**GEP - 2**

**PROVISIONAL ANSWER KEY**

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| **Name of The Post** | **Hydrologist, Class-2 (GWSSB)** |
| **Advertisement No** | **43/2020-21** |
| **Preliminary Test Held On** | **14-02-2021** |
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| **Last Date to Send Suggestion (S)** | **22-02 -2021** |

# Instructions / સૂચના

**Candidate must ensure compliance to the instructions mentioned below, else objections shall not be considered: -**

(1) All the suggestion should be submitted in prescribed format of suggestion sheet Physically.

(2) Question wise suggestion to be submitted in the prescribed format (Suggestion Sheet) published on the website.

(3) All suggestions are to be submitted with reference to the Master Question Paper with provisional answer key (Master Question Paper), published herewith on the website. Objections should be sent referring to the Question, Question No. & options of the Master Question Paper.

(4) Suggestions regarding question nos. and options other than provisional answer key (Master Question Paper) shall not be considered.

(5) Objections and answers suggested by the candidate should be in compliance with the responses given by him in his answer sheet. Objections shall not be considered, in case, if responses given in the answer sheet /response sheet and submitted suggestions are differed.

(6) Objection for each question shall be made on separate sheet. Objection for more than one question in single sheet shall not be considered & treated as cancelled.

**ઉમેદ્વારે નીચેની સૂચનાઓનું પાલન કરવાની તકેદારી રાખવી, અન્યથા વાંધા-સૂચન અંગે કરેલ રજૂઆતો ધ્યાને લેવાશે નહીં**

(1) ઉમેદ્વારે વાંધા-સૂચનો નિયત કરવામાં આવેલ વાંધા-સૂચન પત્રકથી રજૂ કરવાના રહેશે.

(2) ઉમેદ્વારે પ્રશ્નપ્રમાણે વાંધા-સૂચનો રજૂ કરવા વેબસાઇટ પર પ્રસિધ્ધ થયેલ નિયત વાંધા-સૂચન પત્રકના નમૂનાનો જ ઉપયોગ કરવો.

(3) ઉમેદ્વારે પોતાને પરીક્ષામાં મળેલ પ્રશ્નપુસ્તિકામાં છપાયેલ પ્રશ્નક્રમાંક મુજબ વાંધા-સૂચનો રજૂ ન કરતા તમામ વાંધા-સૂચનો વેબસાઈટ પર પ્રસિધ્ધ થયેલ પ્રોવિઝનલ આન્સર કી (માસ્ટર પ્રશ્નપત્ર)ના પ્રશ્ન ક્રમાંક મુજબ અને તે સંદર્ભમાં રજૂ કરવા.

(4) માસ્ટર પ્રશ્નપત્ર માં નિર્દિષ્ટ પ્રશ્ન અને વિકલ્પ સિવાયના વાંધા-સૂચન ધ્યાને લેવામાં આવશે નહીં.

(5) ઉમેદ્વારે જે પ્રશ્નના વિકલ્પ પર વાંધો રજૂ કરેલ છે અને વિકલ્પ રૂપે જે જવાબ સૂચવેલ છે એ જવાબ ઉમેદ્વારે પોતાની ઉત્તરવહીમાં આપેલ હોવો જોઈએ. ઉમેદ્વારે સૂચવેલ જવાબ અને ઉત્તરવહીનો જવાબ ભિન્ન હશે તો ઉમેદ્વારે રજૂ કરેલ વાંધા-સૂચન ધ્યાનમાં લેવાશે નહીં.

(6) એક પ્રશ્ન માટે એક જ વાંધા-સૂચન પત્રક વાપરવું. એક જ વાંધા-સૂચન પત્રકમાં એકથી વધારે પ્રશ્નોની રજૂઆત કરેલ હશે તો તે અંગેના વાંધા-સૂચનો ધ્યાને લેવાશે નહીં.

001. A mechanical weathering process in which curved plates of rock are stripped from a larger rock mass by the action of physical forces is referred as _____

(A) Exfoliation
(B) Frost action
(C) Frost heaving
(D) Solifluction

002. Soils in which iron oxides or clays or both accumulate in the zone of accumulation, commonly found in temperate, humid climate are described as _____.

(A) Pedocals
(B) Pedalfers
(C) Laterites
(D) Bauxites

003. A glacier erosional feature in which a spire of rock is formed by the headward erosion of a ring of cirques around a single high mountain is called _____.

(A) Arete
(B) Col
(C) Horn
(D) Fiord

004. Smooth, elongated hills composed largely of till, having asymmetric profile with a blunt nose pointing in the direction from which the vanished glacier advanced and with a gentler longer slope pointing in opposite direction are identified as _____

(A) Drumlins
(B) Moraines
(C) Eskers
(D) Kames

005. Earthquakes in which the depth of the focus is between 40 to 200 miles below the earth surface are classified as _____ earthquakes.

(A) Shallow focus
(B) Intermediate focus
(C) Deep focus
(D) Very deep focus

006. Volcanoes in which a cone is built up of a combination of pyroclastic material and lava flows around the vent having slope around 30° at the summit and 5° near the base are classified as _____

(A) Cinder cones
(B) Shield volcanoes
(C) Composite volcanoes
(D) Flood volcanoes

007. Accumulation of stream debris having slope less than 10°, commonly found at places where small, intermittent side streamlets coming down from hills meet a larger stream or valley floor is described as _____.

(A) Alluvial fan
(B) Alluvial cone
(C) Delta
(D) Bajada

008. A transition zone between the lower mantle and the outer core boundary, marked by an abrupt change in seismic waves velocity is identified as _____

(A) Gutenberg discontinuity
(B) Mohorovicic discontinuity
(C) Conrad discontinuity
(D) Lehman's discontinuity

009. Deep focus earthquakes are normally associated with the convergence of _____

(A) Two oceanic plates
(B) Two continental plates
(C) Continent and oceanic plates
(D) Transform plates.

010. A region of tranquil, flat bedded sedimentation between the accretionary prism and island arc is called _____.

(A) Back arc basin
(B) Fore arc basin
(C) Rifted basin
(D) Retro arc basin

011. Failed or less active arms of triple junctions are called _____.

(A) Aulocogens
(B) Benioff zones
(C) Melanges
(D) Island arcs

012. A group of folds in which the folds of one layer differ strongly in size or shape from the folds of an overlying or underlying layer is called _____

(A) Periodic Folds
(B) Non-periodic folds
(C) Polyclinal fold
(D) Disharmonic folds

013. A train of folds with sharp hinges on one set of closures and with rounded hinges on the oppositely directed closures are described as _____ folds.

(A) Arrow head
(B) Chevron
(C) Cuspate
(D) Round hinged

014. A fold that closes upward but in which the younging direction is towards the fold core is classified as _____ fold.

(A) Anticline
(B) Antiformal syncline
(C) Syncline
(D) Synformal anticline

015. A spaced cleavage in which there is no reorienting of the sedimentary layering or of the earlier fabric in the micro-lithons is described as _____ cleavage.

(A) Transected
(B) Axial plane
(C) Disjunctive
(D) Crenulation

016. Fold interference pattern in which the axial surface angle $\neq 180^{o}$ and hinge angle = $180^{o}$ are categorised as _____ folds.

(A) Type 0
(B) Type 1
(C) Type 2
(D) Type 3

017. When a layer is initially parallel to the YZ plane of the strain ellipsoid or some what inclined to it but parallel to the Y-axis, the stretching lineation on the cleavage surface develops _____ to the fold axis.

(A) Perpendicular
(B) Parallel
(C) Oblique
(D) Inverted

018. A special type of syn-sedimentary fault which typically develops in deposits of large deltas by the collapse of a rapidly deposited pile of sediments especially muds is identified as _____ fault.

(A) Antithetic
(B) Pivotal
(C) Wrench
(D) Growth

019. Thrusts that develop at an advanced stage of folding by stretching and shearing out of overturned limbs of tight or isoclinal folds are called as _____ thrusts.

(A) Break
(B) Forelimb
(C) Back limb
(D) Stretch

020. According to 'V' rule, 'V' of the outcrops will point downstream when the dip of the beds is downstream and is _____ with respect to the ground slope.

(A) Higher (B) Lower

(C) Equal (D) Zero

021. According to IUGS sub commission, rocks containing both pyroclasts and sedimentary clastic material are termed as _____.

(A) Tuffite (B) Epivolcaniclastics

(C) Aquagene tuff (D) Hyaloclastite

022. The process in which most natural magmas, once created are extracted from the melted source rock at some point before melting is completed is called _____

(A) Compositional zoning (B) Partial melting

(C) Absolute melting (D) Fractional crystallization

023. _____ refers to the incorporation of chemical constituents from the walls or roof of a magma chamber into the magma itself.

(A) Differentiation (B) Fractionation

(C) Diffusion (D) Assimilation

024. Granites which are biotite rich and contain Ilmenite, Cordierite, Muscovite, Andalusite and Sillimanite mineral assemblages are classified as _____ granites

(A) S type (B) Z type

(C) A type (D) M type

025. The process of formation of metasomatic rocks distinctly associated with carbonatite complexes is referred as _____

(A) Fenitization (B) Sericitization

(C) Carbonatization (D) Chloritization

026. A peculiar structure occurring mostly in basic lavas in which the lava exhibits the appearance of a pile of small masses comparable with sacks or cushions is described as _____ structure.

