



# Geological Society of India

## INTERNATIONAL EARTH SCIENCE OLYMPIAD – Entrance Test

Date: January 23, 2011; Time: 10.30 am to 12.00 noon

Registration No.:  Name of the Invigilator: \_\_\_\_\_

Candidate's Signature: \_\_\_\_\_ Invigilator's Signature: \_\_\_\_\_

Seal of the Centre: \_\_\_\_\_

### INSTRUCTIONS

1. You have to be present in the examination hall well before the commencement of the test.
2. You will not be permitted to enter the examination hall 30 minutes after the commencement of the test.
3. You will not be permitted to leave the examination hall until after 30 minutes of commencement of the test.
4. If you have any paper/chit with you, surrender them to the invigilator now.
5. All are multiple-choice questions.
6. Please use a BLACK ball point pen to mark your answers. DO NOT use pencil.
  - Choose the MOST appropriate answer.
  - Darken the circle corresponding to the answer of your choice. An example:

Question	Answer
The shape of the Earth is _____ (A) Spherical      (B) Spheroidal (C) Ovoid          (D) Ellipsoidal	A    B    C    D <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/>

- Marks will not be awarded if more than one answer is chosen.
  - Your answer must be given only in the answer sheet (overleaf). **Answers given anywhere else will not be evaluated.**
7. Please DO NOT tear out or add any sheet from/to the question paper.
  8. Please enter your Registration No. and affix your signature on the answer sheet before starting to answer the questions.

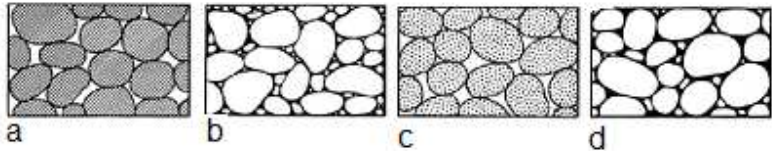
# ANSWER SHEET

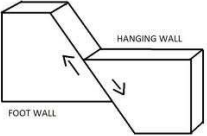
Q.No.	A	B	C	D	Q.No.	A	B	C	D	Q.No.	A	B	C	D	Q.No.	A	B	C	D
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2	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	27	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	52	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	77	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
3	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	28	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	53	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	78	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
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## Question Paper

1	In which of the following climates will chemical weathering be most rapid? a) Hot and dry b) Hot and humid c) Cold and dry d) Cold and humid
2	In caverns, water containing calcium carbonate solution drips from the ceiling, and thereby long, cylindrical, pendent concretions known as ----- are formed. a) Stalactites b) Stalagmites c) Speleothems d) Caves
3	Mineral that is commonly used in glazing porcelain is _____. a) Mica b) Feldspar c) Clay d) Quartz
4	With time, sediment particles transported by rivers become _____. a) Platy and smaller b) Rounded and smaller c) Platy and larger d) Rounded and larger
5	In which rock type do Karst topography and caves develop? a) Silicate b) Felsic c) Carbonate d) Ferric
6	This mineral is commonly known by the name "fool's gold". a) Pyrite b) Chalcopryrite c) Galena d) Bronzite
7	The most abundant element in the earth is a) Oxygen b) Magnesium c) Iron d) Silicon
8	An igneous rock which is characterized by very large crystals of minerals is called a a) Granite b) Basalt c) Pegmatite d) Obsidian
9	The epicenter of an earth describes the _____.

