MIZORAM PUBLIC SERVICE COMMISSION

COMPETITIVE EXAMINATIONS FOR RECRUITMENT TO THE POST OF

GEOLOGIST JUNIOR UNDER COMMERCE & INDUSTRIES DEPARTMENT,
GOVERNMENT OF MIZORAM, NOVEMBER, 2022

GEOLOGY PAPER - II

Time Allowed : 2 hours   Full Marks : 200

All questions carry equal mark of 2 each.
Attempt all questions.

1. The symmetry operation of center of symmetry is
    (a) Rotation
    (b) Inversion
    (c) Reflection
    (d) Rotation + inversion

2. The molecular proportion of elements that constitute Olivine is
    (a) 2:1:4
    (b) 1:2:3
    (c) 4:2:1
    (d) 3:1:2

3. The brilliant red of ruby is due to the presence of
    (a) Chromium
    (b) Manganese
    (c) Copper
    (d) Vanadium

4. In orthorhombic system, body-centered (I) lattice is produced by translating a primitive rectangular lattice at a distance equal to
    (a) ½ c right, ½ b back and ½ a vertical
    (b) ½ c back, ½ b vertical and ½ a right
    (c) ½ c vertical, ½ b right and ½ a back
    (d) ½ c right, ½ b vertical and ½ a back

5. In crystallographic forms, a single face with no geometrically equivalent face elsewhere is known as
    (a) Sphenoid
    (b) Pinacoid
    (c) Pedion
    (d) Dome

6. In X-Ray diffraction of crystal using X-*Ray Powder Diffractometer*
    (a) All possible diffractions take place simultaneously
    (b) All possible reflections from atomic planes take place simultaneously
    (c) A polychromatic radiation source is used to strike the powdered crystal
    (d) The sample rotates though the angle 2q and the detector rotates through q

7. Which of the following method uses optic axis interference figure to determine 2V?
    (a) Wright Method
    (b) Kamb's Method
    (c) Tobi's Method
    (d) Mallard's Method

8. The retardation produced by gypsum plate is
    (a) 230 nm
    (b) 147 nm
    (c) 550 nm
    (d) 430 nm

9. Diamond is composed of carbon that has a base-state electron confiigration of
    (a) $1s^2 2s^2 2p^1$
    (b) $1s^2 2s^2 2p^2$
    (c) $1s^2 2s^2 2p^3$
    (d) $1s^2 2s^2 2p^4$

10. The chemical formula of kaolinite is

(a) $Al_2Si_2O_5(OH)_4$

(b) $Mg_3Si_4O_{10}(OH)_2$

(c) $Al_2Si_4O_{10}(OH)_2$

(d) $KAl_2(AlSi_3O_{10})(OH)_2$

12. In the crystal structure of monticellite, M2 site is occupied by

(a) Ca

(b) Mg

(c) Fe^{2+}

(d) both Mg and Fe^{2+}

13. The cosmic abundance of elements clearly indicated that the absolute abundances of elements depends on

(a) Chemical properties of elements

(b) The atomic number of elements

(c) The atomic weight of elements

(d) Nuclear stability of elements

14. Which one of the following statement is correct with reference to mineral stability?

(a) A stable mineral association is that which has the highest free energy possible under a particular circumstance.

(b) A mineral association is unstable when it is not the association with the highest free energy under specific conditions.

(c) A metastable association is one with more than the minimum free energy for the system but in which the rate of change to an association with lower free energy is so slow as to be undetectable.

(d) Both (a) and (b).

15. The compositions of which one of the following meteorite best matches the composition of that of the Sun?

(a) Ivuna

(b) Urelites

(c) Ataxites

(d) Pallasites

16. Choose the correct statement on rules and regulation of element distribution

(a) A minor element may substitute extensively for major elements if the difference in their ionic radii is not more than 25%.

(b) Ions whose charges differ by one unit may not substitute for another even if their radii are similar and the charge difference can be compensated by another substitution.

(c) LIL elements are more concentrated in mafic rather than felsic rocks because of their large radii and low electric charge.

(d) The HFSE are concentrated in the felsic end of the series because their ionic size and higher charge make their substitution for any major ions in silicate minerals difficult.

17. According to pioneering worker on average mineralogical composition of the earth's crust in volume per cent, the most abundant mineral is

(a) Quartz

(b) Plagioclase

(c) Alkali feldspar

(d) Micas

18. During the analysis of sample by ICPMS, the function of a Meinhard nebuliser is

(a) to filter out larger droplets (>10 mm).

(b) to generate fine aerosol carrying the sample.

(c) to volatilised the sample solution.

(d) to dissociate and ionised the sample solution.