(A) Pillow (B) Flow

(C) Vesicular (D) Amygdaloidal

027. Micro granites showing graphic intergrowths between quartz and feldspars are called as _____

(A) Granophyre (B) Felsite

(C) Quartz Porphyry (D) Aplite

028. A texture in igneous rocks that results due to simultaneous crystallization of two minerals as in case of eutectic melts is called _____ texture.

(A) Intergrowth (B) Directive

(C) Intergranular (D) Poikilitic

029. According to IUGS classification of plutonic igneous rocks, a special name applied to the rocks that contain more than 90% plagioclase with lesser content of mafic minerals is _____.

(A) Granodiorite (B) Monzonite

(C) Anorthosite (D) Tonalite

030. In igneous rocks the inclusions that represent the fragments plucked off the country rocks during the intrusion of the magma or that foundered into the magma from the roof of intrusion are called _____.

(A) Autoliths (B) Enclaves

(C) Xenoliths (D) Batholiths

031. The term used to denote high temperature changes which take place along the immediate contacts of magma with country rock and in xenoliths with or without interchanges of material is _____.

(A) Pyro metamorphism (B) Cataclastic metamorphism

(C) Load metamorphism (D) Static metamorphism

032. Recrystallization texture in a metamorphic rock in which the principal constituents are granular or equidimensional is identified as _____ texture.

(A) Porphyroblastic (B) Granoblastic

(C) Mortar (D) Xenoblastic

033. A type of metamorphism associated with convergent plate margins and occurs during the development of island arcs, continental arcs and continental collision zones is described as _____ metamorphism.

(A) Burial (B) Hydrothermal

(C) Orogenic (D) Contact

034. A non foliated and non lineated metamorphic rock that is typically very fine grained and compact and occurs in contact aureoles is classified as _____

(A) Slate (B) Phyllite

(C) Schist (D) Hornfels

035. Mineral growth that occurs when deformation and metamorphism are believed to occur together is considered to be _____

(A) Syn tectonic (B) Pre tectonic

(C) Post tectonic (D) Inter kinematic

036. Metamorphic facies that covers the temperature range from $300^{o}$ to $500^{o}$ C at low to intermediate pressure is considered as _____ facies.

(A) Green schist (B) Granulite

(C) Eclogite (D) Blue schist

037. A line on a map connecting points of equal metamorphic grade is called _____

(A) Isograd (B) Isotherm

(C) Isobar (D) Isoseismal line

038. The rocks representing high grade regional metamorphism containing dominantly anhydrous minerals and are largely restricted to Pre-Cambrian shield areas represents _____ facies.

(A) Amphibolite (B) Granulite

(C) Green schist (D) Eclogite

039. A low temperature regional metamorphism affecting sediments and interlayered volcanic rocks in a geosyncline without any influence of orogenesis or magmatic intrusion is described as _____ metamorphism.

(A) Orogenic
(B) Burial
(C) Collision
(D) Hydrothermal

040. In sedimentary rocks, the pattern formed by frame work grains, matrix and cement is identified as _____ texture.

(A) Clastic
(B) Non-clastic
(C) Crystalline
(D) Mortar

041. Sedimentary structures formed by contemporaneous cutting and filling by migrating ripples and consists of beds having higher inclination than the principal surface of accumulation are called as _____.

(A) Ripple marks
(B) Cross stratifications
(C) Graded beddings
(D) Mud cracks

042. When the depositional system contains mud as well as sand, intermittent breaks in the current flow may lead to preservation of streaks of mud with ripple troughs, the resulting structure is identified as _____.

(A) Lenticular bedding
(B) Wavy bedding
(C) Flaser bedding
(D) Cross bedding

043. A sandstone having a high ( > 10 % ) proportion of feldspars and high matrix content is classified as _____.

(A) Arkose
(B) Feldspathic wacke
(C) Gray wacke
(D) Arenite

044. Carbonate rocks made up of materials eroded from older, lithified carbonate sediments are termed as _____

(A) Calc-arenites
(B) Calc-lithites
(C) Calci-rudites
(D) Calci-lutites

045. According to Dunham (1962) micritic limestones having more than 10 % coarse grains comprising skeletons of organisms or other materials are called _____

(A) Wackestones
(B) Packstones
(C) Mudstones
(D) Grainstones

046. Shelf sediments sequence starting with lag gravels at the bottom and ending with bioturbated silts and muds on the top represents _____ sequence.

(A) Prograding
(B) Transgressive
(C) Aggradational
(D) Turbidite

047. In a glacial environment, varves with a sandy or silty litho facies deposited during summer season, followed by winter clays represent _____ deposits.

(A) Pro-glacial
(B) Peri glacial
(C) Glacio marine
(D) Loess

048. The measure of the total sand moving capacity of the wind expressed in vector units, without regard to wind direction at the locality is called _____.

(A) Resultant drift potential
(B) Drift potential
(C) Self potential
(D) Deflation

049. In a fluvial environment, the presence of fining upward sequence starting from gravelly deposits at the bottom and ending in silty or muddy sediments represent deposits of _____.

(A) Braided streams
(B) Meandering streams
(C) Alluvial fans
(D) Anastomosing streams

050. A sub-environment of sedimentation within the barrier beach system that extends from low tide work to a depth of about 10 – 20 m is considered as _____

(A) Fore shore
(B) Back shore
(C) Shore face
(D) Wash over flats

051. The process of fossilization in which the original spaces in the shell are impregnated with extra minerals is called _____.

(A) Replacement
(B) Permineralisation
(C) Recrystallization
(D) Petrification

052. A phenomenon in which unrelated genera/species may be develop identical external morphology due to adaptation to a similar life habit is called _____.

(A) Homeomorphism
(B) Dimorphism
(C) Polymorphism
(D) Pseudomorphism

053. The well known articulate group of Brachiopods made their first appearance during _____ period of the geological history.

(A) Silurian
(B) Devonian
(C) Ordovician
(D) Carboniferous

054. The pattern of evolution in horse exhibiting progressive change of characters in some pre-determined directions is called _____.

(A) Para genesis
(B) Epigenesis
(C) Ortho genesis
(D) Meta genesis

055. _____ represents the most dominant group of flora during the lower Gondwana period.

(A) Angiosperms
(B) Pteriodophytes
(C) Gymnosperms
(D) Pteriodosperms

056. Inarticulate Brachiopods with the pedicle emerging freely between the two valves, the opening being shared more or less by both valves are classified as _____

(A) Atremata
(B) Palaeotremata
(C) Protremata
(D) Telotremata

057. A variety of dentition in lamellibranchs, characterised by series of mainly similar alternating teeth and sockets is described as _____.

(A) Teleodont
(B) Taxodont
(C) Schizodont
(D) Isodont

058. Air breathing gastropod forms which are mainly terrestrial and fresh water forms in which the mantle cavity has been modified into a lung are classified as _____

(A) Pulmonata (B) Ophisthobranchia

(C) Ctenobranchia (D) Aspidobranchia.

059. In a gastropod shell, the line of contact between the adjacent whorls is designated as _____.

(A) Spire (B) Siphon

(C) Suture (D) Columella

060. Foraminiferal tests usually found in primitive groups and composed of mica flakes, quartz grains, sponge spicules, shell fragments and other foreign materials are called _____ tests.

(A) Chitinous (B) Agglutinated

(C) Calcareous (D) Siliceous

061. The golden colour of the grains in the 'Golden Oolite' beds in the Chari Series of Kutch basin is attributed to the coating of thin films of _____.

(A) Manganese oxide (B) Strontium oxide

(C) Ferric oxide (D) Magnesian oxide

062. The rocks of Patcham Series in the Jurassic succession of Kutch basin represents their deposition in _____ conditions.

(A) Fluvial (B) Regressive

(C) Transgressive (D) Lagoonal

063. Zones of bio-stratigraphic units that consists of all beds included between the lowest and highest stratigraphic occurrences of any fossil, which may be a species, genus or some larger taxonomic group are identified as _____ zones.

(A) Assemblage (B) Range

(C) Acme (D) Barren

064. A tectonic boundary that defines the eastern limit of the Aravalli mobile against the Vindhyan domain is marked by _____.

(A) Main boundary fault (B) Great boundary fault

(C) Phulad shear zone (D) Rikhabdeo suture zone

065. The fundamental unit of lithostratigraphy which is mappable on 1:50,000 scale and represented by a rock succession deposited under a relatively uniform physico-chemical conditions is _____.

(A) Super group (B) Group

(C) Member (D) Formation

066. Bodies of pyrogenic minerals that have crystallised towards the close of the magmatic period and represents consolidated parts of igneous fractions that remained after the crystallization of the early formed rock silicates are referred as _____ deposits.

