EARTH, ATMOSPHERIC, OCEAN AND PLANETARY SCIENCES
Paper I(Part'B')

41.   Which of the following characteristics best describes the Bay of Bengal?

   1. Open ocean upwelling and winter cooling.
   2. Strong stratification in salinity in surface waters.
   3. High primary production.
   4. Suboxic intermediate waters.

42.   If ΣCO_2 in sea water is increased by the addition of bicarbonate and carbonate
ions from rivers, the ocean will become,

   1. more acidic (pH 6.5)
   2. neutral in pH (pH 7)
   3. less acidic (pH 8)
   4. more alkaline (pH 8.4)

43.   Coriolis force arises due to

   1. revolution of the earth around the sun
   2. rotation of the earth around its axis
   3. revolution of the earth-moon system around sun
   4. gravitational attraction of the earth-moon system

44.   Oxygen minimum zone within the ocean occurs because of very

   1. high biological production.
   2. good water circulation.
   3. high vertical mixing.
   4. high lateral advection.

45.   Wind blowing over the ocean surface drives an ocean current and if the wind
stops abruptly the current continues to flow. This flow is known as

   1. geostropic motion.
   2. intertial motion.
   3. motion with friction.
   4. buoyancy driven motion.

46. In an El Nino year, the western pacific warm pool moves towards the east and this modifies the

    1. Hadley circulation
    2. Langmuir circulation.
    3. Ferrel circulation
    4. Walker circulation

47. If the radius of the earth is R , what is the shortest curved distance on the earth's surface between the location A (60° N , 10° E) and B (60° N , 10° W)?

    1. R / 36
    2. R / 18
    3. $\dfrac{\sqrt{3}R}{36}$
    4. $\dfrac{\sqrt{3}R}{18}$

48. The monthly rain fall (mm) of a city in the southern hemisphere is given below.

JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	DEC
100	87	01	0	0	0	0	0	0	0	2	75

    From this data, one can infer that

    1. summer is a dry season
    2. winter is a dry season
    3. distribution of rainfall is bimodal
    4. annual precipitation is 100 mm.

49. Carbon dioxide is a greenhouse gas that can cause global warming and sea level rise. If we have enough financial resources and technology, we can completely remove CO_2 from the atmosphere. However, this may not be desirable mainly because

    1. the earth may go into an ice-age
    2. it will have an adverse effect on bio-diversity.
    3. plants may become extinct followed by animals and humans
    4. The pH of the rain water will increase.

50.   The depth at which thermocline starts in the oceans

        1. increases from equatorial regions to polar regions.
        2. decreases from west to east.
        3. increases from west to east.
        4. decreases from equatorial to polar regions.

51.   Following are the important milestones in organic evolution:

        a. First land plants and large coral reefs.
        b. First flowering plants.
        c. First fish appear.
        d. Dinosaurs appear.

         Which of the following gives the correct sequence of evolution?

        1. c , a , d, b
        2. c , d , a , b
        3. d , a , c , b
        4. a , c , d , b

52.   The chief source of atmospheric heat is

        1. incoming solar radiation
        2. infrared radiation from the earth.
        3. ultraviolet radiation absorbed by the ozone layer.
        4. ultraviolet radiation absorbed by clouds.

53.   In the course of organic evolution, the first appearance of organisms with hard
        parts occurred in the

        1.   middle Proterozoic
        2.   late Proterozoic
        3.   Devonian
        4.   Cambrian

54.   The hypothesis for the origin of life envisaged that the primitive atmosphere was

        1.   having abundant nitrogen and oxygen
        2.   reducing and contained essentially NH_3, CH_4 and H_2 but not CO_2 or O_2.
        3.   having only free oxygen and hydrogen which combined to give water to
                oceans.
        4.   having only sulfur dioxide and water vapour.

55. Which one of the following combination represents, Northern, Eastern, Southern & Western boundaries of the Indian Ocean respectively?

   1. South Asia, Australia, Southern Ocean, Africa
   2. Africa, Southern Ocean, Australia, South Asia
   3. South Asia, Southern Ocean, Australia, Africa
   4. South Asia, Africa, Southern Ocean, Australia

56. The predominant factor for maintaining the dissolved oxygen level in seawater is

   1. primary production
   2. community respiration
   3. biochemical oxygen demand
   4. air-sea exchange

57. The variance (or degree of freedom) of a chemical system (a rock) comprising muscovite $(KAl_3, Si_3)O_{10}(OH)_2)$ and quartz (SiO_2) in the presence of water vapor is

   1. 0
   2. 1
   3. 2
   4. 3

58. The kinetic energy of gases is $1/2\ MV^2$; M=mass and V=speed. On heating H_2O comprising of the molecules $^1H_2^{16}O$ and $^1H_2^{18}O$, the velocity of the lighter molecule relative to that of the heavier molecules in the vapor phase should be

   1. $> 1/2$ but < 1
   2. > 0 but $< 1/2$
   3. > 1 but $< 3/2$
   4. $> 1\frac{1}{2}$

59. The mineral coesite is a high pressure polymorph of SiO_2, and therefore occurs in the deeper parts of the Earth's interior. The occurrence of coesite at surface condition implies

   1. slow exhumation and impeded volume expansion
   2. rapid exhumation and unimpeded volume expansion
   3. rapid exhumation and impeded volume expansion
   4. slow exhumation and unimpeded volume expansion

60. The mineral quartz, containing only Si and O, is the most common mineral on the continental landscape. If so, we can infer that

1. Si is the most abundant element in the earth
2. O is the most abundant element in the earth
3. quartz is the most stable rock-forming mineral on the landscape
4. quartz is the most abundant mineral in the continental rocks.

61. When moisture – laden winds are blocked by a mountain chain, intense rainfall happens as in the Western Ghat and Himalayan regions - the Orographic effect. In such cases which one of the following factors is dominantly responsible for intense precipitation ?

1. Mountain heights
2. Mountain orientation with respect to wind direction
3. Ascent induced by latent heat of condensation of water vapour
4. Vegetation on the mountain slopes.

62. By which one of the following decay schemes does the decay of $^{40}K \rightarrow {}^{40}Ar$ take place?

1. emission of α-particles
2. electron capture by ^{40}K nucleus
3. emission of β^- - particles
4. emission of β^+ - particles

63. Quantitative chemical analysis of a rock revealed its MgO content to be 10.0 wt.%. If the atomic weight of Mg and O are 24 and 16 respectively, then how much is the Mg content of the rock?

1. 6.0 wt.%
2. 16.0 wt.%
3. 10 wt.%
4. 24 wt.%

64. During storms, thatched roofs of huts are lifted and are carried away by wind. The basic principle that governs the process is

1. Bernoulli's principle
2. Coriolis force
3. Pascal's law
4. Archimedes principle

65. A geostationary satellite orbiting at an attitude of 36,000 km has a period of 24 hours. What is the orbital period of a satellite orbiting at an altitude of 1000 km (take the radius of the Earth as ~6000 km)

1. $4/\sqrt{6}$ hr
2. 2/3 hr
3. 3/2 hr
4. 1/9 hr

66. Age of the earth is estimated to be about 4.5 billion years based on isotopes, such as ^{238}U, whose half life is about 4.5 billion years. If the half-life of ^{238}U were 9.0 billion years, then the age of the Earth would be

1. 4.5 billion years
2. 9.0 billion years
3. $4.5\ e^{-9.0}$ years
4. $9.0\ e^{-4.5}$ years

67. Assuming that the earth's atmosphere is made of 80% N_2 and 20% O_2 by volume, what is the ratio of their partial pressures (partial pressure is based on molecular weight)?

1. 7 : 2
2. 4 : 1
3. 1 : 4
4. 2 : 7

68. Moon's gravity is about 1/6 of that on earth. What is the period of a seconds pendulum on the Moon? (Neglect thermal contraction / expansion)

1. $2\sqrt{6}$ sec.
2. $2\sqrt{3}$ sec.
3. 2 sec.
4. 1 sec.