	<ul style="list-style-type: none"> <li>a) Place of origin of the earthquake inside the earth</li> <li>b) Point on the fault on which the earthquake occurs</li> <li>c) Point on the surface of the earth</li> <li>d) Place at which the earthquake is recorded</li> </ul>
10	<p>If an earthquake occurs at a distance of 118 km from a recording station, which wave will be recorded first?</p> <ul style="list-style-type: none"> <li>a) Raleigh wave</li> <li>b) Tertiary wave</li> <li>c) P wave</li> <li>d) S wave</li> </ul>
11	<p><i>Nautilus</i> is a</p> <ul style="list-style-type: none"> <li>a) Brachiopod</li> <li>b) Gastropod</li> <li>c) Echinoderm</li> <li>d) Cephalopod</li> </ul>
12	<p>The Indian ocean tsunami that damaged property and claimed several thousand lives was caused due to an earthquake off the</p> <ul style="list-style-type: none"> <li>a) Andaman islands</li> <li>b) Indonesian island of Sumatra</li> <li>c) Indonesian island of Java</li> <li>d) Malaysia</li> </ul>
13	<p>The rigid upper layer of the earth (known as lithosphere) rides over a mobile but viscous layer called _____.</p> <ul style="list-style-type: none"> <li>a) The core</li> <li>a) The Asthenosphere</li> <li>b) The Mesosphere</li> <li>c) The Exosphere</li> </ul>
14	<p>This mineral is popularly also known as "lodestone".</p> <ul style="list-style-type: none"> <li>a) Hematite</li> <li>b) Magnetite</li> <li>c) Pyrite</li> <li>d) Barite</li> </ul>
15	<p>A metamorphic rock which shows alternate bands of dark and light colored minerals is called</p> <ul style="list-style-type: none"> <li>a) Slate</li> <li>b) Schist</li> <li>c) Gneiss</li> <li>d) Marble</li> </ul>
16	<p>Two hundred and fifty million years ago, the land masses of the Earth were clustered into a single super-continent known as</p> <ul style="list-style-type: none"> <li>a) Tethys</li> <li>b) Gondwanaland</li> <li>c) Pangea</li> <li>d) Eurasia</li> </ul>
17	<p>A linear lowland between mountain ranges created by the action of a fault is known as</p> <ul style="list-style-type: none"> <li>a) rift valley</li> <li>b) Horst</li> </ul>

	<ul style="list-style-type: none"> <li>c) Thrust belt</li> <li>d) Subduction Zone</li> </ul>
18	<p>Most of the rocks in tropical regions are often covered by an extensive layer of a product of chemical leaching called</p> <ul style="list-style-type: none"> <li>a) Laterite</li> <li>b) Bauxite</li> <li>c) Alluvium</li> <li>d) Clays</li> </ul>
19	<p>Ancient fossils characterised by layers of calcium carbonate precipitated over bacterial filaments in shallow marine environments are called</p> <ul style="list-style-type: none"> <li>a) Lime muds</li> <li>b) Stromatolites</li> <li>c) Corallites</li> <li>d) Coprolites</li> </ul>
20	<p>What is the term that is used for the layer of loose, heterogeneous weathered material lying on top of rocky hill slopes?</p> <ul style="list-style-type: none"> <li>a) Soil</li> <li>b) Weathering profile</li> <li>c) Regolith</li> <li>d) Alluvium</li> </ul>
21	<p>Granite is essentially composed of</p> <ul style="list-style-type: none"> <li>a) Quartz and mica</li> <li>b) Quartz and feldspar</li> <li>c) Quartz and pyroxene</li> <li>d) Pyroxene and plagioclase</li> </ul>
22	<p>What are detrital sedimentary rocks with large pebbles of other rocks or minerals called?</p> <ul style="list-style-type: none"> <li>a) Arenites</li> <li>b) Conglomerates</li> <li>c) Grit</li> <li>d) Sandstone</li> </ul>
23	<p>When did dinosaurs become extinct?</p> <ul style="list-style-type: none"> <li>a) end of Cretaceous</li> <li>b) end of Permian</li> <li>c) end of Jurassic</li> <li>d) end of Holocene</li> </ul>
24	<p>Which biome is often transitional between tropical rainforests and deserts?</p> <ul style="list-style-type: none"> <li>a) Deciduous</li> <li>b) Temperate forest</li> <li>c) chaparral</li> <li>d) Savanna</li> </ul>
25	<p>In which of the following unconsolidated sediments is porosity the highest?</p> <div style="display: flex; justify-content: space-around; align-items: center;">  </div>
26	<p>Which of the following statements regarding dry lands is NOT correct?</p>

