

PROVISIONAL ANSWER KEY

NAME OF THE POST

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Note: Candidate must ensure the compliance to send all suggestion in the given format with reference to this paper with provisional answer key only.

101. How many number of phases generally participate in univariant reaction in an “n” component system  
 (A) n (B) n + 1  
 (C) n + 2 (D) n + 3
102. Schreinemakers first rule states that *the metastable extensions of “i-out” must always lie*  
 (A) On the stable side of i-producing reactions  
 (B) Between i-producing reactions  
 (C) Always at 180° to the i-producing reactions  
 (D) None of the above
103. ACF diagrams for metamorphic rocks can be called as  
 (A) Phase diagrams (B) Pseudocomponent diagrams  
 (C) Compatibility diagrams (D) All of the above
104. Composition of olivine can be expressed as  
 (A)  $X_2Si_2O_6$  (B)  $X_2SiO_4$   
 (C)  $X_3Y_2Si_3O_{12}$  (D) None of the above
105. For a simple solid solution generally  
 (A) substitution is restricted to identical lattice site  
 (B) has the same number of chemically independent phase components as mineral end members  
 (C) both (A) and (B) are true  
 (D) None is correct
106. Every polymorphic transformation is  
 (A) A discontinuous reaction (B) A continuous reaction  
 (C) An Ion-Exchange reaction (D) A oxidation reaction
107. Choose the correct option from the following :  
 (A) Oxygen has three isotopes and  $^{18}O$  is the most abundant  
 (B) Oxygen has two isotopes and  $^{16}O$  is most abundant  
 (C) Oxygen has three isotopes and  $^{16}O$  is most abundant  
 (D) Oxygen has three isotopes and  $^{18}O$  is least abundant
108. The biggest concentration of fresh water on earth’s surface is  
 (A) In continental rivers (B) In continental lakes  
 (C) In arctic and Greenland icecaps (D) In Antarctic icesheets

109. The epicenter of a deep focus earthquake is located  
(A) below a depth of 70 km (B) between 70-300km  
(C) on the earth's surface (D) below 300km
110. Sea-floor spreading goes through various stages. Which of the sequences below currently places these locations in order so that the initial stage is depicted first followed by more advanced stages of development?  
(A) Red Sea, Atlantic ocean, African rift valley  
(B) Red Sea, African rift valley, Atlantic ocean  
(C) Atlantic ocean, Red Sea, African rift valley  
(D) African rift valley, Red Sea, Atlantic ocean
111. Following represents an elevated geotherm  
(A) Subduction zone (B) Mid-Ocean ridge  
(C) Obduction (D) Continental sedimentary basins
112. The significance of paleomagnetism in plate tectonics stemmed from  
(A) One could measure depth of oceans  
(B) It illustrated sea-floor spreading  
(C) It contributed to the precise location of the North Pole  
(D) It explained ocean floor metamorphism
113. The metamorphic facies that represents a transition between diagenesis and regional metamorphism is  
(A) Zeolite facies (B) Amphibolite facies  
(C) Pyroxene Hornfels facies (D) Sanidinite facies
114. Aragonite and calcite have same chemical composition. These represent;  
(A) Polytypism (B) Polymorphism  
(C) Pseudomorphism (D) None of the above
115. Serpentine is a  
(A) Inosilicate (B) Tectosilicate  
(C) Phyllosilicate (D) Nesosilicate
116. The sequence of crystallization in a cooling calc alkaline basaltic magma is likely to be:  
(A) Forsterite-diopside-enstatite (B) Enstatite-diopside-forsterite  
(C) Forsterite-enstatite-diopside (D) Diopside-forsterite-enstatite

117. The range of radius ratio 0.414-0.732 will indicate a cation co-ordination number of  
 (A) 8 (B) 6  
 (C) 4 (D) 3
118. The following mineral is absent in low-P series of metamorphism of pelites  
 (A) Quartz (B) Chlorite  
 (C) Kyanite (D) Muscovite
119.  ${}^{\text{VI}}\text{Mg}^{\text{IV}}\text{Si} = {}^{\text{VI}}\text{Al}^{\text{IV}}\text{Al}$  in low grade metapelites is known as  
 (A) edenite substitution (B) phengite substitution  
 (C) ion exchange (C) None of the above
120. Spinifex texture is the characteristic texture of  
 (A) Gabbro (B) Dolerite  
 (C) Komatiite (D) Basalt
121. The oldest seafloor on Earth is not more than:  
 (A) ~200 million years old (B) ~2 billion years old  
 (C) ~20 million years old (D) ~2 million years old
122. The lower 10 km of the atmosphere where most weather occurs is called:  
 (A) Troposphere (B) Hydrosphere  
 (C) Barosphere (D) Biosphere
123. We get seasons on the Earth mainly because  
 (A) The Sun gets hotter and colder  
 (B) The Moon gets in the way of the Sun  
 (C) The Earth's axis is tilted  
 (D) The Earth gets closer to the Sun
124. The wind system in the equatorial areas is known as?  
 (A) Westerlies (B) Trades  
 (C) Doldrums (D) Monsoon
125. The cosmic ray intensity is minimum at the magnetic  
 (A) Equator (B) North pole  
 (C) South pole (D) Tropic of cancer