19. The isotopic analysis of a mineral indicated that the value of $^{87}Sr/^{86}Sr$ ratio is 0.7090 and the ratio of $^{86}Sr/^{88}Sr$ is 0.1194. What will be the isotope ratio of $^{87}Sr/^{88}Sr$?

(a) 0.08465

(b) 0.80654

(c) 0.06991

(d) 1.21080

20. Migration of elements in the outer part of the earth gives rise to the concept of geochemical cycle which begins with
   (a) alteration and weathering of pre-existing rocks.
   (b) transportation and deposition of materials.
   (c) diagenesis and lithification to metamorphism.
   (d) initial crystallization of magma.

21. The important criteria for a magma to be called as primary magma is
   (a) repeated appearance throughout geologic time.
   (b) occurrence even in small quantities with larger batholiths.
   (c) sparse distribution of emplacement.
   (d) at least a small component in rock suites and association.

22. Studies of mantle petrology from ultramafic xenoliths indicated that the normal state of mantle must be
   (a) semisolid.   (b) essentially liquid.
   (c) essentially solid.   (d) partially melted.

23. The main mechanism of generating large volume of magma in the mantle is
   (a) anomalous thermal perturbation of the geotherm.
   (b) lowering of the mantle solidus (and liquidus) by the addition of volatiles.
   (c) adiabatic decompression of mantle Lherzolite.
   (d) subduction processes.

24. Class III of the CIPW norm classification of igneous rocks is known as salfemic which has the salic to femic ratio of
   (a) between 7 and 1.667.   (b) between 1.667 and 0.60.
   (c) between 0.60 and 0.143.   (d) less than 0.143.

25. Which of the following statement is correct in terms of Bowen's Reaction Principle?
   (a) The conversion of An to Ab releases Ca^{2+} and Al^{3+} while changes in pyroxene and formation of amphibole invite those ions.
   (b) The decrease in oxygen fugacity is marked by the formation of magnetite at the expense of iron-bearing silicates.
   (c) The reaction series was established by Bowen for alkaline basaltic magma crystallizing under dry condition at low pressure.
   (d) With decrease in temperature the Differentiation Index (D.I) of the reaction series also decreases.

26. The given mineral reaction indicates which one of the following magmatic process?
$$2CaCO_3 + 2Mg_2Si_2O_6 + KAlSi_3O_8 \leftrightarrow Mg_2SiO_4 + 2CaMgSi_2O_6 + KAlSi_2O_6 + 2CO_2$$
   Cal   En   Kfs   Fo   Di   Le
   (a) Fractional crystallization.   (b) Magma assimilation.
   (c) Magma mixing.   (d) Liquid immiscibility.

27. On commingling and reaching the same T, the viscosity of the silicic magma may be greater or less than that of the mafic one, depending upon the proportions of the two magmas. This point is called
   (a) Homogenization of magma.   (b) Equilibrium crystallization.
   (c) Ideal mixing.   (d) Crossover of viscosity

28. A large-scale fractionation through crystal settling during crystallization are found in
   (a) Stillwater Complex in southern Montana.
   (b) Basalt-Rhyolite complex in Mt. McLoughlin in Oregon.
   (c) Proterozoic of Kosterhavet National Park of the Koster Islands in Sweden.
   (d) All of the above.

29. The spinifex texture in igneous rocks indicates
    (a) Slow cooling process.
    (b) Rapid cooling process.
    (c) Secondary mineralization in void spaces.
    (d) Slow and steady crystallization.

30. When the spaces between fine laths of plagioclase in igneous rocks are filled by glass and/or granular pyroxene and olivine, and the fine laths swerve around these mafic grains, the texture is called
    (a) Pilotaxitic texture.
    (b) Hyalopilitic texture.
    (c) Ophitic texture.
    (d) Intersertal texture.

31. The minerals which involve in myrmekitic texture indicating post-magmatic replacement process are
    (a) quartz and oligoclase.
    (b) orthoclase or microcline and quartz.
    (c) microcline and albite.
    (d) albite and orthoclase.

32. As per IUGS classification scheme the mineral composition of norite is
    (a) 10-90% orthopyroxene or clinopyroxene, <5% of olivine.
    (b) 90-100% plagioclase with proxene and hornblende up to 10%.
    (c) 50-90% hornblende, 10-50% of pyroxene, <10% plagioclse.
    (d) 65-35% orthopyroxene, <5% hornblende or olivine, 35-65% plagioclase.

33. The characteristic mineral composition of sub-aluminous rocks are
    (a) Muscovite, corundum, almandine.
    (b) Hornblende, pyroxene, biotite.
    (c) Pyroxene, olivine, melilite.
    (d) Aegirine, riebeckite.

34. The structurally controlled intrusions formed through movement of magmas along the axial direction of folds rather than the limbs is called
    (a) Laccoliths.
    (b) Lopoliths.
    (c) