

IESO 2012 Written TEST Geosphere

Name _____ Nationality _____

Write down your answer in the separate answer sheet.

Choose ONLY one answer for every question.

All questions carry the same points

1. The existence of an inner solid core is supported by seismic signals crossing the core that have arrival _____ than (as) expected for a given seismic station.	Earlier	A
	Later	B
	Same time	C

2. Which of the following statements is most correct for transform faults?	They may have active and inactive segments	A
	They change from normal to reverse along strike	B
	They are related to mid ocean ridges	C
	A and C are correct	D

3. Isostatic models explain the presence of thick roots under most mountain chains. These roots depend on _____.	The average rock density in the mountain chain	A
	The height of the mountain chain	B
	Neither A or B	C
	Both A and B.	D

4. Polygonal patterns are found in several geological structures. Choose all polygonal patterns. a) Columnar jointing in igneous rocks b) Mud cracks c) Polygonal soils d) Recrystallization of some minerals during metamorphism	a,b	A
	b,d	B
	a,b,c	C
	a,b,c,d	D

5. Each mineral has a typical colour of its powder (streak). Choose the correct combination of mineral name and the colour of its powder.	Hematite, red; Azurite: blue; Malachite: green; Kaolin: white; Goethite: ochre (orange); Magnetite: black.	A
	Hematite, red; Azurite: blue; Malachite: green; Kaolin: ochre (orange); Goethite: white; Magnetite: black.	B
	Hematite: black; Azurite: blue; Malachite: green; Kaolin: white; Goethite: red; Magnetite: ochre (orange).	C
	Hematite, red; Azurite: blue; Malachite: green; Kaolin: ochre (orange); Goethite: black; Magnetite: white.	D

6. Stromatolites are _____:	Related to the first stages of plate tectonic development on the Earth	A
	Related to the activity of cyanobacteria (blue-green algae)	B
	Fossil marine plants indicative of warm and clear shallow waters developing during interglacial periods	C
	Related to the activity of bacteria	D

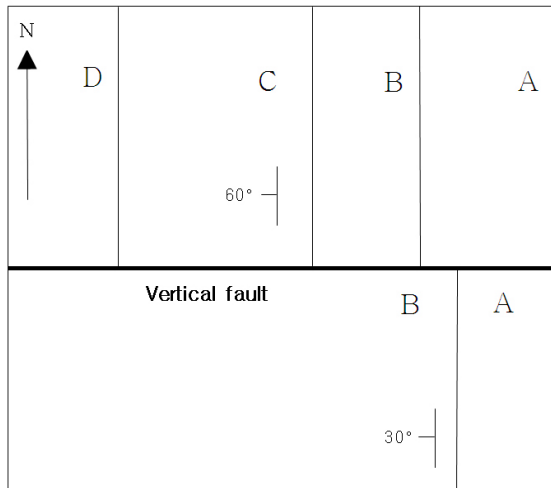
7. Gravitational acceleration is recorded at points A and B of the same elevation. Assuming a homogeneous subsurface structure and similar density, which point (A or B) will show a larger gravitational acceleration?



A

B

8. Which type of fault could have displaced the traces of contact between northern and southern blocks? Notice that the dip of the layers changes from the northern to the southern block and that you have evidence that it is not a strike slip fault.



Left-lateral strike-slip fault

A

Reverse fault

B

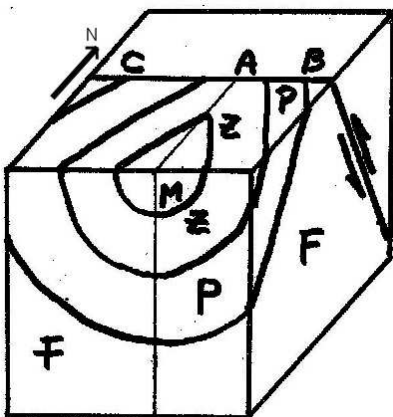
Normal fault

C

A rotational or oblique slip fault

D

9. M, Z and P are sedimentary beds that have been affected by a reverse fault. Will the boundaries between the sedimentary beds be closer or farther apart in the northern block.