126. Sea water is saline because:
- (A)  $\text{Na}^+$  and  $\text{Cl}^-$  are most abundant cation and anion in seawater.  
 (B)  $\text{Na}^{+2}$  is abundant but  $\text{Cl}^-$  is less abundant.  
 (C)  $\text{Ca}^{+2}$  is less abundant in sea water than  $\text{Na}^{+2}$   
 (D)  $\text{Na}^{+2}$  has higher residency time compared to  $\text{Ca}^{+2}$
127. Ozone layer in Earth's atmosphere, is confined to
- (A) Troposphere (B) Stratosphere  
 (C) Mesosphere (D) Thermosphere
128. The most abundant element in the Earth's crust is
- (A) Aluminum (B) Oxygen  
 (C) Iron (D) Carbon
129. Slickenside striations on a fault plane have a pitch of  $90^\circ$ . The fault is:
- (A) a dip-slip fault, (B) a strike-slip fault,  
 (C) an oblique-slip fault, (D) a transform fault
130. The two limbs of a fold, when plotted as planes on a stereographic projection, intersect each other twice – both the intersection points lying on the periphery of the stereonet, diametrically opposite to each other. The fold is
- (A) a reclined fold (B) a horizontal (non-plunging) fold  
 (C) a steeply plunging fold (D) None of the above
131. A sedimentary bedding dips  $40^\circ$  towards  $\text{N}45^\circ\text{W}$ . Its apparent dip towards  $\text{N}10^\circ\text{W}$  will be around:
- (A)  $25^\circ$  (B)  $45^\circ$   
 (C)  $60^\circ$  (D)  $80^\circ$
132. An unconformity surface separates sedimentary strata dipping  $60^\circ$  towards  $\text{N}80^\circ\text{E}$  below the unconformity, and strata dipping  $5^\circ$  towards  $\text{N}45^\circ\text{E}$  above it. The structure is called:
- (A) disconformity (B) non-conformity  
 (C) angular unconformity (D) paraconformity
133. Corals prefer a temperature range of
- (A)  $30^\circ - 35^\circ\text{C}$  (B)  $15^\circ - 20^\circ$   
 (C)  $35^\circ - 40^\circ\text{C}$  (D)  $230^\circ - 29^\circ\text{C}$

134. *Gingko* is a  
(A) index fossil (B) living fossil  
(C) invertebrate fossil (D) vertebrate fossil
135. If two distinctly unrelated groups develop same morphological traits, the mode of evolution is known as  
(A) parallel evolution (B) divergent evolution  
(C) convergent evolution (D) monophyletic group
136. Infaunal taxa live  
(A) on the substratum (B) in the substratum  
(C) as floaters (D) as swimmers
137. Species with narrow range of salinity tolerance are known as  
(A) Stenohaline (B) Euryhaline  
(C) Oligohaline (D) None of these
138. *Ptilophyllum* is a plant fossil known from the  
(A) Lower Gondwana strata (B) Middle Gondwana strata  
(C) Upper Gondwana strata (D) Deccan intertrappean beds
139. Siwalik vertebrate fauna in general indicate a  
(A) temperate climate (B) polar climate  
(C) tropical humid climate (D) arid climate
140. Aquifer anisotropy relates to  
(A) Temporal variation in aquifer parameters  
(B) Both spatial and temporal variation in aquifer parameters  
(C) Directional variation in aquifer parameters  
(D) Spatial variation in aquifer parameters
141. Hill-Piper plot in groundwater quality is used for studying  
(A) Hydrochemical facies of ground water samples  
(B) Metamorphic facies of rock samples  
(C) COD of water  
(D) BOD of water

142. Total dissolved solutes of groundwater is a direct function of  
(A) Intrinsic permeability of the formation  
(B) Storativity of the formation  
(C) Electrical conductivity of the water  
(D) None of the above
143. Which of the following is characteristic of a tsunami?  
(A) Very long wavelength  
(B) Very fast moving  
(C) Very low amplitude in the open ocean  
(D) All of these
144. What led to maximum number of fatalities during Indonesian 2004 earthquake?  
(A) Death on account of entrapment of humans in earthquake opened chasms  
(B) Fires generated on account of earthquake  
(C) Epidemic diseases caused due to earthquake  
(D) Tsunami along the coastal tract bounding Indian Ocean
145. Which of the following feature one gets at convergent plate boundaries?  
(A) Transform faults (B) Island Arcs  
(C) Mid Oceanic Ridges (D) Sea Mounts
146. The monsoon has well developed cycle in  
(A) South and South East Asia (B) North Australia  
(C) Africa (D) East United State
147. Which one is cosmogenic nuclide?  
(A)  $Pb^{206}$  (B)  $K^{40}$   
(C)  $U^{235}$  (D)  $Be^{10}$
148. The basic unit in Biostratigraphy is  
(A) Subzone (B) Zone  
(C) Chron (D) System
149. The Ninety East Ridge is present in which ocean  
(A) Atlantic (B) Indian  
(C) Pacific (D) Arctic