69. In the rain shadow area (leeward side of a mountain), the air mass is characterized by

1. warm and stable conditions
2. warm and unstable conditions
3. cold and stable conditions
4. cold and unstable conditions

70. Which of the following soil properties determines the rate at which water can pass through porous material?

    1. Porosity
    2. Permeability
    3. Capillarity
    4. Infiltration

71. The Earth would have one side always facing the sun if the

    1. Earth went around the sun but did not rotate.
    2. period of rotation and revolution were equal
    3. period of rotation was half that of the period of revolution
    4. period of rotation was twice that of the period of revolution.

72. Assuming the altitude of all the continents to be the same, the range of temperature would be greatest at the

    1. centre of the largest mass at high latitude
    2. centre of the largest mass at low latitude
    3. western part of the largest mass in southern hemisphere
    4. eastern part of the largest mass in northern hemisphere

73. Ocean surface currents are mainly caused by

    1. wind
    2. tides
    3. salinity differences
    4. density differences

74. The stress at which rocks begin to strain permanently is the

    1. yield strength
    2. ultimate strength
    3. fracture strength
    4. tensile strength

75. A scientist runs an experiment to test the deformation behaviour of a rock in the atmospheric condition and plots the compressive stress (σ) as a function of strain (ε). She finds that

    1. $\sigma \propto 1/\varepsilon$
    2. $\sigma \propto \varepsilon$
    3. $\sigma \propto \varepsilon^2$
    4. $\sigma \propto 1/\varepsilon^2$

76. In the Himalayan mountain belt one can find abundant

    1. normal faults and folds
    2. thrusts and folds
    3. strike – slip faults and bending of rock strata
    4. gravity – induced sag structures

77. Natural earthquakes are generated due to

    1. plastic flow of rocks and release of plastic strain energy
    2. folding of rock layers
    3. sudden release of elastic strain energy during fracture propagation
    4. sudden release of viscous strain accumulated in rocks.

78. The Mohorovicic discontinuity below the Himalayan orogen is at a depth greater than that below the Indian Craton. This is because of :

    1. isostatic mass adjustment
    2. lateral density variation
    3. upwelling material below the Indian craton
    4. less tectonic activity in the Himalayan region.

79. P-wave shadow zones recorded by seismologists indicate the boundary between the

    1. lower and upper crusts
    2. inner core and outer core
    3. lower mantle and outer core
    4. transition zone and lower mantle

80. In the mantle, heat flow on long time scales takes place by convection. With increase in the Rayleigh number, the mantle convection would

    1. stop
    2. become vigorous
    3. propagate laterally
    4. be pulsating

81. In a narrow channel, water is flowing in a laminar manner. The flow will turn turbulent if

    1. the Reynolds number exceeds a critical number
    2. the viscosity of water increases
    3. the Rayleigh number decreases down to a critical value
    4. the Reynolds number drops below a critical value

82. A small pebble is dropped into the deep sea from a floating glacier mass. The pebble falls down, and is then likely to hit the sea bottom with

    1. an accelerating velocity
    2. a decelerating velocity
    3. a uniform velocity
    4. a pulsating velocity

83. The landmasses overlain by thick glacier masses slowly move up following the phase of deglaciation. This indicates that the Earth's interior is

    1. perfectly elastic
    2. perfectly plastic
    3. visco-elastic
    4. Newtonian

84. In the Earth's crust the radioactive element Rb is likely to concentrate preferentially in

    1. K – feldspar
   2. quartz
    3. Ca-feldspar
    4. olivine

85. A mineral with monoclinic crystal symmetry is observed under ab optical microscope. The observations indicate that the mineral is optically

    1. bi-axial
    3. uni-axial
    3. isotropic
    4. tri-axial

86. Crustal rocks below the Atlantic ocean are dated systematically across the mid-oceanic ridge. The maximum of age of the rocks is:

    1. > 200 Ma
    2. = 50 Ma
    3. < 200 Ma
    4. < 100 Ma

87. A scientist measured the shear stress and shear rates in a magma flowing out of an active volcano, and prepared the following graph
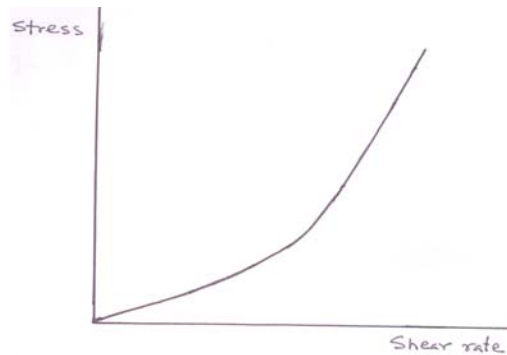
The magma is :

   1.   Newtonian
   2.   Non-Newtonian
   3.   Plastic
   4.   Bingham

88. The temperature at the centre of the Earth is estimated to be:

   1. $< 3000^{\circ}C$
   2. $> 4000^{\circ}C$
   3. $> 1000^{\circ}C$
   4. $2000^{\circ}C$

89. What is the rationale central to the following processes, e.g., rusting of iron, conversion of graphite to diamond within the earth, and NaCl dissolving in water?

   1.   The presence of fluid.
   2.   All reactions involve volume increase.
   3.   Free energy becomes more negative.
   4.   No change in volume.

90. Permanent ice sheet over Antarctica developed in a early Cenozoic as a result of

   1.   intense glaciation over the earth
   2.   separation of Antarctica from other continents leading to its thermal isolation
   3.   Complete stoppage of solar radiation
   4.   Extensive volcanism on earth

91. Which one of these depositional environment will be best for the preservation of fossils?

    1. Bottom of river.
    2. Deserts.
    3. Shallow sea floor.
    4. Deep sea floor.

92. After an earthquake, the epicenter is located by noting at various places

    1. the difference in the arrival times of S & P waves
    2. the intensity of the earthquake
    3. number of buildings damaged
    4. number of people dead

93. The Earth's magnetic field has undergone reversals in the past. The present field is named after

    1. Gauss
    2. Brunhes
    3. Olduvai
    4. Matuyama

94. Continental shelves are characterized by gradients in the range of

    1. 1 : 1000 to 1 : 1500
    2. 1 : 30 to 1 : 40
    3. 1 : 20 to 1 : 30
    4. 1 : 60 to 1 : 200

95. The epicenter of a deep focus earthquake is located

    1. on the earth's surface
    2. below a depth of 70 km
    3. between 70-300 km
    4. below 300 km.

96. Read the following statements and pick out the correct option.

    Statement I : Isostatically over-compensated mountainous regions are associated with a thicker crust.
    Statement II : Isostatically under compensated mountainous regions are associated with a thinner crust.
    1. Statements I and II are correct
    2. Statement I is true, but II is false
    3. Statement I is false, but II is true
    4. Statements I and II are false.

97. A fall in bore-level or sea-level is not responsible for an increase in

    1.   channel length
    2.   channel head
    3.   channel slope
    4.   channel sinuosity

98. In the Earth, brittle rocks become more and more ductile with increasing depth. If so, frequently occurring earthquakes are likely to have their focus at:

    1.   deeper levels
    2.   shallow levels
    3.   core-mantle boundary
    4.   transition zone

99. In extensional tectonic regimes of the Earth we commonly observe

    1.   normal faults
    2.   thrusts
    3.   vertical faults
    4.   reverse faults

100. The effective shear stress on a frictional plane will be a maximum when the plane is inclined to the compression direction at an angle of:

    1. $90°$
    2. $>45°$
    3. $<45°$
    4. $45°$

101. If the earth's axis of rotation were not tilted, which one of the following statements would be TRUE?

    1.   Equal day and night at all places throughout the year
    2.   Duration of day and night will depend on latitude but will not change with time.
    3.   The poles will have daylight for six months.
    4.   There will be no seasons.

102. For an element having a radioactive isotope of 5×10^9 y half-life, its atomic weight in 5×10^6 years will

    1.   increase
    2.   decrease
    3.   remain constant
    4.   decrease to $1/1000^{th}$ of its initial value.

103. On earth , both incoming and outgoing radiations show variations with latitude such that there is heat excess at the equator and deficit at high latitudes. However, neither the poles are getting colder not is the equator getting warmer with time because

   1. the earth abledo is changing with time.
   2. solar activity is changing with time.
   3. atmospheric and oceanic circulations redistribute heat
   4. of the build-up of atmospheric green house gases.

104. The mixing time of deep ocean water is about 1000 years. Therefore, elements such Na, Mg, P and Si having residence limits significantly longer than 1000 years should be homogeneously distributed in the ocean. Which one of the following sets of elements is non homogeneously distributed

   1. Na + Mg
   2. Na + Si
   3. Si + P
   4. P + Mg

105. The partial pressure of CO_2 in the atmosphere of Venus is about 88.7 bars. If H_2O were present on Venus it would most likely to be in the form of

   1. liquid water
   2. Ice
   3. mixture of water and ice
   4. water vapour

106. Meteorites are generally divided into three major groups: stony, strony-iron and iron meteorites. The most likely source of iron meteorites is :

   1. the crust of the parent bodies.
   2. the core of the parent bodies
   3. undifferentiated parent bodies
   4. the mantle of the parent bodies

107. The half life of ^{26}Al is 750,000 years. How much of ^{26}Al will now be present 10g of Al_2O_3 formed at the time of formation of the earth?

   1. 10g
   2. 5g
   3. 0g
   4. 54g

108. The number of carbon atoms present in unit volumes of graphite and diamond respectively are

    1. dependent on their origin
    2. more in graphite, less in diamond
    3. more in diamond , less in graphite
    4. independent of the form

109. Relative percentage of which of the following minerals increases with increase in maturity of sediments?

    1. Feldspar
    2. Quartz
    3. Amphibole
    4. Olivine

110. The maximum flow velocity required to entrain a resting particle is for

    1. sand
    2. unconsolidated clay
    3. silt
    4. consolidated clay

111. Dentritic drainage pattern develops over a region having a

    1. highly jointed rock
    2. conical mountain
    3. uniform unbroken lithology
    4. a regularly fractured lithology

112. Over the same rock type, the thickest soil profile will develop in one of the following environments:

    1. Arid
    2. Frigid
    3. Humid
    4. Desert

113. Which one of the following does not form a good aquifer?

    1. Jointed basalt
    2. Massive granite
    3. Tills
    4. Sandstone

114. Which one of the following is an indicator of release of free oxygen into the atmosphere?

   1. Banded iron formation
   2. Stromatolites
   3. Red beds
   4. Cherts

115. Which one of the following is used for dating and correlation in magnetostratigraphy?

   1. Field intensity
   2. Polarity reversal
   3. Normal polarity
   4. Secular variation

116. Large depositional features formed by braided streams where a river emerges from a confined, steep valley into a basin or onto the flood plain of a large river are called

   1. alluvial fans
   2. colluvial fans
   3. bed forms
   4. flood plain deposits

117. The changing altitude of a point on the land surface at any time is a function of:

   1. Altitude = function of (bedrock uplift + deposition + compaction + erosion)
   2. Altitude = function of (bed rock uplift + deposition – compaction – erosion)
   3. Altitude = function of (bed rock uplift + deposition – compaction – erosion)
   4. Altitude = function of (bed rock uplift – deposition + compaction + erosion)

118. The zone above the water table that is generally unsaturated is known as:

   1. vadose zone
   2. phreatic zone
   3. capillary zone
   4. soil-water zone

119. Which of the following younging sequence of sedimentary rocks formed in a coastal environment indicates marine transgression.