	<p>a) Dry lands are often characterized by infrequent but intense rainfall events.</p> <p>b) Coarse and sandy soil cover results in high rate of infiltration.</p> <p>c) Because of high evaporation and infiltration rates, runoff is negligible during high intensity rainfall events.</p> <p>d) Due to the absence of vegetation cover, transpiration is very low.</p>
27	<p>Identify the type of fault in the figure on the right.</p> <p>a) Normal fault</p> <p>b) Reverse fault</p> <p>c) Strike slip fault</p> <p>d) Transform fault</p>
	
28	<p>In India which is the most earthquake-prone zone?</p> <p>a) The Indian Peninsula</p> <p>b) The Indo-Gangetic Plain</p> <p>c) The Himalaya</p> <p>d) Gujarat</p>
29	<p>It is horse-shoe shaped; it is home to most active volcanoes in the world and is characterized by frequent earthquakes.</p> <p>a) Marianna's trench</p> <p>b) Java (Sunda) trench</p> <p>c) The Pacific ring of fire</p> <p>d) Peru – Chile trench</p>
30	<p>The property of a mineral to show a bright band of scattered light because of the presence of small inclusions of a different mineral is known as</p> <p>a) Luster</p> <p>b) Iridescence</p> <p>c) Asterism</p> <p>d) Chatoyancy</p>
31	<p>Fossilization needs</p> <p>a) Quick burial within sediments</p> <p>b) Quick drowning in water</p> <p>c) Quick transportation</p> <p>d) Slow burial within</p>
32	<p>What are the two important mineral constituents of limestone?</p> <p>a) calcite and aragonite</p> <p>b) calcite and gypsum</p> <p>c) calcite and dolomite</p> <p>d) aragonite and dolomite</p>
33	<p>Which of the following is NOT a tectonic plate boundary?</p> <p>a) Mid-oceanic Ridge</p> <p>b) Subduction Zone</p> <p>c) Transform fault</p> <p>d) Continental margin</p>
34	<p>What is a "downward" fold in which younger rock layers occur at the inward portion or the center of the structure called?</p> <p>a) Synform</p> <p>b) Syncline</p> <p>c) Antiform</p>



	<ul style="list-style-type: none"> <li>a) Non-detrital sedimentary formation</li> <li>b) Detrital sedimentary formation</li> <li>c) Metamorphic rocks</li> <li>d) Igneous rocks</li> </ul>
44	<p>Intense structural deformation of the earth's crust associated with plate tectonics is referred to as</p> <ul style="list-style-type: none"> <li>a) Continental drift</li> <li>b) Folding</li> <li>c) Faulting</li> <li>d) Orogeny</li> </ul>
45	<p>Are magnitude and intensity of an earthquake the same?</p> <ul style="list-style-type: none"> <li>a) Yes</li> <li>b) May be</li> <li>c) No</li> </ul>
46	<p>The most important gas responsible for the greenhouse effect is</p> <ul style="list-style-type: none"> <li>a) Carbon dioxide</li> <li>b) Methane</li> <li>c) Water vapor</li> <li>d) Nitrous oxide</li> </ul>
47	<p>The annual range of temperature over Siberia (located in the northern part of Asia in Russia) is larger than that at Mumbai because</p> <ul style="list-style-type: none"> <li>a) It is not a developing country</li> <li>b) Of Greenhouse effect</li> <li>c) It is at a higher latitude</li> <li>d) It is a larger area</li> </ul>
48	<p>Without the greenhouse effect, the surface temperature of the earth would be lower by</p> <ul style="list-style-type: none"> <li>a) 18°C.</li> <li>b) 15°C.</li> <li>c) 33°C.</li> <li>d) 255°K.</li> </ul>
49	<p>The hydrological cycle describes the transport of</p> <ul style="list-style-type: none"> <li>a) Nitrogen</li> <li>b) Carbon</li> <li>c) Water</li> <li>d) Hydrogen</li> </ul>
50	<p>The region of the ocean where temperature decreases rapidly with depth is called the</p> <ul style="list-style-type: none"> <li>a) Thermocline</li> <li>b) Pycnocline</li> <li>c) Isoline</li> <li>d) Incline</li> </ul>
51	<p>Cooling sea-water results in its sinking because</p> <ul style="list-style-type: none"> <li>a) It increases the buoyancy</li> <li>b) It increases the salinity</li> <li>c) It decreases the entropy</li> <li>d) It increases the density</li> </ul>
52	<p>The geostrophic approximation is a balance between</p> <ul style="list-style-type: none"> <li>a) Coriolis and hydrostatic forces</li> </ul>