150. Large garnet occur in a schist made up of matrix of fine grained biotite, muscovite and quartz. This texture is known as;
- (A) Granoblastic (B) Poikiloblastic  
 (C) Porphyroblastic (D) Porphyritic
151. Foraminifera are good index fossils for the
- (A) Archaean (B) Proterozoic  
 (C) Phanerozoic (D) None of the above
152. Past seawater temperature can be reconstructed from the
- (A) Oxygen isotopic composition of the calcareous foraminifera  
 (B) Carbon isotopic composition of the calcareous foraminifera  
 (C) Carbon isotopic composition agglutinated foraminifera  
 (D) All of the above
153. Three major orbitally forced cyclicities (~100 kyr, ~40 kyr, ~22 kyr) in the climatic changes on earth are termed as
- (A) Milankovitch cycles (B) Turner cycles  
 (C) Gliesberg cycle (D) Wilson cycle
154. Earth's magnetic field has its origin in the
- (A) Movement inside the Earth's core (B) Earth's rotation  
 (C) Solar storms (D) Plate motion
155. A 'pan-cake'- shaped oblate strain ellipsoid is characteristic of:
- (A) flattening deformation (B) plane-strain deformation  
 (C) constrictional deformation (D) None of the above
156. Competence contrast between layers is an essential condition for formation of:
- (A) passive folds (B) bending folds  
 (C) shear folds (D) buckling folds
157. If, in a folded layered sequence, thinner layers show smaller folds and thicker layers show larger folds, the fold structure will be called:
- (A) disharmonic fold (B) arrowhead fold  
 (C) polyclinal fold (D) fan fold



158. 'Klippe' and 'Tectonic Window' are terms related to:  
(A) normal faults (B) overthrust sheets  
(C) diapiric intrusions (D) transform faults
159. Glossopteris is a plant fossil known from the rocks of  
(A) Upper Gondwana (B) Middle Gondwana  
(C) Lower Gondwana (D) Rajmahal Intertrappean Beds
160. Body of strata corresponding to the overlapping stratigraphic ranges of two or more specific fossil taxa is known as  
(A) Taxon range biozone (B) Lineage biozone  
(C) Assemblage biozone (D) Concurrent range biozone
161. Angiosperms appear first in the fossil record  
(A) Late Cretaceous (B) Middle Cretaceous  
(C) Early Cretaceous (D) Late Jurassic
162. Hydraulic conductivity is inversely proportional to:  
(A) Flow rate (B) Darcy velocity  
(C) Linear velocity (D) Hydraulic gradient
163. Under equilibrium groundwater flow condition the water table head:  
(A) Changes with time (B) Does not change with time  
(C) Remains above confining layer (D) None of the above
164. An influent stream has  
(A) Water in the stream at higher elevation than water table elevation  
(B) Water in the stream at lower elevation than water table elevation  
(C) Water in the stream at equal elevation to the water table elevation  
(D) No water flows on either side
165. The deposition of suspended and dissolved material in a soil profile is referred as  
(A) Eluviation (B) Illuviation  
(C) Leaching (D) Enrichment
166. Longitudinal bars in a braided stream are formed because of  
(A) Capacity failure  
(B) Competency failure  
(C) Both capacity and competency failure  
(D) high gradient flow in the river

167. If rate of relative sea level fall exceeds rate of subsidence on a shoreline it will result in  
 (A) wide shelf area (B) narrow shelf area  
 (C) high gradient shelf (D) low gradient shelf
168. In the present day ocean carbonate compensation depth (CCD) is observed at depths between  
 (A) 3.5 and 5.5km (B) 0.5 - 1.5km  
 (C) 2.5 – 3.5 km (D) 2 - 4 km
169. Bar finger sands in a delta are  
 (A) poorly sorted sands found in delta plain  
 (B) well-sorted cross-stratified sands found in delta front  
 (C) massive sand associated with delta lobe  
 (D) well-sorted sand found in prodelta
170. Prolonged weathering of silicate minerals in a humid climate is likely to have following clay mineral assemblages.  
 (A) Vermiculite and Smectite (B) Chlorite and Illite  
 (C) Kaolinite and Gibbsite (D) Palygorskite and Sepiolite
171. The oldest continental deposition of the NW Himalayan Foreland Basin is related to —.  
 (A) Siwalik Group (B) Kasauli Formation  
 (C) Dagshai Formation (D) Subathu Formation
172. Occurrence of ferroan calcite cement in a carbonate rock is indicator of  
 (A) sea floor diagenesis (B) Vadose diagenesis  
 (C) Phreatic diagenesis (D) Deep-burial diagenesis
173. Amongst following sedimentary structures, which one should be relied upon as the best paleocurrent indicator?  
 (A) Parting Lineation (B) Cross-stratification  
 (C) Asymmetric ripple (D) Flute mark
174. We find oldest record of Gondwana sedimentation from rocks of  
 (A) early carboniferous age (B) early Permian age  
 (C) early Triassic age (D) late Carboniferous age