Closer to each other

A

Further away


B

No change

C

Move to the left

D


<p>10. A “doodle” that celebrated the 374th anniversary of Steno appeared on January 11 of this year. Steno did a great job trying to find out how many natural processes worked. He is considered the father of Geology because he established several principles that worked as keystones for the further developments of the geological knowledge.</p> <p>The Google logo makes reference to the most famous of his principles that refers to the order of layers in a normal sedimentary sequence. Can you name the principle and whether or not exceptions to the principle could exist.</p>  <p>Reference: www.google.com/Nicolas-Steno-374th-birthday</p>	The law of Faunal Succession, no exception	A
	Law of Superposition, no exception	B
	Principle of Superposition, there are exceptions	C
	The law of Faunal Succession, there are exceptions	D


11. Crinoids are a group of:	algae	A
	bivalves	B
	corals	C
	echinoderms	D

12. A granite pluton intrudes a sedimentary succession composed of limestone and sandstone. Which kind of metamorphic rocks will be formed?	marble and quartzite	A
	schist and marble	B
	schist and gneiss	C
	quartzite and gneiss	D

13. Which of the following pairs of minerals cannot be found in the same rock type?	olivine – pyroxene	A
	olivine -quartz	B
	biotite – quartz	C
	plagioclase – pyroxene	D

<p>14. Which of the following phenomena are precursors of an impending (forthcoming) volcanic eruption?</p> <p>a) Floods</p> <p>b) Anomalous seismicity</p> <p>c) Heavy rains</p> <p>d) Increase of temperature and chemical changes in fumarolic gases</p> <p>e) Strong winds</p> <p>g) Ground uplift</p>	a,b,d	A
	b,d,g	B
	b	C
	all	D

<p>15. What is this geological phenomenon called that has occurred in a karst region?</p> 	volcanic chimney	A
	meteor impact crater	B
	rockfalls	C
	sinkhole	D

<p>16. What kind of a fault caused the displacement of this fence?</p> 	Dextral (right lateral) strike-slip fault	A
	Sinistral (left lateral) strike-slip fault	B
	oblique slip fault	C
	thrust fault	D

<p>17. Choose the sedimentary feature which DOES NOT increase with distance from the source area of sediments.</p> <p>1. grain size 2. roundness 3. quartz to feldspar ratio</p>	1	A
	2	B
	3	C
	2 and 3	D

<p>18. The precipitation of which of the following minerals is regulated by the concentration of CO₂ in the solution?</p>	halite;	A
	gypsum;	B
	apatite;	C
	calcite;	D

<p>19. In which of the following geological contexts is it more probable to find oil reservoirs?</p>	Deep ocean trench	A
	Abyssal plains	B
	Mid - oceanic ridges	C
	Passive continental margin	D

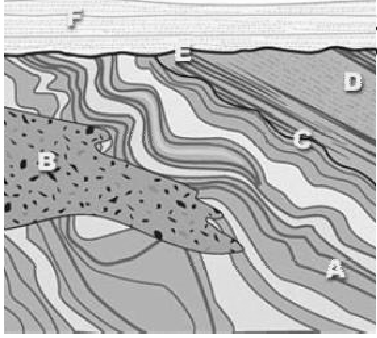
20. Comparing two materials with different viscosities, the one with the higher viscosity....:	flows easier	A
	is harder to deform	B
	is easier to deform	C
	is less sticky	D

21. Which of the following provide evidence of plate tectonic activity?	the rotation of Earth	A
	the presence of mid-ocean ridge	B
	the presence of impact crater	C
	the presence of erosion	D

22. The photo below displays cross-bedding. Where is the youngest strata shown on this vertical outcrop?	top	A
	bottom	B
	top right	C
	bottom left	D