	<ul style="list-style-type: none"> <li>b) Coriolis and pressure gradient forces</li> <li>c) Frictional and hydrostatic forces</li> <li>d) Frictional and pressure gradient forces</li> </ul>
53	<p>The El Niño impacts the Indian summer monsoon through</p> <ul style="list-style-type: none"> <li>a) Teleconnections</li> <li>b) Telekinesis</li> <li>c) Viscous effects</li> <li>d) Dipole effect</li> </ul>
54	<p>The glacial-interglacial cycles due to orbital variations are also known as</p> <ul style="list-style-type: none"> <li>a) Carnot cycles</li> <li>b) Rabinowitz cycles</li> <li>c) Milankovich cycles</li> <li>d) Solar cycles</li> </ul>
55	<p>Most tropical cyclones originate _____.</p> <ul style="list-style-type: none"> <li>a) Between 0° and 5° north and south of the equator</li> <li>b) In the centers of sub-tropical highs</li> <li>c) Between 10° and 20° north and south of equator</li> <li>d) To the west of westerly winds</li> </ul>
56	<p>The concentration of nitrogen in the Earth's atmosphere at sea level is about</p> <ul style="list-style-type: none"> <li>a) 4%</li> <li>b) 21%</li> <li>c) 78%</li> <li>d) 96%</li> </ul>
57	<p>_____ of the earth's atmosphere shields the earth from harmful ultraviolet radiation.</p> <ul style="list-style-type: none"> <li>a) Equatorial bulge</li> <li>b) Ionic layer</li> <li>c) Ozone layer</li> <li>d) Protective layer</li> </ul>
58	<p>The layer of the earth that reflects radio waves back to the earth is called the</p> <ul style="list-style-type: none"> <li>a) Ionosphere</li> <li>b) Radiation zone</li> <li>c) Aurora borealis</li> <li>d) Ozone layer</li> </ul>
59	<p>The phenomenon of polar lights (aurora) commonly occurs in the</p> <ul style="list-style-type: none"> <li>a) Stratosphere</li> <li>b) Ionosphere</li> <li>c) Troposphere</li> <li>d) Mesosphere</li> </ul>
60	<p>The atmospheric pressure at mean sea level is</p> <ul style="list-style-type: none"> <li>a) 1.03 kg/cm<sup>2</sup></li> <li>b) 10.3 kg/cm<sup>2</sup></li> <li>c) 14.7 kg/cm<sup>2</sup></li> <li>d) .017 kg/cm<sup>2</sup></li> </ul>
61	<p>The temperature is minimum</p> <ul style="list-style-type: none"> <li>a) Just after sunset</li> <li>b) Around midnight</li> <li>c) About 2:00 to 3:00 am</li> </ul>

	d) Just before sunrise
62	The portion of the atmosphere which extends from the earth's surface up to 8 miles and experiences decrease in temperature at constant rate is a) Stratosphere b) Tropopause c) Troposphere d) Mesosphere
63	A northerly wind means a _____. a) Wind coming from the north b) Wind going towards the north c) Wind in the northern hemisphere d) Wind in northern India
64	An empirical measure for describing wind speed based mainly on observed sea conditions is called the a) Beaufort scale b) Richter scale c) Fujita scale d) Storm scale
65	A strong tropical cyclone that developed in the Northern Indian Ocean Basin and caused the worst natural disaster in Burma, killing nearly 100,000 people, was named a) Katrina b) Nargis c) Sidr d) Irrawady
66	Relative to the horizon, as seen from the earth's southern hemisphere, the sun daily a) Rises in the east and sets in the west. b) Rises in the west and sets in the east. c) Moves mainly in a northward direction. d) Moves mainly in a southward direction.
67	When Venus has reached its maximum eastern elongation from the sun as viewed from the earth, it is visible in the sky a) In opposition to the sun. b) As an evening "star". c) As a morning "star". d) In conjunction with the sun.
68	In order to have a solar eclipse, you need to have a) A full moon. b) A new moon. c) The moon on or close to the ecliptic. d) (B) and (C)