175. An overturned cross-stratification is formed by  
 (A) overturning of cross-stratification by tectonic force  
 (B) liquefaction of cross-stratified bed  
 (C) by overburden pressure  
 (D) operation of a current with strong shear above a liquefied cross-stratified bed
176. Geochronological dating of a zircon grain from a sandstone give idea on  
 (A) depositional process involved  
 (B) depositional environment  
 (C) age of provenance and maximum depositional age for the sandstone  
 (D) age of provenance
177. A sedimentary rock included fossils of two species that are known to have lived between 480-430 and 450-250 million years ago. What could be the age of the rock?  
 (A) 445 million years (B) 480 million years  
 (C) 250 million years (D) 410 million years
178. Which of the following geological features is INCORRECTLY matched?  
 (A) Mariana Trench- Atlantic Ocean (B) Ninety East Ridge-Indian Ocean  
 (C) Bermuda Rise-Atlantic Ocean (D) Carlsberg Ridge-Indian Ocean
179. Compared to clay, fine grained sandstone has  
 (A) higher porosity and lower permeability  
 (B) higher porosity and higher permeability  
 (C) lower porosity and lower permeability  
 (D) lower porosity and higher permeability
180. In arkosic sandstones, we get enrichment of  
 (A) K (B) Ca  
 (C) Na (D) Mg
181. The relationship with which magnetic Inclination ( $I$ ) varies with latitude ( $\theta$ ) of the Earth is  
 (A)  $\tan(I) = 2 \tan(\theta)$  (B)  $\tan(I) = \tan 2(\theta)$   
 (C)  $\tan(I) = \tan(\theta)$  (D)  $I = \tan(\theta)$

182. A polar wandering curve:
- (A) shows that the magnetic poles wandered relative to fixed continents
  - (B) shows that the rotational poles wandered to fixed continents
  - (C)** shows that the continents wandered relative to generally-fixed pole positions
  - (D) is a graph of the Mercalli Index
183. Which of the following metamorphic facies is characterised by maximum temperatures and minimum pressures?
- (A) Blueschist facies
  - (B) Greenschist facies
  - (C)** Sanidinite facies
  - (D) Hornblende facies
184. Which of the following geological formations contains diamondiferous conglomerates?
- (A)** Vindhayan Super Group
  - (B) Siwalik Super Group
  - (C) Vaikrita Group
  - (D) Karewa Formation
185. Which of the following is a depositional glacial landscape?
- (A)** Kames
  - (B) Fjord
  - (C) Cirque
  - (D) Arête
186. From youngest to oldest, the correct sequences of epochs of Tertiary period is
- (A) Paleocene, Oligocene, Eocene, Miocene
  - (B) Eocene, Miocene, Paleocene, Oligocene
  - (C)** Paleocene, Eocene, Oligocene, Miocene
  - (D) Miocene, Paleocene, Oligocene, Eocene
187. What is a drumlin?
- (A) A block of bedrock not quarried away by the bottom of a glacier.
  - (B) A sinuous ridge of water-deposited glacial debris.
  - (C) A small depression formed from the melting of a block of ice buried beneath till.
  - (D)** A streamlined hill constructed of glacial till.
188. \_\_\_\_\_ soil horizon is the zone of accumulation, where dissolved matter, leached from other parts of the soil, precipitates to form new minerals.
- (A) A-horizon
  - (B)** B-horizon
  - (C) C-horizon
  - (D) O-horizon
189. In which environment will you find maximum soil thickness?
- (A) Periglacial
  - (B) Humid Mid-Latitude
  - (C)** Humid tropical
  - (D) Tropical wet-dry