(A) Early magmatic (B) Late magmatic

(C) Hydrothermal (D) Weathering

067. High temperature hydrothermal deposits that form near the intrusives are identified as _____ deposits.

(A) Hypothermal (B) Mesothermal

(C) Epithermal (D) Telethermal

068. A process of essentially simultaneous capillary solution and deposition by which a new mineral is substituted for one or more earlier formed minerals is referred as _____

(A) Metasomatic replacement (B) Crystallisation

(C) Dissolution (D) Exsolution

069. In India, 43% of the iron ore reserves are located in the states of _____ and _____.

(A) Gujarat, Maharashtra (B) Karnataka, Kerela

(C) Bihar, Orissa (D) Rajasthan, Madhya Pradesh

070. The Manganese deposits occurring in the states of Madhya Pradesh and Maharashtra are associated with the rocks of _____ age.

(A) Mesozoic (B) Paleozoic

(C) Pre-Cambrian (D) Cenozoic

071. In the state of Gujarat, the Copper-Lead-Zinc ore deposits with 12 % metal content are reported from _____

(A) Jambughoda region (B) Ambaji region

(C) Panandhro region (D) Bhavnagar region

072. In India, the Lapsa Buru deposit in the state of Bihar is considered to be the largest deposit of _____ in the world.

(A) Copper (B) Uranium

(C) Gold (D) Kyanite

073. An interlocking network of small ore bearing veinlets traversing a mass of rock and occur as separate bodies or in association with other type of deposits is described as _____.

(A) Saddle reefs (B) Ladder veins

(C) Stock works (D) Pitches and flats

074. Aquifer in which a water table varies in undulating form and in slope, depending on areas of recharge and discharge, pumpage from wells and permeability is classified as _____ aquifer.

(A) Confined (B) Leaky

(C) Unconfined (D) Idealised

075. _____ is a frequently used and more favoured method of artificial recharge of ground waters.

(A) Stream channel method (B) Basin method

(C) Irrigation method (D) Ditch and Furrow method

076. A measure of the amount of water that can be transmitted horizontally through a unit width by the full saturated thickness of the aquifer under a unit hydraulic gradient is considered as _____.

(A) Storage co-efficient (B) Aquifer transmissivity

(C) Specific storage (D) Specific retention

077. The conditions required for the validation of Darcy's law prevail when the Reynolds number is _____.

(A) Greater than 100 (B) Less than 10

(C) 10 to 50 (D) 50 to 100

078. In ground water studies, the plot of n2 H as a function of n18 O that forms a straight line which is parallel to but below the meteoric water line is described as _____

(A) Local meteoric water line
(B) Global meteoric water line
(C) Regional meteoric water line
(D) Non meteoric water line

079. During precipitation the water is isostatically heavier than the vapour left behind in the atmosphere in terms of _____ isotopes.

(A) $^{2}H$ and $^{16}O$
(B) $^{2}H$ and $^{18}O$
(C) $^{2}H$ and $^{17}O$
(D) $^{1}H$ and $^{18}O$

080. The term used to describe the bodies of ground water in an aquifer that differ in their chemical composition is _____

(A) Hydrochemical facies
(B) Lithofacies
(C) Geochemical facies
(D) Groundwater facies

081. In case of well sorted sediments, the intrinsic permeability is always proportional to the _____ of sediments.

(A) Grain shape
(B) Grain size
(C) Grain composition
(D) Grain orientation

082. According to Bernoulli's equation, the term that represents the length of the water column in a well or piezometer is _____.

(A) Pressure head
(B) Velocity head
(C) Elevation head
(D) Viscosity head

083. The elevation to which water rises in a well that taps a confined aquifer is called _____

(A) Drawdown level
(B) Potentiometric level
(C) Capillary Fringe
(D) Phreatic level

084. _____ is a term applied to the length of the sinous path followed by a fluid particle and is defined as the length of flow path divided by the overall length of the sample.

(A) Tortuosity
(B) Effective porosity
(C) Absolute porosity
(D) Permeability

085. The ability of a specific chemical substance to crystallize with more than one type of structure is known as _____.

(A) Polytypism
(B) Polymorphism
(C) Pseudomorphism
(D) Homeomorphism

086. Silicates in which all four oxygens of a $SiO_4$ tetrahedron are shared by adjoining tetrahedra giving rise to 3-dimensional network of unit composition $SiO_2$ are classified as _____.

(A) Phyllo silicates
(B) Soro silicates
(C) Ino silicates
(D) Tecto silicates

087. A group of minerals that are relatively hard, dense, refractory and generally occur as accessory minerals in igneous and metamorphic rocks and as resistant detrital grains in sediments are grouped as _____.

(A) Oxides
(B) Hydroxides
(C) Halides
(D) Sulfides

088. Plagioclase feldspars show _____ type twinning.

(A) Simple (B) Complex

(C) Cyclic (D) Polysynthetic

089. _____ refers to a non-random overgrowth shown by two compositionally different crystalline substances.

(A) Anataxis (B) Epitaxis

(C) Eutaxis (D) Syntaxis

090. A type of mechanism in which the internal rearrangement in going from one form to another is extensive and involves breaking of atomic bonds and a reassembly of the structural units in a different arrangement is called _____ polymorphism.

(A) Reconstructive (B) Displacive

(C) Order-disorder (D) Destructive

091. Substitution of silica for wood fibre to form petrified wood is a common example of _____ pseudomorphs.

(A) Encrustation (B) Alteration

(C) Substitution (D) Omission

092. _____ is a mineral structure in which specific atomic sites are occupied in variable proportions by two or more different chemical elements or groups.

(A) Solid solution (B) Exsolution

(C) Pseudomorphism (D) Polytypism

093. The property in which temperature changes in a crystal may cause simultaneous development of positive and negative charges at opposite ends of a polar axis is called _____.

(A) Piezoelectricity (B) Pyroelectricity

(C) Thermoluminescence (D) Triboluminescence

094. The property of minerals in reflected light in which minerals show silky appearance that results from closely packed fibres or from a parallel arrangement of inclusions or cavities is called _____.

(A) Chatoyancy (B) Luminescence

(C) Phosphorescence (D) Fluorescence

095. Theory of plate tectonics is based on following postulations

(a) Plates are internally rigid

(b) Plates are inefficient stress guides

(c) A stress applied to one margin of a plate is transmitted to its opposite margin with no deformation of the plate interior.

(d) Deformation takes place only at the plate margins

(A) Statement (a) (b) and (d) are correct (B) Statement (a) (c) and (d) are correct

(C) Statement (b) (c) and (d) are correct (D) Statement (a) (b) and (c) are correct

096. Euler's theorem explains motion between two relative plates considering

(a) A single angular rotation about a pole of rotation

(b) A variable angular rotation about a pole of rotation

(c) The pole of rotation moves relative to plate motion

(d) The pole of rotation and its anitpodal point remain fixed

(A) Statement (a) and (b) are correct (B) Statement (b) and (c) are correct

(C) Statement (c) and (d) are correct (D) Statement (d) and (a) are correct

097. Two important processes that lead to formation of planets formation processes are

(a) Condensation is the production of solid dust grains as the gases in the solar nebula cool.

(b) Accretion is the collision of the dust grains to form clumps and progressively larger bodies

(c) Accretion is the production of solid dust grains as the gases in the solar nebula cool.

(d) Condensation is the collision of the dust grains to form clumps and progressively larger bodies

(A) Statements a and b are correct (B) Statements c and d are correct

(C) Statements a and c are correct (D) Statements b and d are correct

098. Arrange the following minerals in order of increasing depth in Earth's interior.

(a) Olivine

(b) Perovskite

(c) Spinel

(d) Wadsleyite

(A) a - b - c - d (B) a - c - d - b

(C) a - d - c - b (D) d - a - b - c

099. Continental drift has influence distribution of flora and fauna by_____

(A) Supplementing them towards dispersal across continents

(B) Creating barriers to their dispersal

(C) Decreasing diversity

(D) Increasing diversity and isolation

100. Continental suturing leads to _____

(A) Diversification of faunas by cross-migration and the extinction of less well-adapted groups

(B) Homogenization of faunas by cross-migration and the extinction of less well-adapted groups

(C) Homogenization of faunas by residing at a place and the extinction of well-adapted groups

(D) Diversification of faunas by residing at a place and the extinction of well-adapted groups

101. The weathering that leads to form cavernous hollows typically several cubic metres in volume and have arch-shaped entrances, concave inner walls, overhanging margins (visors) and fairly smooth, gently sloping debris-covered floors especially in medium- and coarse-grained granites, sandstones and limestones is referred as _____

(A) Alveoles (B) Dayas

(C) Tafoni (D) Gnammas

102. A _____is a duricrust that has been cemented by iron may be up to 80 percent ranging between 1 m and 10 m thickness found in desert environment

(A) Ferricrete (B) Desert Tufas

(C) Stone Pavements (D) Silcretes

103. Slow plastic deformation of rock or soil in response to stress created by weight of overburden is referred to as _____.

(A) Debris flow (B) Rock creep

(C) Solifluction (D) Talus creep

104. The water balance equation relates runoff (Q), precipitation (P), evapotranspiration (ET) and changes in storage in soil or groundwater (ΔS) in the form _____.