69	<p>From where on the Earth will we see the North Star at the horizon?</p> <ul style="list-style-type: none"> <li>a) North pole</li> <li>b) South pole</li> <li>c) on the Equator</li> <li>d) Nowhere-- it is not possible.</li> </ul>
70	<p>We the see the same face of the Moon always, because</p> <ul style="list-style-type: none"> <li>a) The Moon does not rotate on its axis</li> <li>b) The phases of the Moon make it appear so.</li> <li>c) The rotation period of the Moon is the same as the period of revolution of Moon around the Earth</li> <li>d) Magnetic forces due to material on Earth and Moon keep them locked in the same orientation</li> </ul>
71	<p>Which planet can't be seen high in the sky at midnight?</p> <ul style="list-style-type: none"> <li>a) Venus</li> <li>b) Mars</li> <li>c) Jupiter</li> <li>d) Saturn</li> </ul>
72	<p>The river channels observed on Mars are estimated to be about 3.9 billion years old. How did astronomers arrive at this age estimate?</p> <ul style="list-style-type: none"> <li>a) By radioactive age dating of rock samples from the channels.</li> <li>b) By calculating the time it would take for that much water to evaporate on Mars.</li> <li>c) By assuming they are the same age as dry river channels on the Earth.</li> <li>d) By counting the number of craters in the now-dry channels.</li> </ul>
73	<p>Refracting telescopes always contain which of the following?</p> <ul style="list-style-type: none"> <li>a) Mirrors</li> <li>b) Lenses</li> <li>c) Film</li> <li>d) CCD</li> </ul>
74	<p>According to Kepler's Law, the cube of the mean distance of a planet from the Sun is proportional to the</p> <ul style="list-style-type: none"> <li>a) Area that is swept out</li> <li>b) Cube of the period</li> <li>c) Square of the period</li> <li>d) Fourth power of the mean distance</li> </ul>
75	<p>In our solar system which planet has a moon with a mass closest to its own?</p> <ul style="list-style-type: none"> <li>a) Earth</li> <li>b) Mars</li> <li>c) Jupiter</li> <li>d) Saturn</li> </ul>
76	<p>By what factor would the brightness of a star decrease if an observer moved from 1 to 3 light years from the star?</p> <ul style="list-style-type: none"> <li>a) 3 times</li> <li>b) 9 times</li> <li>c) 27 times</li> <li>d) 81 times</li> </ul>