190. Paired terraces form when \_\_\_\_\_ of the river channel  
 (A) lateral migration is more rapid than vertical incision  
**(B) vertical incision is more rapid than lateral migration**  
 (C) there is only lateral migration  
 (D) None of the above
191. Weathering of iron-rich minerals often forms \_\_\_\_\_, which is a common component of laterite soils.  
 (A) Gibbsite (B) Tetrahedrite  
 (C) Limonite **(D) Goethite**
192. Which of the following is not a sulfide ore mineral?  
 (A) Molybdenite (B) Bornite  
**(C) Cuprite** (D) Marcasite
193. An ore deposit that has formed later than the host rocks is referred as \_\_\_\_\_.  
 (A) Syngenetic (B) Diagenetic  
**(C) Epigenetic** (D) None of the above
194. The Zawar deposit in Udaipur district is an important source of \_\_\_\_\_ in India.  
 (A) Copper **(B) Lead – Zinc**  
 (C) Tin – Tungsten (D) Gold - Silver
195. A greisen deposit exposes the \_\_\_\_\_ part of a granitic body.  
 (A) Lower **(B) Uppermost**  
 (C) Middle (D) Basal
196. Select the correct pairing of the following:  
 1. Scheelite (A) ZnS  
 2. Pyrite (B) FeS<sub>2</sub>  
 3. Galena (C) CaWO<sub>4</sub>  
 4. Sphalerite (D) PbS  
 (A) (1 – B); (2 - A); (3 – C); (4 – D) **(B) (1 – C); (2 – B); (3 – D); (4 – A)**  
 (C) (1 – C); (2 – B); (3 – A); (4 – D) (D) (1 – B); (2 – A); (3 – D); (4 – A)
197. The Kolar region in Dharwar craton hosts a number of \_\_\_\_\_ gold deposits.  
 (A) Porphyry **(B) Vein-type**  
 (C) Placer-type (D) None of the above

198. Which of the following is an ore mineral of tungsten?  
(A) Cassiterite (B) Rutile  
(C) Scheelite (D) Molybdenite
199. \_\_\_\_\_ deposits are generally associated with ultramafic rocks.  
(A) Gold (B) Chromite  
(C) Lithium (D) Zinc
200. Bauxite deposits are generally the result of the process called \_\_\_\_\_.  
(A) Residual magmatic injection (B) Residual concentration  
(C) Early magmatic segregation (D) Hydrothermal segregation
201. \_\_\_\_\_ is the largest producer of mica in world.  
(A) India (B) Sri Lanka  
(C) Australia (D) New Zealand
202. \_\_\_\_\_ is the most important period of coal formation in India.  
(A) Cambrian  
(B) Permian  
(C) Jurassic  
(D) Pliocene
203. Ore deposits formed at shallow depths in the temperature range of 50 to 200°C may be referred as \_\_\_\_\_.  
(A) Hypothermal (B) Mesothermal  
(C) Xenothermal (D) Epithermal
204. The terms 'SEDEX' and 'MVT' generally refer to ore deposits of \_\_\_\_\_.  
(A) Magnetite and hematite (B) Lead and zinc  
(C) Gold and silver (D) PGE and REE
205. The point vertically beneath the camera center at the time of exposure where a plumb line extended from the camera lens to the ground intersects the photo image is called as  
(A) Principal point (B) Isocenter  
(C) Nadir (D) Reference point
206. The frequency of repetitive coverage in photogeology and remote sensing is known as  
(A) Spatial resolution (B) Spectral resolution  
(C) Radiometric resolution (D) Temporal resolution

207. Which of the following is not a coastal landform  
(A) Barrier island (B) Spits  
(C) Tombolos (D) Doline
208. Decay of rocks by biological, chemical and mechanical agents with little or no transport is called as  
(A) Exhumation (B) Erosion  
(C) Weathering (D) Denudation
209. A river developing on land surface before development of any structure is termed as  
(A) Superimposed river (B) Antecedent river  
(C) Captured river (D) Diverted river
210. Which of the following rock has such high porosity that it often floats in water?  
(A) Pumice (B) Obsidian  
(C) Andesite (D) Rhyolite
211. A cone shaped body that forms where a stream flowing out of mountains debouches on to a plain is known as  
(A) Mound (B) Playa  
(C) Alluvial fan (D) Terrace
212. The record of an earthquake is known as  
(A) Seismograph (B) Seismometer  
(C) Seismogram (D) Diffractogram
213. Isohyets are the points joining the points of equal :  
(A) Rainfall (B) Pressure  
(C) Temperature (D) Salinity
214. We get ophiolites in  
(A) Subduction zone (B) Suture zone  
(C) Spreading centre (D) None of the above
215. Which of the following is not a mineral  
(A) Hedenbergite (B) Fayalite  
(C) Pseudotachylite (D) Monazite
216. Which of the following time intervals witnessed huge basaltic volcanism in India  
(A) Cretaceous (B) Miocene  
(C) Ordovician (D) Cambrian