(A) $Q = \Delta S - ET \pm P$ (B) $Q = ET - P \pm \Delta S$

(C) $Q = \Delta S - P \pm ET$ (D) $Q = P - ET \pm \Delta S$

105. Buckle-folded veins, boudinage structures, and deformed fossils are few evidences that are used to determine _____.

(A) Strain ratio in two dimensions (B) Stress ratio in two dimensions

(C) Strain ratio in three dimensions (D) Stress ratio in three dimensions

106. The penecontemporaneous structures can be distinguished from tectonic structures by the following features

(a) The bed or the bounding layers do not share the same deformation.

(b) The bed or the bounding layers share the same deformation.

(c) Structures are often truncated by an erosion surface

(d) Structures are do not truncated by an erosion surface

(A) Statements a and b are correct (B) Statements a and c are correct

(C) Statements b and c are correct (D) Statements c and d are correct

107. Antiformal structure with no distinct trend of hinge in is said to be_____.

(A) Antiform (B) Basin

(C) Dome (D) Synform

108. _____ type of Joints are said to be classified on the basis of their mode of formation.

(A) Curved and inclined joint (B) Dipping and plunging joint

(C) Normal and Reserve joints (D) Tensional and Shear Joints

109. A point that separates a concave and convex segment of a fold is called as ____

(A) Trough point (B) Inflection point

(C) Hinge point (D) Crest point

110. The orientations of the dip isogons over a fold is qualitatively describe as _____.

(A) Variation in the thickness of limb and similarity in curvature in the fold

(B) Uniform in the thickness of limb and similar curvature in the fold

(C) Uniform in the thickness of limb and difference curvature in the fold

(D) Variation in the thickness of limb and difference in curvature in the fold

111. The most commonly used criterion for determining the relative ages of joint sets are:

(a) The abutting relationship. Younger joints abut older joints.

(b) The cutting of surface marking. A younger joint cuts the marking of an older joint

(c) The abutting relationship. Younger joints cuts older joints.

(d) The cutting of surface marking. A younger joint abut the marking of an older joint

(A) Statements (a) and (b) are correct (B) Statements (a) and (c) are correct

(C) Statements (b) and (c) are correct (D) Statements (c) and (d) are correct

112. Horizontal component of the displacement along fault plane is called _____

(A) Dip (B) Heave

(C) Hade (D) Throw

113. _____ describes the normal and shear stress acting on planes of all possible orientations through a point in the rock.

(A) Balanced cross-section (B) Rose diagram

(C) Mohr diagram (D) Stereographic projections

114. For non-coaxial deformations the orientation of the principle strain axes _____

(A) Are different for different amounts of strain

(B) Always point in the same directions (same orientation, different lengths)

(C) Are same for different amounts of strain

(D) Always point in the different directions (different orientation, same lengths)

115. In case of Mohr circle,

(a) The value of the maximum (sigma 1 and sigma 2) and minimum (sigma 1 and sigma 3) principal stresses are plotted on the horizontal axis

(b) The value of the maximum (sigma 1 and sigma 3) and minimum (sigma 1 and sigma 2) principal stresses are plotted on the horizontal axis

(c) The distance between sigma 1 and sigma 3 defines the diameter of a circle centered at (sigma 1 + sigma 3)/2, 0)

(d) The distance between sigma 1 and sigma 3 defines the diameter of a circle centered at (sigma 1 + sigma 2)/2, 1)

(A) Statements (a) and (b) are correct (B) Statements (a) and (c) are correct

(C) Statements (b) and (c) are correct (D) Statements (c) and (d) are correct

116. _____ deformation preserves continuity of originally continuous structures and layers, and describes a scale-dependent deformation style that can form by a range of deformation mechanisms.

(A) Plastic (B) Ductile

(C) Brittle (D) Plastic and Ductile

117. The largest faults in a faulted area, called master faults, are associated with minor faults that may be antithetic or synthetic where,

(A) An antithetic fault dip perpendicular to the master fault while, a synthetic fault dips parallel to the master fault

(B) An antithetic fault dip parallel to the master fault while, a synthetic fault dips perpendicular to the master fault

(C) An antithetic fault dip in the same direction as master fault while, a synthetic fault dips toward the master fault

(D) An antithetic fault dips toward the master fault while synthetic fault dips in the same direction as the master fault

118. Folds with straight hinge lines are _____.

(A) Cylindrical (B) Non-cylindrical

(C) Square (D) Rectangular

119. An erosional remnant of a nappe is called a _____.

(A) Fenster (B) Foreland

(C) Hinterland (D) Klippe

120. The original motif is rotated 360 degrees, so that it returns to its original position and is then inverted through a center. The combination of operations produces result persistant with _____.

(A) 2 bar inversion (B) Centre of symmetry

(C) One fold rotation (D) Screw

121. Minerals Pyrite and Marcasite are the example of _____.

(A) Exsolution (B) Isomorphism

(C) Polymorphism (D) Solid solution

122. The term _____ refers to the process whereby an initial homogenous melt separates into two or possibly more distinct crystalline mineral without addition or removal of material to or from the system.

(A) Exsolution (B) Polymerisation

(C) Solid Solution (D) Twining

123. A _____ is a mineral structure in which specific atomic site(s) are occupied in variable proportion by two or more different chemical elements or groups.

(A) Exsolution (B) Isomorphism

(C) Polymorphism (D) Solid solution

124. Pyralspite series represents _____.

(A) Garnets with absence of $Ca^{2+}$ on A site

(B) Garnets with presence of $Ca^{2+}$ on A site

(C) Aluminosilicate with presence of Al as independent AlO4 octahedra

(D) Olvine group with presence of Mg and Fe as independent octahedral

125. The wider cleavage angle in amphibole (56° and 124°) is because of _____.

(A) Extension of chain along b-axis (B) Extension of chain along c-axis

(C) Doubling chain along c-axis (D) Doubling chain along b-axis

126. A sheet in which each oxygen or (OH) is surrounded by three cations as in the brucite type structure, phyllosilicates are classified as _____

(A) Octahedral
(B) Dioctahedral
(C) Trioctahedral
(D) Tetrahedral

127. High and low temperature silica polymorphs show _____ type of transformation respectively.

(A) Displacive and reconstructive
(B) Displacive and Order-disorder
(C) Reconstructive and displacive
(D) Reconstructive and Order-disorder

128. In the petrographic microscope, orientation of polariser is aligned by observing Biotite and Tourmaline under plane polarised light:

(a) Biotite is lightest when cleavage is oriented parallel to the vibration direction of lower polariser and darkest when cleavage is at right angle.

(b) Biotite is darkest when cleavage is oriented parallel to the vibration direction of lower polariser and lightest when cleavage is at right angle.

(c) Tourmaline is lightest when long dimension is parallel to the vibration direction of lower polariser

(d) Tourmaline is lightest when long dimension is right angle to the vibration direction of lower polariser

(A) Statements (a) and( b) are correct
(B) Statements (b) and (c) are correct
(C) Statements (c) and (d) are correct
(D) Statements (d) and (a) are correct

129. Considering the textural criteria first, what does one understand by aphanitic nature of igneous rocks?

(A) The crystals that compose the rock are predominantly of felsic or mafic minerals.

(B) The crystals that compose the rock have at least 10% of felsic or mafic minerals.

(C) The crystals that composes the rock are readily visible with the naked eye or

(D) The crystals that compose the rock too small to be seen readily with the naked eye

130. In igneous rocks if the phenocrysts contain numerous inclusions of another mineral that they enveloped as they grew, the texture is called_____ and the host crystal may then be called_____ respectively.

(A) Phenocrysts, matrix
(B) Poikilitic, oikocryst
(C) Oikocryst, poikilitic
(D) Matrix, phenocrysts

131. _____texture, involving albitic plagioclase overgrowths on orthoclase occurs in some granites where the plagioclase preferentially forms on the structurally similar alkali feldspar, rather than nucleating on their own.

(A) Rapakivi
(B) Spherulitic
(C) Ophitic
(D) Variolitic

132. In the early stages of a basaltic eruption, the runny lava cools and develop black corrugated, or ropy, appearance. The corrugations are usually less than 2 cm high, with axes perpendicular to, or convex to, the flow direction. Such lavas are called _____.

(A) Block lavas
(B) Lava tubes
(C) Pillows
(D) Pahoehoe

133. Incorporation of chemical constituents from the walls or roof of a magma chamber into the magma itself is referred to as _____

(A) Assimilation
(B) Fractional crystallization
(C) Mixing
(D) Liquid immiscibility

134. _____point in a phase diagram marking the lowest point on the liquidus, at the point where it meets the solidus.

(A) Eutectic
(B) Fluidity
(C) Invariant
(D) Projection

135. Eutectic point in a phase diagram indicates

(a) The composition of the final melt formed during crystallization,

(b) The temperature at which a melt becomes entirely crystallized during cooling

(c) The composition of first melt to form during melting.