    1.   conglomerate – sandstone – limestone – mudstone
    2.   conglomerate – limestone – sandstone – mudstone
    3.   mudstone – sandstone – limestone – conglomerate
    4.   limestone – mudstone – sandstone - conglomerate

120. Which one of the following minerals formed in a lake indicates maximum aridity ?

    1.   calcite
    2.   anhydride
    3.   halite
    4.   gypsum

121. Which one of the following is not a good reservoir rock for petroleum ?

    1.   limestone
    2.   sandstone
    3.   mudstone
    4.   reef boundstone

122. Which one of the following features is absent at the source region, if quartz grains along with fresh, angular to subrounded grains of feldspar are present in sandstone?

    1.   rapid erosion
    2.   tectonic activity
    3.   chemical weathering
    4.   physical weathering

123. Which one of the following is the correct sequence of bedforms generated in sand (>0.6 mm in size) with increasing flow velocity ?

    1.   no movement $\rightarrow$ lr plane bed > ripple > upper plane bed > Antidune
    2.   no movement > ripples > dunes > upper plane bed > Antidunes
    3.   no movement > lower plane beds > dunes > upper plane bed > Antidune
    4.   no movement > dunes > ripples > up flat bed > Antidune

124. Which one of the following types of grain contacts indicates the highest burial depth of sediments ?
    1.   point contact
    2.   sutured contact
    3.   long contact
    4.   concavo-convex contact

125. Weathering of feldspar minerals may result in which one of the following sets of products ?

1. clays; Ca, Na, K ions; dissolved silica
2. iron oxides; Ca, Fe, Mg, Mn ions; clays : dissolved silica
3. Fe, Mg ions ; Mn oxides; clays
4. Na, K, Mg, Fe ions ; clays ; Fe – Mn oxides

126. In the troposphere, core of maximum zonal wind speed is called

1. storm track
2. strong westerly
3. mean jet stream axis
4. westerly flow

127. Violent updrafts in thunderstorm indicate that a tremendous amount of energy is being released. A measure of this amount of energy available to create such motion is

1. kinetic energy
2. potential energy
3. convective available potential energy
4. convective instability

128. Fronts are defined by their temperature structure, although many other quantities change across the front. Advancing cold air at the surface defines the cold front, where the front moves towards the warm air mass. Refreshing cold air, where the front moves towards the cold air mass is called

1. colder front
2. warm front
3. warmer front
4. stationary front

129. When water vapour condenses in the clouds, latent heat is released. This heat warms the air in the column, causing it to expand. According to the hypsometric equation, horizontal pressure gradients develop which push the air out of the column. Hence which of the following is correct?

1. It will increase the sea level pressure in the column
2. It will decrease the sea level pressure in the column
3. Sea level pressure will remain same
4. No change in pressure gradient

130. The earth is heated by sun, and is cooled by long wave (IR) radiation to space. If A is global albedo, S solar constant, R earth's radius, σ Stefan Boltzmann constant and T radiation emission temperature, then which one of the following is correct ?

    1.   Radiation in = $A.S.\pi R^2$
           Radiation out = $\sigma T^4 . 4\pi r^2$

    2.   Radiation in = $A.S.\pi R^2$
           Radiation out = $\sigma.T^4.\pi R^2$

    3.   Radiation in = $(1-A) . S.\pi R^2$
           Radiation out = $\sigma.T^4. 4\pi R^2$

    4.   Radiation in = $(1-A) S.4\pi R^2$
   Radiation out = $\sigma.T^4.4\pi R^2$

131. Potential temperature (θ) is defined as the temperature of a parcel of dry air at pressure p and temperature T would have if it is expanded or compressed adiabatically to standard pressure p_s, usually, 1000 hPa. The expression for (θ) is:

    1. $\theta = T(p_s / p)^{R/Cp}$

    2. $\theta = T(p/p_s)^{R/Cp}$

    3. $\theta = T(p/p_s)^{Cp/R}$

    4. $\theta = T(p/p_s)^{-R/Cp}$

132. A convenient measure of the magnitude of the acceleration compared to the Coriolis force may be obtained by forming the ratio of the characteristics scales for the acceleration (U^2 / L) and the Coriolis force terms ($F_o U$). This nondimensional number, called Rossby Number (R_o), is defined as