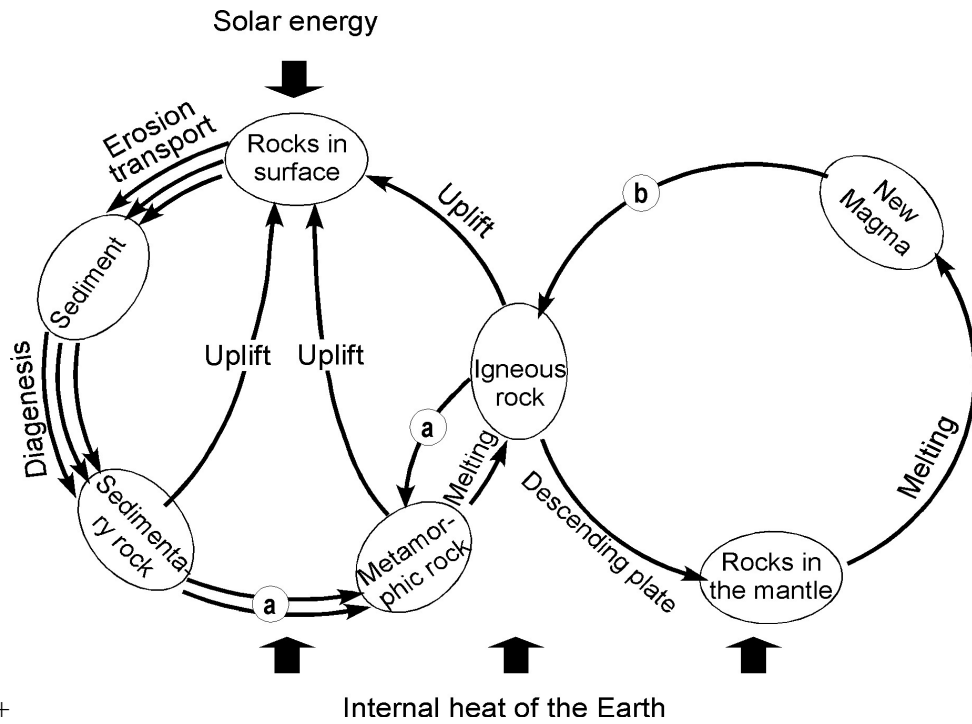


23. There are three rocks A, B, and C. Two of them are basalt and limestone. If the formation temperature T of the three rocks are $T_A > T_B > T_C$, which statement is correct?	A is limestone	A
	B is schist	B
	B is evaporite	C
	C is basalt	D

	24. Which of the geological features can not be determined in this geological section for its relative age sequence? There is no overturning of beds.	A
		B
		C
		D
		E
		F

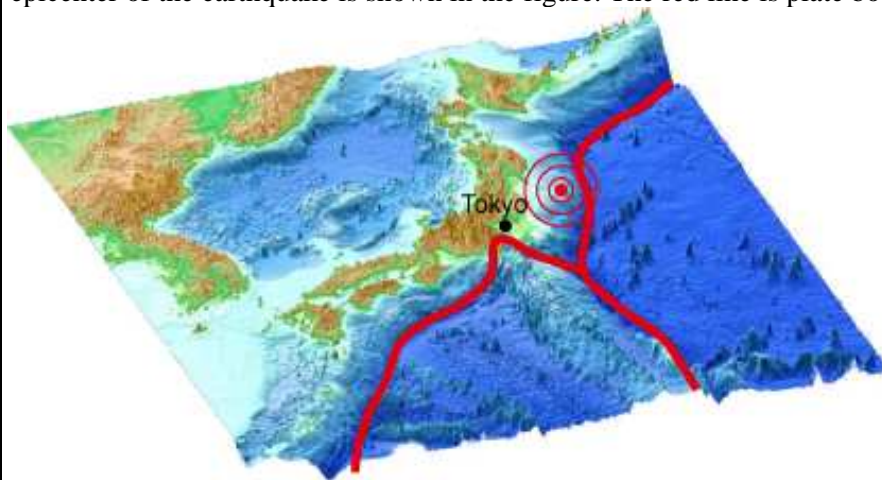
25. Choose ALL sedimentary structures useful in paleocurrent analysis. 1. graded bedding, 2. cross bedding, 3. desiccation cracks, 4. ripple marks	1,2	A
	1,3	B
	3,4	C
	2,4	D

This is a schematic diagram showing rock cycle in lithosphere. Rocks at the Earth's surface change due to various geological processes.