(d) The temperature at which melting begins during heating

(A) Statements (a) and (b) are correct
(B) Statements (c) and (d) are correct
(C) Statements (a), (b), and (c) are correct
(D) Statements (a), (b), (c), and (d) are correct

136. Groundmass in which feldspar microlites or laths are aligned in a swirly flow pattern is referred to as _____ texture

(A) Aphanitic
(B) Intersertal
(C) Seriate
(D) Trachytic

137. In a two-phase mixtures, compositional range within a solid solution series where no homogeneous crystal is stable is referred to as _____.

(A) Crystallisation gap
(B) Formational gap
(C) Liquidus gap
(D) Miscibility gap

138. Zones of mineral sequence namely, Chlorite, Biotite. Staurolite, Kyanite, Sillimanite recognized in orogenic terranes worldwide is referred to as _____.

(A) Barrovian zones
(B) Blackwall zones
(C) Metasomatic zones
(D) Multi mineralic zones

139. Single mica crystals (not porphyroclasts) that are shaped much like ó-type mantled porphyroclasts having their long axis is oriented in the direction of extension is referred to as _____

(A) Asymmetric folds
(B) Mica-fish
(C) Quarter folds
(D) Quarter mats

140. Read the statements

(a) Blastoporphyritic means a porphyritic-like texture that is of igneous origin.

(b) Porphyroblastic means a porphyritic-like texture that is of igneous origin.

(c) Blastoporphyritic means a porphyritic-like texture that is of metamorphic origin.

(d) Porphyroblastic means a porphyritic-like texture that is of metamorphic origin.

(A) Statements (a) and( b) are correct
(B) Statements (b) and (c) are correct
(C) Statements (c) and (d) are correct
(D) Statements (d) and (a) are correct

141. _____is a general terms for any planar and linear textural element in a metamorphic rock.

(A) Tectonite and foliation
(B) Foliation and tectonite
(C) Foliation and lineation
(D) Lineation and foliation

142. A _____ comprises of two cleavages. The first cleavage may be a slaty cleavage or schistosity that becomes microfolded whereas the second cleavage is developed by dissolution of quartz from the fold limbs (steeper) and precipitate in the hinge areas or be transported further away. New micas may also grow normal to $\sigma 1$ during the second phase.

(A) Crenulation cleavage
(B) Microlithons
(C) Stylolytic
(D) Slaty cleavage

143. A texture that has shear bands (or C foliations), which are spaced cleavages that transect well-developed mineral foliation (S foliation) at a small angle is referred to as _____

(A) Mylonitic texture
(B) Cataclastic texture
(C) S-C texture
(D) Symplectite texture

144. If $\varnothing$ = number of phases in the system; $C$ = number of components; $F$ = number of degrees of freedom Gibbs phase rule as applied to systems at equilibrium is expressed as:

(A) $F = C - \varnothing + 2$
(B) $F = 2 + \varnothing - C$
(C) $F = \varnothing - C + 2$
(D) $F = 2 - \varnothing + C$

145. _____diagrams are commonly used in combination to depict the relationships between rock composition, mineral assemblage, and metamorphic grade in metamorphosed pelitic rock sequences.

(A) ACF and ACM
(B) ACF and AFM
(C) AFM and AKF
(D) AKF and ACF

146. Mineral Assemblages for rocks belonging to Blueschist Facies are _____

(A) Chlorite + Albite + Epidote (or Zoisite) + Actinolite ± Quartz
(B) Glaucophane + Lawsonite or Epidote/Zoisite
(C) Prehnite + Pumpellyite
(D) Pyralspite Garnet + Omphacitic Pyroxene

147. A mixed rock comprising dark schistose component is intimately associated with light of poorly schistose material having both igneous and metamorphic components is referred to as _____.

(A) Ophiolite
(B) Peridotites
(C) Skarn
(D) Migmatites

148. Good geothermometers and geobarometers are based on equilibria _____.

(A) that are not sensitive to pressure and temperature respectively
(B) that are not sensitive to temperature and pressure respectively
(C) that are not sensitive to composition and temperature respectively
(D) that are not sensitive to composition and pressure respectively

149. The two principal metasomatism processes of mass transfer in rocks are _____.

(A) Diffusion and Hydrolytic alteration
(B) Diffusion and Infiltration
(C) Fenitization and Hydrolytic alteration
(D) Infiltration and Fenitization

150. A _____ is a rock dominated by Ca-Fe-Mg-rich calc-silicate minerals, usually formed by replacement of carbonate-bearing rocks during either regional or contact metamorphism.

(A) Granofels
(B) Marble
(C) Metacarbonates
(D) Skarn

151. Sand may be defined as a sediment consisting primarily of grains in the size range _____.

(A) < 4 mm
(B) 4 mm to 63 mm
(C) 0.063 mm to 2.0 mm
(D) > 2.0 mm

152. The petrographic description of the texture of terrigenous clastic sediments and sedimentary rocks is done based on _____ relationship

(A) Clasts - matrix
(B) Phenocrysts - groundmass
(C) Clast - groundmass
(D) Phenocrysts - matrix

153. _____ captures the sharpness or flattening of peak frequency distribution curves of grain size distribution record.

(A) Kurtosis
(B) Skewness
(C) Sorting
(D) Textural maturity

154. Calcium magnesium carbonate [$CaMg(CO_3)_2$] is a common rock-forming mineral known as _____ and rock comprising said mineral is referred to as _____ respectively.

(A) Siderite and Iron stone
(B) Chalcedony and siliciclastic
(C) Calcite and micrite
(D) Dolomite and dolostone

155. _____ are formed only in relatively shallow water in the absence of strong currents, whereas _____may form as a result of water flow in any depth in any subaqueous environment respectively.

(A) Current ripples, wave ripples
(B) Wave ripples, current ripples
(C) Current ripples, Flow ripples
(D) Wave ripples, Flow ripples

156. The graded bed reflects the changing processes that occur during the flow and these vary according to the density of the initial mixture. Low- to medium-density turbidity currents will ideally form a succession known as a _____

(A) Para sequence
(B) Bara Sequence
(C) Bouma sequence
(D) Meta sequence

157. _____ formed by the migration of sinuous subaqueous dunes typically has asymptotic bottom contacts and an undulating lower boundary.

(A) Flaser bedding
(B) Graded bedding
(C) Planar cross-bedding
(D) Trough cross-bedding

158. Why the sediments in the lake bottom show well preserve primary sedimentary stratifications?

(A) Epilimnion condition at the lake bottom
(B) Oxidation condition at the lake bottom
(C) Presence of anaerobic at the lake bottom
(D) Palustrine condition at the late bottom

159. Large bodies of water that periodically dry out are described as _____.

(A) Ephemeral lakes (B) Glacial lake

(C) Lakes by caldera collapse (D) Perennial lakes

160. _____ or desert rose is the common mineral to crystallise in the inland sabkhas regions.

(A) Calcite (B) Chalcedony

(C) Common salt (D) Gypsum

161. At any point on the surface of the earth, the level of the ocean water will rise and fall twice a day as the two bulges are passed in each rotation. This creates the _____.

(A) Diurnal tides (B) Ebb tide

(C) Neap tides (D) Spring tides

162. The primary criterion used in Dunham classification scheme is the texture, which is describes_____.

(A) proportion of carbonate matrix present and the framework of the clasts

(B) proportion of carbonate mud present and the framework of the rock

(C) proportion of carbonate ground mass present and the framework of the phenocrysts

(D) proportion of carbonate sand present and the framework of the fossils

163. A small, single-celled, marine organisms that range from a few tens of microns in diameter to tens of millimetres across either floating or live on sea floor are called as _____ respectively.

(A) Ahermatypic corals and Hermatypic corals (B) Benthic and planktonic Foraminifera

(C) Hermatypic corals and ahermatypic corals (D) Planktonic and benthic Foraminifera

164. _____ is the impression of an organism or an organic structure in the sediment.

(A) Burrows and Tubes (B) Cast

(C) Mould (D) Trails

165. Marine and sessile forms of Brachiopoda have _____

(A) Adductor muscles are more prominent that divaricator

(B) Ventral umbo is more prominent than the dorsal

(C) Dorsal umbo is more prominent than the ventral

(D) Divaricator muscles are more prominent that Adductor

166. The Brachiopoda shell where hinge line is long and straight and length of shell is more than width is referred to as _____.