    1. $R_o = U^2 / L$
    2. $R_o = U^2 / f_o.L$
    3. $R_o = U / f_o . L$
    4. $R_o = U / L$

133. The variance (degree of freedom) at known pressure of an eutectic point of the simple binary system as shown in the figure is:
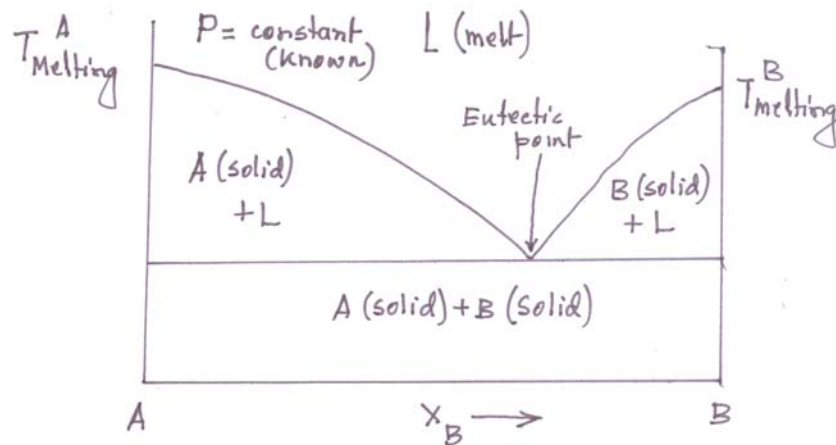
   1.   0 (zero)
   2.   1
   3.   2
   4.   3

134. Pressure solution Stylolites are observed to be inclined at an angle of 45° relative to the bedding in the rock by a geologist. Which one of the following interpretations is correct?

   1.   Styloties cannot be oriented at 45° relative to bedding. The geologist made an error in his observations.
   2.   The stylolites are definitely tectonic in region.
   3.   The relative angle of stylolites with bedding has no consequence in deciding its origion.
   4.   The stylolites are definitely diagenetic in origin.

135. Overprinting of ductile deformation microstructures by brittle microstructures are observed by a geologist in a thin-section of a deformed rock. Which one of the following interpretations of the observations is false?

   1.   The deformation occurred in a brittle-ductile deformation regime.
   2.   The deformation occurred in a ductile regime and on-going erosion subsequently changed the deformation regime to brittle.
   3.   The deformation regime charged from brittle to ductile due to reduction of grain-size.
   4.   The deformation microstructure represents a re-activated fault zone.

136. The 2006 Sumatra Earthquake produced a tsunami in the southern Bay of Bengal. Potential tsunamigenic region affecting the Arabian sea is

1. the Kachchh region in Gujarat
2. the Palaghat region in Kerala
3. the Makran coastal region in South Pakistan
4. the Bombay High Region.

137. Active tectonic studies using Global Positioning System in the Indian Sub-continent indicate that Himalayan seismic hazard is

1. the highest in regions that have not experienced great earthquakes in the recent past.
2. the highest in regions that have experienced great earthquakes in the recent past.
3. lower compared to peninsular India.
4. same as that of peninsular India.

138. Himalayan mountains have formed primarily as a result of

1. compressive deformation between Indian and Asian tectonic plates.
2. relative uplift of sediments in the Tethys Ocean in an extensional setting
3. strike- slip deformation between Indian and Eurasian plates.
4. extrusion of volcanic material over a long period of time on the Tethys ocean floor.

139. The Carlsberg Ridge in the Indian Ocean is a divergent plate boundary between the Indo-Australian (IA) and African tectonic plates because

1. the IA plate moves to the NE and the African plate moves SW at the ridge.
2. both the plates move northwards, but the IA plate moves faster.
3. both the plates move southwards, but the African plate moves faster.
4. both the plates move northwards, but the IA plate moves slower.

140. In convergent plate tectonic setting, thickest continental lithosphere is associated with

1. Ocean-Ocean convergent settings.
2. Ocean- Continent convergent settings.
3. Continent-Continent collision settings
4. Ocean-Ocean divergent settings.