean
- B. North Indian Ocean
- C. South Pacific Ocean
- D. North Atlantic Ocean

14. The day and night cycle on Earth is caused by

- A. Earth's orbit around the Sun
- B. Moon's orbit around the Earth
- C. Earth's tilted axis
- D. Earth's rotation around its axis

15. Which of the following refer to the presence of ultra-low velocity zone

- A. Transition zone
- B. Lehman discontinuity
- C. Low velocity layer
- D. D'' layer

16. The freezing point of pure water is 0 °C, which is equivalent to _____.

- A. 33°F
- B. 35°F

C. 32°F

D. 36°F

17. Phytoplankton is plant-like plankton while zooplankton is animal-like plankton. Which statement is correct about phytoplankton and zooplankton?

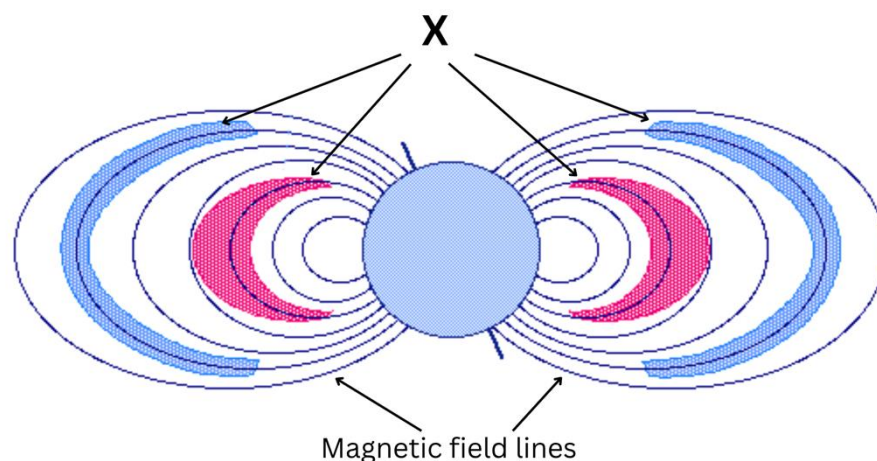
A. Phytoplankton is commonly found in the upper sunlight layer of water body while zooplankton could be found in deeper layer.

B. Protozoan and crustacean krill are examples for phytoplankton while diatom and dinoflagellate are examples of zooplankton.

C. Phytoplankton consumes oxygen while zooplankton releases oxygen.

D. Phytoplankton can be found in different colours and shapes while zooplankton is mostly in brown colour.

18. Figure Q18 below show a diagram of Earth's magnetic field.



What is X?

A. Van Gogh belt

B. Van Allen belt

C. Asteroid belt

D. Satellite belt

19. The earth's magnetic field is generated by fluid motions in this layer

A. Inner core

B. Outer core

- C. Mantle
- D. Oceanic crust

20. An anticline is

- A. An upward-arched fold with the youngest rocks exposed along the hinge line
- B. A downward-arched fold with the oldest rocks exposed along the hinge line
- C. An upward-arched fold with the oldest rocks exposed along the hinge line
- D. A downward-arched fold with the youngest rocks exposed along the hinge line

21. Which one of the following is a warm current in the Pacific Ocean?

- A. Gulf Stream
- B. Oyashio Current
- C. Kuroshio Current
- D. Agulhas Current

22. The Nebula Theory describe the formation of:

- A. The solar system
- B. The Moon
- C. Black hole
- D. The universe

23. Resistivity measures

- A. effect on current flow of charge storage in ground
- B. naturally occurring DC currents
- C. apparent resistance of ground to direct current (DC) flow
- D. apparent resistance of ground to induced alternating current (AC) flow

24. Which one of the following minerals would be the most widely found in the schist and form alternate bands in this rock?

- A. Quartz
- B. Feldspar
- C. Calcite
- D. Mica

25. Why the average temperature in July is higher in the Northern Hemisphere?

- A. The Northern Hemisphere has more landmasses and heat strike directly to the ground.
- B. The Northern Hemisphere has more oceans and store more heat.
- C. The Northern Hemisphere has high specific heat.
- D. More latent heat is transferred in the Northern Hemisphere.

- It must orbit the parent star
- It must have enough gravity to force it into a spherical shape
- It must big enough to cleared away its neighbourhood around its orbit

26. The statements above are most probably referring to:

- A. Planets
- B. Dwarf planets
- C. Natural satellites
- D. All the above

27. Sedimentary rocks exhibit the greatest range of density variation due to factors such as:

- A. Mineral composition, cementation, porosity
- B. Cementation, water seepage, pore fluid type
- C. Mineral composition, cementation, water seepage
- D. Cementation, porosity, fracture

28. What type of metamorphism is local extent and results from the rise in temperature in country rock surrounding an igneous intrusion?

- A. Regional
- B. Burial
- C. Contact
- D. Metasomatism

29. Choose the correct statement below about the temperature of an object.

- As the temperature of an object increases, it emits more electromagnetic radiation
- As the temperature of an object increases, the wavelength of the electromagnetic radiation becomes shorter

- iii. As the temperature of an object increases, the atoms and molecules moves fast
- iv. As the temperature of an object increases, the atoms and molecules changes energy slowly

- A. ii, iii and iv
- B. i, ii and iii**
- C. i, ii and iv
- D. i, iii and iv

30. The series of waves at regular intervals is called _____.

- A. Wave
- B. Tsunami**
- C. Current
- D. Tide

31. Magnetic field at Earth's surface depends on field generated in Earth's core, magnetic mineral content of surface materials, and _____ of surface rocks.

- A. magnetic induction
- B. induce polarization
- C. electromagnetic
- D. remnant magnetization**

32. Bowen's reaction series describes

- A. The sequence in which minerals melt in rapidly heating magma
- B. The sequence in which plutons are formed in migrating magma
- C. The sequence in which rocks are formed in average continental crust
- D. The sequence in which minerals crystallise in cooling magma**

33. Choose the correct statement below about the seasons in the Earth.

- i. Winter Solstice in the Northern Hemisphere occur in December every year
- ii. At equinox in June, every location in the Earth has 12 hours of sunlight and darkness.
- iii. Summer Solstice in the Southern Hemisphere marks the date when the South Pole face away from the Sun.
- iv. Seasons in the Earth are controlled by the tilt of Earth's rotation

- A. i and iii
- B. ii and iii

C. i and iv

D. i, ii and iv

34. Which one of the following is a cold current?

A. Norwegian Current

B. Mozambique Current

C. California Current

D. Alaska Current

35. The astronomical model in which the Earth and planets revolve around the Sun at the center of the universe is known as:

A. Geocentric model

B. Tyconic model

C. Heliocentric model

D. Runaway model

36. Which one of the following rocks could be described as pyroclastic?

A. Tuff

B. Dolerite

C. Syenite

D. Basalt

37. Choose the correct statement below.

i. Amount of insolation that reach the Earth's surface is absorbed, reflected, or scattered in the atmosphere.

ii. Insolation that reaches Earth's surface is at short wavelengths.

iii. Earth emits energy in the form of longwave radiation.

iv. The ozone depletion caused the longwave radiation to release outside the atmosphere.

A. i, ii and iv

B. i, iii and iv

C. ii, iii and iv

D. i, ii and iii

38. Malaysia is located in the _____ Ocean .

A. Indian

B. North Atlantic

C. Pacific

D. South Atlantic

39. Which of the following is TRUE about the moons of Mars:

- i. Their names are Phobos and Deimos
- ii. They are rocky and potato-shaped
- iii. Their orbits are unstable
- iv. They are captured asteroids

A. i, ii and iii

B. i, ii and iv

C. i, iii and iv

D. i, ii, iii and iv

40. What is hidden zone in seismic refraction interpretation

A. The bottom layer has lower velocity than the top layer

B. Critical refraction is occur

C. Refraction energy return to the surface

D. Travel-time curve consist of two segment

- End of Questions -