(A) Articulata (B) Inarticulata

(C) Megathyroid (D) Spiriferid

167. The coiling in Murex and Physa are _____ respectively.

(A) Dextral and Sinstral (B) Discoidal and helicoidal

(C) Dextral and Discoidal (D) Sinstral and Dextral

168. Most palaeoanthropologists accept that there are two separate lines or stages of hominin evolution namely,_____.

(A) The Australopiths and Homo (B) The Ardipithecus and Homo

(C) The Praeanthropus and Homo (D) The Sahelanthropus and Homo

169. Major changes may be observed during the evolutionary history of the horses is through_____.

(A) Enlargement of brain and changes in the teeth

(B) Enlargement of limbs and changes in the brain size

(C) The changes in limb structure and teeth

(D) The changes in spine structure and tail

170. Arrange the Ammonoids in order of evolution of their sutures

(a) Ammonitic type

(b) Ceratitic type

(c) Goniatitic type

(d) Nautiloid type

(A) (a), (b), (c), and (d)

(B) (a), (d), (b), and (c)

(C) (b), (a), (c), and (d)

(D) (d), (c), (b), and (a)

171. Extension of Aravalli and Bundhelkhand underneath Indo-Gangetic Plain & Himalayas are marked by _____respectively.

(A) Delhi-Hardwar Ridge and Faizabad Ridge

(B) Faizabad Ridge and Delhi-Hardwar Ridge

(C) Faizabad Ridge and Great Boundary Fault

(D) Great Boundary Fault and Delhi-Hardwar Ridge

172. Large part of Eastern Ghats form outcrops _____ type of rock.

(A) Charnokites

(B) Mafic Granuites

(C) Khondalites

(D) Leptynite

173. In Palaeozoic sequence of Himalayas, Panjal volcanic are exposed in _____ regions.

(A) Kashmir and Zanskar-Spiti

(B) Kashmir and Peshawar

(C) Zanskar and Kinnaur

(D) Nepal and Bhutan

174. Arrange lithostratigraphic sequence of Mesozoic of Kutch basin

(a) Bhuj Formation

(b) Jhurio Formation

(c) Juran Formation

(d) Jumara Formation

(A) (a), (b), (c), and (d)

(B) (a), (d), (c), and (b)

(C) (a), (c), (d) and (b)

(D) (a), (c), (b) and (d)

175. Insitu Dinosaur nest with eggshells are found at _____ .

(A) Anjar, in Kutch

(B) Kevadiya along Narmada

(C) Raolia near Balasinor

(D) Than near Chotila

176. The Brachiopod Lingula seems to look exactly the same today as the fossils found in Lower Palaeozoic rocks and hence is of _____.

(A) no biostratigraphic value

(B) little biostratigraphic value

(C) moderate biostratigraphic value

(D) large biostratigraphic value

177. A _____ is metaphorically hammered into the rocks at that point, and all beds above it are defined as belonging to one epoch/period and all below it to another. All other beds of similar age around the world are then correlated with the strata

(A) Copper Spike
(B) Iron Spike
(C) Golden Spike
(D) Silver Spike

178. _____refers to ore deposits that form at the same time as their host rocks.

(A) Syngenetic
(B) Epigenetic
(C) Hypogene
(D) Supergene

179. _____refers to ore deposits that form after their host rocks.

(A) Syngenetic
(B) Epigenetic
(C) Hypogene
(D) Supergene

180. Sedimentary exhalative (SEDEX) deposits accounts for more than 50% of the world's Zn and Pb reserves forms from_____

(A) The discharge of metal-rich hydrothermal fluids on the sea floor
(B) Flushing of subsurface brines out of a sedimentary basin
(C) Topographic or gravity-driven fluid flow model
(D) Expulsion of basinal fluids through diagenesis and compaction

181. Gold mineralization in metamorphic tectonites is widely accepted as Orogenic gold deposits having common features such as _____.

(A) Near-surface supergene derivation
(B) Paleo-placer deposits
(C) Strata- bound deposits in continental-basin margins, and braided stream deposit
(D) Quartz-dominant vein systems in sulphide and carbonate

182. Both ruby and sapphire are the gem varieties of _____ mineral

(A) Crystalised Alumina
(B) Crystalised Beryl
(C) Hydrated phosphate of copper and aluminium
(D) Hydrated amorphous form of silica

183. Lignite deposits from Gujarat is reported from _____

(A) Ahmedabad, Surendranagar and Sabarkantha
(B) Ahmedabad, Gandhinagar, Mehsana districts
(C) Kutch and Bhavnagar and Bharuch districts
(D) Surendranagar, Sabarkantha and Chhota Udaipur districts

184. _____are essentially water clathrates of natural gas molecules, held captive below water at depths of more than 800 m, mostly in the continental rise and partly in the continental slope in the permafrost and outer continental margins of the world.

(A) Coal gas
(B) Gas hydrates
(C) Oil shales
(D) Tar sands

185. Withdrawing groundwater from aquifers depletes and depresses water levels around the pumping well The water table that forms around the well under observation is called _____

(A) Vadoze zone
(B) Water table
(C) Cone of Aquifer
(D) Cone of depression

186. Key factors to be considered for integrated aquifer-system management.

(a) Geology and well diameter

(b) Depth and Geology of well

(c) Renewable character and optimum aquifer pump rates of potential aquifers

(d) Prioritisation of subaquifer units and Well-field locations

(A) Statement (a) and (b) are correct
(B) Statement (b) and (c) are correct
(C) Statement (c) and (d) are correct
(D) Statement (d) and (a) are correct

187. In groundwater management, the _____is the rate at which groundwater can be withdrawn from an aquifer without causing an undesirable adverse effect

(A) Safe yield
(B) Sustainable yield
(C) Pumping
(D) Perennial yield

188. _____corresponds to water abstraction from an aquifer during one year such that undesirable effects are not allowed in the area.

(A) Safe yield
(B) Sustainable yield
(C) Optimum yield
(D) Perennial yield

189. _____ as the flow of water that can be abstracted from a given aquifer without producing adverse results.

(A) Safe yield
(B) Sustainable yield
(C) Optimum yield
(D) Perennial yield

190. _____is the quantity of water that can be pumped out from a well with no damage either to the aquifer or to the well itself

(A) Safe yield
(B) Sustainable yield
(C) Optimum yield
(D) Perennial yield

191. Body wave's travel through the Earth's Interior and radiate from the initial rupture point of an earthquake, called the _____.

(A) Epicenter
(B) Focus
(C) Hypocenter
(D) Edge

192. A drainage pattern characterized by a series of fairly straight parallel streams joined at right angles by tributaries is called _____.

(A) Rectangular Pattern
(B) Dendritic Pattern
(C) Trellis Pattern
(D) Radial Pattern

193. An elongate hill formed when a glacier flows over and reshapes a mound of till or stratified drift:

(A) Esker
(B) Moraines
(C) Kettle
(D) Drumlin

194. Which is a small volcano, as high as 300 meters, made up of loose pyroclastic fragments blasted out of a central vent?

(A) Caldara
(B) Composite volcano
(C) Shield Volcano
(D) Cinder cone

195. The lower portion of a glacier where more snow melts in summer than accumulates in winter so that there is a net loss of glacial ice is called as _____ .

(A) Zone of accumulation
(B) Zone of ablation
(C) Zone of aeration
(D) Zone of saturation

196. A technique whereby seismic data from many earthquakes and recording stations are analyzed to provide a three-dimensional view of the Earth's interior is called _____.

(A) Seismic tomography
(B) Seismic Profile
(C) Seismic Gap
(D) Seismogram

197. A steep-walled semicircular depression eroded into a mountain peak by a glacier is termed as _____ .

(A) Cirque
(B) Fjord
(C) Hanging Valley
(D) Moraine

198. The portion of the upper mantle beneath the lithosphere consists of weak, plastic rock and extends from a depth of about 100 kilometers to about 350 kilometers below the surface of the Earth surface is called _____.

(A) Lithosphere
(B) Asthenosphere
(C) Atomsphere
(D) Mesosphere

199. A boundary between two lithospheric plates where the plates are sliding horizontally past one another is termed as _____.

(A) Convergent collision plate boundary
(B) Convergent subduction plate boundary
(C) Divergent plate Boundary
(D) Transform plate boundary

200. A continuous submarine mountain chain that forms at the boundary between divergent tectonic plates within oceanic crust is called _____.

(A) Rift Velley
(B) Mid-oceanic ridge
(C) Oceanic trench
(D) Island arc

201. Weathering in which the edges and corners of a rock weather more rapidly than the flat faces, giving rise to a rounded shape is termed as _____.

(A) Exfoliation weathering
(B) Spheroidal weathering
(C) Partitional weathering
(D) Block disintegration

202. The line joining the corresponding points on successive profiles of the fold is called as_____.

(A) Crest line
(B) Inflection line
(C) Hinge line
(D) Trough Line

203. Inclined fold in which the pitch of the fold axis on the axial plane is between 80° and 100°.

(A) Plunging fold
(B) Periclinal fold
(C) Reclined fold
(D) Flexure fold

204. Substances that undergo a large plastic deformation before rupture are called _____.

(A) Brittle (B) Ductile

(C) Amorphous (D) Malleable

205. The line joining points of equal elevation is known as a

(A) Level line (B) Horizontal line

(C) Surface line (D) Contour line

206. The _____refers to the geographic direction of a horizontal line at a right angle to the strike and towards the downward inclination of the planar structure.

(A) Apparent dip direction (B) True dip direction

(C) Strike direction (D) Plunge

207. The equatorial plane of the reference sphere appears as a circle in stereographic projection is known as the_____.

(A) Primitive circle (B) Great circle

(C) Small circle (D) Semi cirle

208. The projection of a planar structure as a great circle trace may be called a_____.

(A) Stereographic projection (B) Cyclographic projection

(C) Equal area projection (D) Hemispherical projection

209. The folded surface in cross section is represented a plunge direction towards the convex side of the fold closure is termed as _____.