26. What is the name of the process represented by (a) in the diagram above?	solidification	A
	metamorphism	B
	transport	C
	earthquake	D

A great earthquake M 9.0 occurred off the Pacific of Tohoku in Japan on March 11, 2011. The epicenter of the earthquake is shown in the figure. The red line is plate boundary.



Divergent-normal	A
Convergent-strik slip	B

	Convergent-reverse	C
	Convergent-normal	D

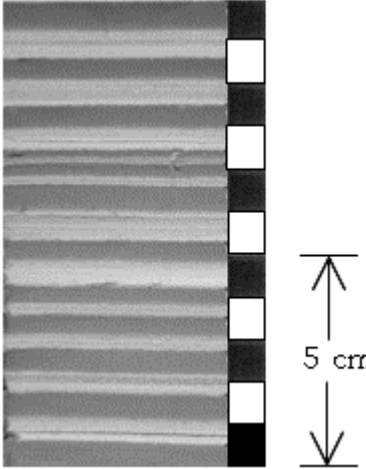
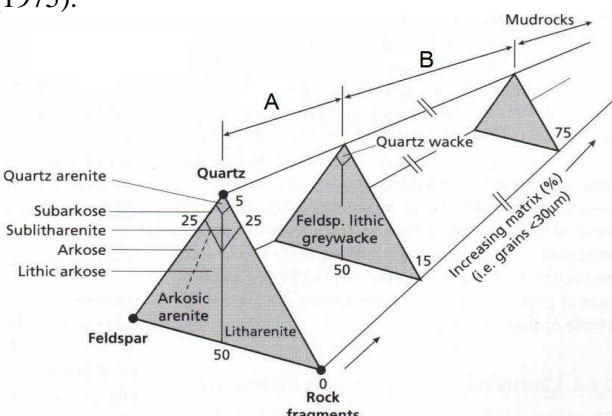
	The following diagram shows a sedimentary sequence obtained from a lake. Answer the questions.		
	28. Explain the formation of light and dark layers in terms of water circulation.	a,b	A
	a) The light layer was deposited during the time of good water circulation and organic matter was oxidized	a,c	B
	b) The dark layer was deposited during the time of good water circulation and organic matter was oxidized	b,d	C
	c) The dark layer was deposited during the time of poor water circulation and organic matter was not oxidized.	c,d	D
d) The light layer was deposited during the time of poor water circulation and organic matter was not oxidized.			
30. Which layer(s) do you think show coarse grains? (1.pts)	Light layer	A	
	Dark layer	B	
	Both	C	
	Neither	D	

Figure shows the classification of sandstones by Pettijohn (1975).	30. Show the names of rocks A and B in the figure.	Quartz arenite-mudrock	A
		Mudrock-greywacke	B
		Arenite-wacke	C
		Greywacke-quartz arenite	D

31. Earth's bulk density is 5500 kg/m^3 . It is estimated that Earth's uncompressed density (the density Earth would have if gravity were "turned off" and pressure inside the Earth were zero) is 4000 kg/m^3 . Using the actual mass of Earth ($6.0 \times 10^{24} \text{ kg}$), what would its radius have to be to give a bulk density of 4000 kg/m^3 ? (Assume this Earth is a perfect sphere.)	2500 km	A
	14200 km	B
	3050 km	C
	7100 km	D

32. How can studies of ice cores help scientists to understand and predict future climate changes?	The record of frequencies-amplitudes of cyclic climate changes can serve to predict major cycles;	A
	The physical record can be correlated with changes in atmospheric gases and aerosols;	B

	The physical record can be correlated to changes in mean ocean and atmospheric temperatures,	C
	The physical record can be correlated to changes in ocean salinity, glacial intervals, etc.	D
	All of the above answers	E