217. Which of the following Era boundaries witnessed maximum extinction events  
 (A) Cretaceous / Tertiary Boundary  
**(B) Permian / Triassic Boundary**  
 (C) Precambrian / Cambrian Boundary  
 (D) Archean / Proterozoic Boundary
218. The advent of animals with hard parts / skeleton occurred near  
**(A) Precambrian / Cambrian boundary**  
 (B) Base of Cretaceous  
 (C) Base of Pliocene  
 (D) Base of Jurassic
219. Which of the following time intervals witnessed abundance of Dinosaurs  
**(A) Mesozoic** (B) Cenozoic  
 (C) Paleozoic (D) Proterozoic
220. Banded Iron Formations of India are confined to  
 (A) Cretaceous (B) Miocene  
**(C) Precambrian** (D) Ordovician
221. Which of the following will not make a fossil?  
**(A) Decomposed organic material** (B) Plant impressions (casts)  
 (C) Animal footprints (D) Loose animal bones
222. Modern Man "*Homo sapiens*" evolved within  
 (A) Pliocene (B) Miocene  
**(C) Pleistocene** (D) Oligocene
223. Which of the following fossils helped in reconstruction of "Gondwanaland"  
**(A) Glossopteris** (B) *Homo erectus*  
 (C) Brachiopods (D) Phacops
224. Dravite is  
 (A) Non-quad pyroxene (B) Chrome diopside  
 (C) A clay mineral **(D) Tourmaline**
225. Last Glacial Maximum ( LGM) occurred around  
 (A) 1 million years ago **(B) 20,000 years ago**  
 (C) 2 million years ago (D) 1600 years ago



226. Which of the following channel pattern is a representative of very low energy system  
(A) Meandering (B) Braided  
(C) Anastomosing (D) Straight
227. Retreat of glacial snout is marked by which of the following landform  
(A) End moraine (B) Lateral moraine  
(C) Drumlin (D) Medial moraine
228. Varve deposits are formed in  
(A) Glacial environment (B) Aeolian environment  
(C) Coastal environment (D) Fluvial environment
229. Remote sensing data is received through  
(A) Electric waves (B) Sound waves  
(C) Electromagnetic waves (D) Magnetic waves
230. Coarse gravel size thin layer over fine-grained material in arid environment is known as  
(A) Megadunes (B) Lag deposits  
(C) Monadnocks (D) Yardang
231. In the IR band, water body is marked by which of the following colour.  
(A) Dark colour  
(B) White colour  
(C) Blue colour  
(D) Water body can't be distinguished in IR band
232. Standard FCC is prepared by combining remote sensing data in which of the following bands  
(A) blue, green and red (B) green, red and Infrared  
(C) red, infrared and blue (D) blue, green and infrared
233. The Age of Rajmahal Trap is?  
(A) 65-66 Ma (B) 133-110 Ma  
(C) 118-116 Ma (D) 245-248Ma
234. The richest variety of occurrence of fossils flora is reported from  
(A) Siwalik sediments  
(B) Inter-trappeans of Rajmahal volcanism  
(C) Inter trappeans of Deccan volcanism  
(D) Gondwana sediments

235. Goldschmidt mineralogical phase rule states that number of phases is equal to number of components. The underlying assumption in this is;
- (A) It is a degenerating system
  - (B) It is an adiabatic system
  - (C) Degree of freedom is 2**
  - (D) It is valid only for one component systems
236. To observe  $0^\circ$  declination, one must be positioned:
- (A) away from a magnetic pole *and* on a line connecting both the magnetic and rotational poles**
  - (B) anywhere along the Equator, facing either north or south, *only*
  - (C) anywhere along the Equator, facing either east or west, *only*
  - (D) at a rotational pole, facing in *any* direction
237. Mineralogically Dolerite is equivalent of
- (A) andesite
  - (B) granite
  - (C) gabbro**
  - (D) rhyolite
238. An earthquake of magnitude 7 on the Richter scale differs from that of magnitude 4 in terms of total energy released by
- (A) 3 times
  - (B) 30 times
  - (C) 1000 times**
  - (D) 27000 times
239. Which holds the minerals of sedimentary rocks together
- (A) Van der Waal's force between mineral surfaces
  - (B) unbalanced electrical charge
  - (C) intergranular cement**
  - (D) intergranular fluids
240. One would utilize a dip-needle *specifically* to measure:
- (A) gravitational force
  - (B) magnetic declination**
  - (C) magnetic inclination
  - (D) fault motion

241. Bentonite is considered to have formed from  
 (A) weathering of granites  
 (B) weathering of gabbros  
 (C) Chemical weathering of volcanic ash  
 (D) Alteration product of calcareous rocks
242. The slow downward movement of soil caused by gravity is known as  
 (A) A landslide (B) Physical weathering  
 (C) An avalanche (D) Hillside creep
243. Aseismic ridges are associated with  
 (A) Subduction (B) Sea floor spreading  
 (C) Hotspot (D) Island arc
244. If the density of saline formation fluid is  $1.09 \text{ gm/cm}^3$ , the formation pressure at a depth of 2500m will be  
 (A)  $250 \text{ kg/cm}^2$  (B)  $272.5 \text{ kg/cm}^2$   
 (C)  $252.5 \text{ kg/cm}^2$  (D)  $2500 \text{ kg/cm}^2$
245. To induce a positive Bouguer anomaly, a rock unit should have the following property:  
 (A) transmit only P waves (B) be denser than average  
 (C) transmit only L waves (D) lie within the seismic shadow zone
246. A stream demonstrates regular, continuous flow only during the late spring and early summer of the year. Based on this information, a geologist would classify this stream as:  
 (A) perennial (B) dendritic  
 (C) intermittent (D) ephemeral
247. Point bars are deposited:  
 (A) on the inside of stream meanders (B) on the outside of stream meanders  
 (C) at the base of waterfalls (D) in abrasion potholes
248. Which of the following water will have highest density  
 (A) Warm water with high salinity (B) Cold water with low salinity  
 (C) Warm water with low salinity (D) Cold water with high salinity
249. The sun produces its energy by  
 (A) oxygen to nitrogen (B) hydrogen to helium  
 (C) helium to hydrogen (D) oxygen to carbon dioxide