(A) Outcrop of plunging antiform (B) Outcrop of plunging synform

(C) Outcrop of synform (D) Outcrop of antiform

210. Which fold is result of instability when a layer or a stack of layers is subjected to a layer-parallel compression?

(A) Bending fold (B) Shear fold

(C) Passive fold (D) Buckle fold

211. The relative displacement of two adjoining points on either side of the fault plane is known as the

(A) Strike slip (B) Dip slip

(C) Net slip (D) Gross slip

212. Which pair of the forms is observed in the calcite crystal of hexagonal system?

(A) Rhombohedron- Octahedron (B) Rhombohedron- Scalenohedron

(C) Rhombohedron-Pyritohedron (D) Rhombohedron-Hexahedron

213. What are the cleavage angles in pyroxenes:

(A) Exactly 90° (B) 80° and 100°

(C) 87° and 93° (D) 84° and 96°

214. Which pair of minerals are belong to orthorhombic crystal system

(A) Olivine - Topaz (B) Olivine - Sphene

(C) Olivine - Rutile (D) Olivine - Enstatite

215. Three axes are unequal and not perpendicular to each other in _____ crystallographic system.

(A) Monoclinic (B) Orthorhombic

(C) Triclinic (D) Tetragonal

216. The ability of a specific chemical substance to crystallize with more than one type of structure is known as _____.

(A) Isostructuralism (B) Polymorphism

(C) Pseudomorphism (D) Polytypism

217. In which class of isometric system lack the mirror plane:

(A) $\bar{4}3m$ (B) $4/m\bar{3}2/m$

(C) 432 (D) $\bar{3}2/m$

218. Law of rational-indices mainly base on the position of:

(A) Faces (B) Edges

(C) Solid angles (D) Inter-facial angle

219. The highest degree of symmetry is shown by _____ and the lowest degree of symmetry is shown by_____ respectively.

(A) Cubic system, Triclinic system

(B) Cubic system, Monoclinic system

(C) Hexagonal system, Monoclinic system

(D) Tetragonal system, Monoclinic system

220. Which one of the following mineral shows imperfect prismatic cleavage at 87°and 93°?

(A) Augite (B) Orthoclase

(C) Microcline (D) Andesine

221. In tetragonal system if mirror plane if perpendicular to each of the rotational axis _____symmetry combination is result.

(A) 4/m3/m2/m (B) 4/m4/m2/m

(C) 4/m2/m2/m (D) 2/m2/m2m

222. Which of the following is correct order of mineral hardness?

(A) Calcite-Gypsum-Microcline-Quartz (B) Gypsum-microcline-calcite-quartz

(C) Gypsum-calcite-Topaz-quartz (D) Gypsum-calcite-microcline-quartz

223. The volatile-rich silica-poor magma kimberlite which brings diamonds to the surface from great depth at _____ temperatures.

(A) 1200° C (B) 1000° C

(C) 800° C (D) 600° C

224. Which magma is formed near the base of the continental crust?

(A) Basaltic magma (B) Theolitic magma

(C) Ophiolitic magma (D) Granitic magma

225. A large conformable, saucer-shaped concordant intrusions igneous intrusion with a depressed central region is called as _____ .

(A) Batholith (B) Lopoloith

(C) Sill (D) Laccoloith

226. Which volcanoes are built of both lava flows and fragmental material ejected from vents during periods of explosive activity?

(A) Shild (B) Dome

(C) Maar (D) Composite

227. Which differentiation processes of lava is operating in open system processes?

(A) Gravitational segregation

(B) Flowage segregation

(C) Mixing of two or more contrasting magma

(D) Convective melt fractionation

228. Andesitic magma (dioritic) is formed at _____ temperature.

(A) 1400° C (B) 1200° C

(C) 1000° C (D) 800° C

229. Which volcanic rock is exclusively occur in Achaean terrain and considered as volcanic equivalent of peridotite.

(A) Lamprophyres (B) Spilites

(C) Komatiite (D) Tonalite

230. If the amount of plagioclase is exceptionally high (>90), the special name of the rock is given as _____.

(A) Gabbro (B) Anorthosite

(C) Diorite (D) Granodiorite

231. The extensive differentiation resulted into incorporation of dense metallic separate phase is called as_____.

(A) Atmophile (B) Chalcoplile

(C) Siderophile (D) Lithoplile

232. Based on chemical composition ultra basic rock comprises of _____ of silica.

(A) > 66 wt. % $SiO_2$ (B) 52–66 wt. % $SiO_2$

(C) 45–52% wt. % $SiO_2$ (D) < 45 wt. % $SiO_2$

233. Which texture refers to a dense network of lath-shaped plagioclase microphenocyrsts included in larger pyroxenes?

(A) Porphyritic (B) Ophitic

(C) Aplitic (D) Aphanitic

234. Rapid changes in temperature occur in day and night cause's expansion and contraction of different minerals result in to splitting of rock is called_____.

(A) Oxidation (B) Exfoliation

(C) Hydrolysis (D) Carboxylation

235. A sandstone that contains more than 15% of feldspar is called as

(A) Feldspathic wacke
(B) Greywacke
(C) Feldspathic subarkose
(D) Feldspathic arenite

236. The sandstone is characterised by sub angular to very angular grains of quartz is called as texturally _____ rock.

(A) Immature
(B) Mature
(C) Submature
(D) Supermature

237. The pores developed in the carbonate rocks due to dissolution of rock are called:

(A) Vuggy porosity
(B) Moldic porosity
(C) Inter-particle porosity
(D) Fenestral porosity

238. Sandstones having more than 15 percent of matrix and dominate by lithic fragments are described as:

(A) Quartz Wacke
(B) Mudstone
(C) Arkosic Wacke
(D) Lithicwacke

239. Carbonate rock having grain supported framework and more than ten percent mud is termed as_____.

(A) Packstone
(B) Grainstone
(C) Wackestone
(D) Mudstone

240. _____ is not an allochemical component of carbonate.

(A) Intraclast
(B) Oolite
(C) Bioclast
(D) Micrite

241. Which ripples migrate and generate curved cross-laminae that are formed mainly in trough-shaped?

(A) Sinuous
(B) Linguoid
(C) Catenary
(D) Straight

242. _____ reflect the disruption of biogenic and physical stratification features or sediment fabrics by the activity of an organism.

(A) Biodepositional structures
(B) Biodepositional structures
(C) Bioerosional structures
(D) Bioturbational Structures

243. _____ cross-stratification is characterized by undulating sets of cross-laminae that are both concave-up and convex-up.

(A) Herringbone
(B) Hummocky
(C) Torrential
(D) Wedge shaped

244. _____ describes the distribution of grain size of sediments, either in unconsolidated deposits or in sedimentary rocks.

(A) Grain contact
(B) Grain shape
(C) Grain sorting
(D) Grain orientation

245. Which environmental zone extends from low tide to daily fair weather wave base?

(A) Backshore
(B) Foreshore
(C) Shoreface
(D) Onshore

246. The temperature at which recrystallisation or new mineral formation takes place depends on the initial material is called _____.

(A) Protolith (B) Mesolith

(C) Neolith (D) Paleolith

247. Quartz and olivine minerals that are typically a granular and appear as preferred _____ orientation.

(A) Dimensional (B) Lattice

(C) Random (D) Oblique

248. Which facies are characterized by the development of low molar volume and assemblage under condition of high pressure?

(A) Eclogite-Granulite (B) Granulite –Blueshist

(C) Greenshist-Amphibole (D) Eclogite-Blueschist

249. Granulites facies is characterized by _____ mineral composition.

(A) Prehnite + pumpellyite (+ chlorite + albite)

(B) Orthopyroxene + clinopyroxene + plagioclase ± garnet

(C) Chlorite + albite + epidote (or zoisite) + actinolite ± quartz

(D) Hornblende + plagioclase (oligoclase, andesine) ± garnet

250. _____pair of rocks are completely foliated in nature.

(A) Quartzite – Phyllite (B) Shist – Hornfelse

(C) Hornfelse – Quartzite (D) Phyllite – Schist

251. In contact metamorphic rocks porphyroblast like garnet and staurolite comprises of numerous inclusions are called as _____ texture.

(A) Desussate (B) Poikiloblastic

(C) Granoblstic (D) Nodular

252. _____ structure is developed due to alternating felsic and darker mineral layers.

(A) Schistose (B) Granulose

(C) Gneissose (D) Granoblastic

253. Which mineral growth is probably believed that the most common type in orogenic metamorphism and deformation?

(A) Post-Kinematic (B) Syn-kynamatic

(C) Pre-kynamatic (D) Inter-kinamatic

254. At any particular grade of metamorphism, the mineral paragenesis that develops in a rock under equilibrium conditions depends only on the _____.

(A) Textural parameters (B) Dominant mineral composition

(C) Bulk composition (D) Essential mineral composition

255. Metamorphism in which temperature and pressure acts as a dominant agent is known as _____ metamorphism.

(A) Dynamothermal (B) Contact

(C) Cataclastic (D) Thermal

256. _____ is a mirror type of contact metamorphism characterized by very high temperature at very low pressure, generated by volcanic or sub-volcanic body.

(A) Burial metamorphism
(B) Pyrometamorphism
(C) Orogenic metamorphism
(D) Contact metamorphism

257. The fossil of man like apes, *Proconsul africanus* of early Miocene is equivalent to_____ of Indian Siwalik form.

(A) Australopithecus
(B) Ramapithecus
(C) Sivapithecus
(D) Dryopthecus

258. In which group of coral septa are added in multiple of six patterns.

(A) Hexacorallia
(B) Octocorallia
(C) Tabulata
(D) Rugosa

259. A triangular gap along the hinge line of the pedicle valve, through which the pedicle emerges is known as

(A) Pedicle opening
(B) Deltidium
(C) Chilidium
(D) Delthyrium

260. Which one is oldest Equine of the old word?

(A) Merychippus
(B) Equus
(C) Eohippus
(D) Mesohippus

261. Graptolites are very useful index fossils of:

(A) Cretaceous age
(B) Permian and Triassic ages
(C) Carboniferous age
(D) Ordovician and Silurian

262. Which group of foraminifera has porcellaneous wall structures?

(A) Fusilina
(B) Rotalina
(C) Miliolina
(D) Textularina

263. Which provides the correct order of taxonomic categories from largest to smallest?

(A) Kingdom-phylum-class-order-genus-family-species
(B) Kingdom-phylum-class-order-family-genus-species
(C) Kingdom-phylum-order-class-genus-family-species
(D) Kingdom-phylum-order-class-family-genus-species

264. Which hinge line is consisting of straight, numerous, homodont teeth which that appear to radiate from the centre?

(A) Dysodont
(B) Taxodont
(C) Cyclodont
(D) Heterodont

265. A calcareous support for the lophophore in the articulate brachiopods is called _____ .

(A) Brachipophore
(B) Brachidium
(C) Muscles scars
(D) Mantle lobe

266. Which characteristic plant fossil is found in Karharbari Formation of Damuda group?

(A) Glossopteris
(B) Gangamopteris
(C) Gondwanidium
(D) Dicrodium

267. Which one of the following stages are belong to middle Siwalik group:

(A) Dhokpathan - Pinjor
(B) Dhokpathan - Tatrot
(C) Dhokpathan - Nagri
(D) Dhokpathan - Chinji

268. The line of demarcation between Archaean and Proterozoic being placed at:

(A) 2000 m.y.
(B) 3000 m.y.
(C) 2300 m.y.
(D) 2500 m.y.

269. Which group of the Trichinopoly area is belongs to in Paleocene in age?

(A) Ariyalur
(B) Naniyur
(C) Trichinopoly
(D) Uttatur

270. The division of the Mesozoic rocks of Kachcch in Jhurio, Jumara, Jhuran and Bhuj are an example of _____.

(A) Chronostratigraphy
(B) Lithostratigraphy
(C) Biostratigraphy
(D) Seismic stratigraphy

271. Which plain of the Indian subcocontinent separate the Himalay and the Peninsular India?

(A) Indo-Indus
(B) Indo-Brahmaputra
(C) Indo-Gangetic
(D) Indo-Malaya

272. Sittampundi layered basic complex forms occurs in _____.

(A) Granulite craton
(B) Dharwar craton
(C) Singhbum craton
(D) Bastar craton

273. Emplacement of Closepet granites marks important structures that divide _____.

(A) Eastern Dharwar craton from Bhandara craton
(B) Western Dharwar craton from Granulite craton
(C) Western Dharwar craton from Eastern Dharwar craton
(D) Eastern Dharwar craton from Granulite craton

274. The peninsular Indian Gondwana sequence has an age span of _____ period.

(A) Permian to Lower Jurassic
(B) Late Carboniferous to late Cretaceous
(C) Carboniferous to Triassic
(D) Early Permian to Early Cretaceous

275. Which is the oldest group of the Aravalli Super Group?

(A) Delwara group
(B) Champaner group
(C) Udaipur group
(D) Lunawada group

276. Great Boundary Fault separates the Aravalli Super Group of rocks from _____ in Rajasthan.

(A) Delhi Group
(B) Bhilwara group
(C) Vindhyan Group
(D) Erinpura granite

277. Ambamata-Devi deposits of Gujarat are associated with _____ores.

(A) Iron
(B) Manganese
(C) Copper
(D) Lead-zinc

278. The manganese ore deposits of Madhya Pradesh and Maharashtra are _____

(A) Residual deposits.

(B) Replacement deposits.

(C) Sedimentary deposits.

(D) Sedimentary deposits followed by metamorphism.

279. Which are most common manganese mineral ores?

(A) Pyrolusite - Rhodonite

(B) Pyrolusite - Rhodocrosite

(C) Pyrolusite - Psilomelane

(D) Psilomelane - Rhodocrosite

280. Pegmatites and magmatic segregation deposits have formed at temperatures around _____.

(A) 1200° C

(B) 1000° C

(C) 850° C

(D) 1350° C

281. Leaching of valuable elements from the upper parts of mineral deposits and their precipitation at depth to produce higher concentrations is called as _____.

(A) Resudial

(B) Supergene enrichment

(C) Mechanical accumulation

(D) Sedimentary Precipitation

282. Which out of the following minerals is formed as a result of evaporation in the arid regions?

(A) Gypsum

(B) Zinc

(C) Coal

(D) Copper

283. The Khetri belt of Rajasthan is famous for which ore deposits.

(A) Lead-Zinc

(B) Copper

(C) Manganese

(D) Iron

284. Hydrothermal deposits, which are formed at great depths, near the intrusive and with high is called_____.

(A) Hypothermal deposits

(B) Mesothermal deposits

(C) Epithermal deposits

(D) Syngenetic deposits

285. Diamond in kimberlite is good examples of _____.

(A) Disseminated deposit.

(B) Segregated deposit

(C) Injected deposit

(D) Pegmatitic deposit

286. Which of the following is found in the form of Monazite sand along the Kerala coast?

(A) Chromite

(B) Uranium

(C) Thorium

(D) Graphite

287. Chrysolite asbestos result from the :

(A) Magmatic liquid

(B) Alteration of serpentine

(C) Alteration of olivine to serpentine

(D) Hydrothermal solutions

288. Which of the following is a main component of common glass?

(A) Monazite sand

(B) Arkosic sand

(C) Silica Sand

(D) Carbonate Sand

289. The precipitation of mineral from mineralizing solution in the transverse veins or fractures is formed _____ deposit.

(A) Stock work
(B) Ladder veins
(C) Saddle reefs
(D) Fissure veins

290. Which types of aquifers are underlain by tremendous volume of unconsolidated rock material derived by erosion of bordering mountains?

(A) Extensive plains
(B) Buried valleys
(C) Intermontane valleys
(D) Water courses

291. The imagery surface in confined aquifer coinciding with the hydrostatic level of the water is called as _____ .

(A) Plain surface
(B) Potentiometric Surface
(C) Horizontal surface
(D) Isopach surface

292. The _____ of a soil or rock is the ratio of the volume of water that after saturation can be drained by gravity to its own volume.

(A) Storage coefficient
(B) Specific yield
(C) Specific retention
(D) Specific discharge

293. Choose the CORRECT order or percent porosity.

(A) Fine gravel < Medium gravel < Coarse gravel
(B) Fine gravel > Medium gravel < Coarse gravel
(C) Fine gravel > Medium gravel > Coarse gravel
(D) Fine gravel < Medium gravel > Coarse gravel

294. The mathematical relationship proposed for water flow through saturated porous media is_____

(A) Bernoulli's equation
(B) Reynold's Number
(C) Froude Number
(D) Darcy's law

295. Reynold's number expresses the dimensionless ratio of inertial viscous force to distinguish between the _____ flows.

(A) Turbulent and Density
(B) Turbulent and Laminar
(C) Turbulent and Gravity
(D) Turbulent and Rotational

296. The _____ of a soil or rock depends on a variety ph physical factor such as porosity and particles size, shape and arrangement.

(A) Permeability
(B) Hydraulic conductivity
(C) Transmissivity
(D) Capillary pressure

297. Which of the following rock is likely to have least porosity?

(A) Sandstone
(B) Claystone
(C) Siltstone
(D) Shale

298. In which recharge method the water releasing over the ground surface in order to increases the quantity of water infiltrating in to ground.

(A) Recharge through wells
(B) Recharge through Pits
(C) Recharge through stream channel
(D) Incidental recharge

**299.** **How many combination of stable isotopes of Hydrogen and Oxygen that makes water molecules with atomic mass ranging from 18 to 22.**

**(A) 10** **(B) 09**

**(C) 08** **(D) 07**

**300.** **Within groundwater system, the recharge area along the groundwater divides and discharge area are located at the bottom of major drainage divides is termed as _____.**

**(A) Intermediate groundwater flow system** **(B) Regional groundwater flow system**

**(C) Local groundwater flow system** **(D) Transitional groundwater flow system**