77	<p>Which of the following devices would not work on the Moon?</p> <ul style="list-style-type: none"> <li>a) Thermometer</li> <li>b) Spectrometer</li> <li>c) Spring balance</li> <li>d) Siphon</li> </ul>
78	<p>Which of the following planets has no moons?</p> <ul style="list-style-type: none"> <li>a) Ceres</li> <li>b) Mars</li> <li>c) Venus</li> <li>d) Neptune</li> </ul>
79	<p>The planet Neptune was discovered by studying the deviations in the orbit of _____</p> <ul style="list-style-type: none"> <li>a) Jupiter</li> <li>b) Uranus</li> <li>c) Saturn</li> <li>d) Pluto</li> </ul>
80	<p>Which planet seems to be turned on its side with an axis tilt of 98 degrees?</p> <ul style="list-style-type: none"> <li>a) Jupiter</li> <li>b) Venus</li> <li>c) Neptune</li> <li>d) Uranus</li> </ul>
81	<p>What is the essential difference between X-ray, radio waves and infrared radiation?</p> <ul style="list-style-type: none"> <li>a) wave amplitude</li> <li>b) temperature</li> <li>c) wavelength</li> <li>d) wave velocity</li> </ul>
82	<p>The apparent daily path of the Sun in the sky during winter is different from that in summer, because</p> <ul style="list-style-type: none"> <li>a) the sun revolves</li> <li>b) Earth's distance from the Sun changes</li> <li>c) the Sun rotates</li> <li>d) Earth's axis is tilted</li> </ul>
83	<p>The following instrument demonstrates the rotation of the Earth around its axis.</p> <ul style="list-style-type: none"> <li>a) pendulum clock</li> <li>b) Foucault's pendulum</li> <li>c) spectrometer</li> <li>d) photomultiplier tube</li> </ul>
84	<p>If you were to stand on the Moon, then the position of the Earth in the moon sky</p> <ul style="list-style-type: none"> <li>a) will remain the same with time</li> <li>b) will change with time</li> <li>c) will not be able to see the Earth from the Moon</li> <li>d) none of the above</li> </ul>
85	<p>The distance of the star nearest to the solar system is</p> <ul style="list-style-type: none"> <li>a) a few million light years</li> <li>b) a few light days</li> <li>c) a few light years</li> </ul>

	d) a few thousand light years
86	Semi-diurnal tides have a) one high and one low daily b) two highs and one low daily c) one high and two lows daily d) two highs and two lows daily
87	Water entrapped in sediments during their formation is known as a) Connate water b) Meteoric water c) Juvenile water d) Magmatic water
88	Lysimeter is used to measure a) Evaporation b) Evapo-transpiration c) Transpiration d) Humidity
89	Isohyet is a line joining points having a) The same atmospheric pressure b) The same amount of rainfall c) The same temperature d) The same depth of water table
90	A water-bearing formation sandwiched between two layers of impermeable geological formation is called _____. a) confined aquifer b) unconfined aquifer c) semi-confined aquifer d) aquifer
91	In drinking water, the upper limit of fluoride content is _____. a) 0.1 mg/l b) 1.5 mg/l c) 15 mg/l d) 20 mg/l
92	The evaporation through plants and from the surrounding soil together is known as a) Transpiration b) Evaporation c) Evapo-transpiration d) Both a and b
93	_____ has the highest porosity. a) Clay b) Gravel c) Silt d) Sandstone
94	Waterholding capacity is more in _____ soils. a) Sandy

	<ul style="list-style-type: none"> <li>b) Clayey</li> <li>c) Loamy</li> <li>d) Red</li> </ul>
95	<p>An unconfined aquifer is also known as _____ aquifer.</p> <ul style="list-style-type: none"> <li>a) An artesian</li> <li>b) A Leaky</li> <li>c) A Water table</li> <li>d) Perched</li> </ul>
96	<p>The amount of salt present in 1 Kg of sea water is:</p> <ul style="list-style-type: none"> <li>a) 3.5g</li> <li>b) 35mg</li> <li>c) 35g</li> <li>d) 350mg</li> </ul>
97	<p>Thermocline is the region where</p> <ul style="list-style-type: none"> <li>a) Temperature increases rapidly with depth</li> <li>a) Temperature decreases rapidly with depth</li> <li>b) Temperature remains uniform</li> <li>c) Temperature is lowest</li> </ul>
98	<p>Because of the Coriolis force, a southward ocean current in the southern hemisphere deflects</p> <ul style="list-style-type: none"> <li>a) westward</li> <li>b) eastward</li> <li>c) downward</li> <li>d) not affected</li> </ul>
99	<p>Sinking motion in the thermohaline circulation takes place</p> <ul style="list-style-type: none"> <li>a) along the the Gulf Stream</li> <li>b) near the equator</li> <li>c) near polar regions</li> <li>d) off the coast of Peru</li> </ul>
100	<p>Altimeter is used for measuring</p> <ul style="list-style-type: none"> <li>a) sea level</li> <li>b) sea surface temperature</li> <li>c) sea surface salinity</li> <li>d) ocean colour</li> </ul>

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