250. Cofferdam system is a method for  
 (A) Soil reclamation using substance barriers  
 (B) Soil extraction and storage for cleaning  
 (C) Soil electrokinetic cleaning  
 (D) Contaminated soil surface insulation
251. A thin knife-like ridge of rock that separates two U-shaped glacial valleys is known as  
 (A) Drumlin (B) Doline  
 (C) Horn (D) Arete
252. Lowest geothermal gradient is observed at  
 (A) Cratonic shields (B) Mobile belts  
 (C) Subduction Zones (D) Mid-oceanic ridges
253. Steinmann's trinity refers to  
 (A) A fossilised oceanic crust (B) Mid-oceanic ridge volcanism  
 (C) Subduction volcanism (D) Sub-alkaline volcanism
254. In Pratt's model of Isostasy  
 (A) Thickness of crustal blocks are considered uniform  
 (B) Density of crustal blocks are considered uniform  
 (C) Composition of crustal blocks are considered uniform  
 (D) None of the above
255. In Froude No. ( $F$ ) > 1 we get  
 (A) Out of phase flow (B) Rapid flow  
 (C) Sluggish flow (D) In-phase flow
256. Water from a certain source is shown to contain 10,000 ppm dissolved solids. This indicates that what percentage of the *particles* in this water are represented by the dissolved solids?  
 (A) 0.01% (B) 0.1%  
 (C) 1.0% (D) 10.0%
257. Rank these coals in order of quality (*lowest to highest*):  
 (A) bituminous - lignite - anthracite (B) anthracite - lignite - bituminous  
 (C) lignite - anthracite - bituminous (D) lignite - bituminous - anthracite
258. The value of Poisson's ratio lies between  
 (A) -1 and -2 (B) -1/2 and + 1  
 (C) -1 and +1/2 (D) -1 and -1/2

259. Which one of the following generally *decreases* downstream along the length of a stream?  
 (A) channel width (B) channel depth  
 (C) gradient (D) water velocity
260. A sand grain has a diameter of  
 (A) 2-4 mm (B) 0.0625 - 2 mm  
 (C) 0.0039 - 0.0625mm (D) > 4mm
261. Glacier ice:  
 (A) is a metamorphic rock  
 (B) sinks to the bottom of water  
 (C) is white in pure form  
 (D) is transformed into firn upon increased pressure
262. This chemical reaction:  $2\text{Fe}_2\text{SiO}_4 + 4\text{H}_2\text{O} + \text{O}_2 = 2\text{Fe}_2\text{O}_3 + 2\text{H}_4\text{SiO}_4$ , is an example of:  
 (A) dissolution (B) hydration  
 (C) oxidation (D) reduction
263. Conodonts appeared for the first time in the geological record in  
 (A) Paleocene (B) Triassic  
 (C) Devonian (D) Ordovician
264. Which out of these is a planktonic microfossil  
 (A) Lagenella (B) Nummulite  
 (C) Globigerina (D) Rotalia
265. Guano represent  
 (A) Argillaceous deposits (B) Phosphatic deposits  
 (C) Ferruginous deposits (D) Calcareous deposits
266. The angle between any line and its horizontal projection measured in a vertical plane is the \_\_\_\_\_ of the line  
 (A) Pitch (B) Plunge  
 (C) Dip (D) Dip and Strike
267. Mount Everest Limestone belongs to  
 (A) Ordovician (B) Silurian  
 (C) Devonian (D) Carboniferous

268. *Syringothyris Cuspidata* is the characteristic fossil of  
(A) Silurian (B) Lower Devonian  
(C) Lower Carboniferous (D) Upper Carboniferous
269. The Earth's magnetic field has undergone reversals in the past. The present field is named after  
(A) Gauss (B) Brunhes  
(C) Olduvai (D) Matuyama
270. Out of these which is intrusive into Delhi system  
(A) Bijli Rhyolite (B) Erinpura Granite  
(C) Bundelkhand Granite (D) Singhbhum Granite
271. The largest unit in the chronostratigraphy is  
(A) Supergroup (B) Era  
(C) System (D) Series
272. The age of Muth quartzite is  
(A) Silurian (B) Ordovician  
(C) Devonian (D) Archean
273. Permian is represented in Spiti by  
(A) Kanwar (B) Guling System  
(C) Muth Quartzite (D) Agglomerate Shale
274. The equivalent in optics for the law of refraction of plane seismic wave is  
(A) Huygen's principle (B) Fermat's principle  
(C) Snell's law (D) Bragg's law
275. Volcanism is generally absent at  
(A) Along the convergent boundary of two continental plates  
(B) Along subduction boundaries of an oceanic and a continental plate  
(C) At hot spots  
(D) Along sea-floor spreading centres
276. Name the supercontinent to which most of the continental landmass was joined together ~600 Ma ago  
(A) Gondwanaland (B) Rodinia  
(C) Pangaea (D) Laurasia

277. Nunatak is a
- (A) Fluvial landform (B) Eolian bedform  
 (C) Glacial bedform (D) Oceanic bedform
278. The zone of sharp change in sea water temperature between 200m and 1000m water depth is known as:
- (A) Pycnocline (B) Isotherm  
 (C) Thermocline (D) None of the above
279. 'Ediacaran fossil's have significance in determining the
- (A) Archean/Proterozoic boundary (B) Permian / Triassic boundary  
 (C) Cretaceous / Tertiary boundary (D) Precambrian / Cambrian boundary
280. In the Himalaya, rock layers often show fold structures, which have formed by buckling in response to
- (A) layer-parallel shear forces (B) cross-layer compressive force  
 (C) layer-parallel compressive force (D) cross-layer gravity force
281. What is the name of the geological process for the following chemical reaction?
- $$\text{Mg}^{2+} + 2\text{CaCO}_3 \longrightarrow \text{CaMg}(\text{CO}_3)_2 + \text{Ca}^{2+}$$
- (A) Cementation (B) Dolomitisation  
 (C) Sea floor weathering (D) Recrystallisation
282. The gas found dissolved in the sea in an amount greater than its amount in the atmosphere is
- (A) Nitrogen (B) Oxygen  
 (C) Argon (D) Carbon dioxides
283. The Alpine-Himalayan belt of Earthquakes is:
- (A) Shallow Focus (B) Deep Focus  
 (C) Intermediate Focus (D) None of the above
284. Breccia and conglomerate differ in
- (A) size of the clasts (B) shape of the clasts  
 (C) cementing material (D) environment of deposition
285. A local water table positioned above the regional water table is said to be:
- (A) stranded (B) displaced  
 (C) perched (D) depressed

286. The concentration of heavy minerals by streams or wave action leading to an economic deposit results in a
- (A) Hydrothermal deposit                      **(B) Placer deposit**  
 (C) Skarn deposit                                (D) Stratiform deposit
287. Spring tides occur at:
- (A) New moon                                      (B) Full moon  
**(C) Both New and Full moon**                (D) None of the above
288. What is the relative humidity when the absolute humidity is 3 grams per cubic meter and the air has a capacity of 12 grams per cubic meter?
- (A) 4%                                              (B) 9%  
**(C) 25%**                                              (D) 400%
289. Which of the following gases are attributed to anthropogenic cause of global warming
- (A) ozone and methane                      (B) nitrous oxide and sulfur dioxide  
**(C) methane and carbon dioxide**            (D) ozone and carbon monoxide
290. The present concentration of carbon dioxide in the atmosphere is in the range of:
- (A) 1-10 parts per million                      (B) 10-100 parts per million  
**(C) 100-1000 parts per million**              (D) 1000-10,000 parts per million
291. Which of the following terms is used to describe the appearance of a mineral in transmitted light?
- (A) diaphaneity**                                      (B) translucence  
 (C) opaqueness                                      (D) porosity
292. The partly melted rock layer on which the plates move is known as
- (A) lithosphere                                      **(B) asthenosphere**  
 (C) hydrosphere                                      (D) outer core
293. We know that the OUTER core is liquid because:
- (A) P waves pass through it                      (B) S waves pass through it  
 (C) P waves cannot pass through it              **(D) S waves cannot pass through it**
294. Universe is made primarily of which of the following two elements?
- (A) Hydrogen and Helium**                      (B) Hydrogen and Carbon  
 (C) Carbon and Nitrogen                      (D) Silicon and Oxygen
295. Streams of protons and electrons from the Sun produce
- (A) Solar wind**                                      (B) Prominences  
 (C) Quasars                                              (D) Spicules



296. Where the heavy elements which make up bulk of the earth originated?  
(A) In meteorites (B) In the Big Bang  
(C) In supernova (D) In the Sun
297. The planet with the maximum greenhouse gases in its atmosphere is  
(A) Venus (B) Mars  
(C) Neptune (D) Pluto
298. Which mineral amongst the following can be considered nearly a pure phase.  
(A) Biotite (B) Garnet  
(C) Cordierite (D) Andalusite
299. A mineral crystallizing in isometric system has  
(A) Three optic axes (B) One optic axis  
(C) Infinite optic axes (D) Two optic axes
300. The Gutenberg discontinuity lies between:  
(A) Outer core and lower mantle (B) Lower mantle and upper mantle  
(C) Outer core and inner core (D) Crust and upper mantle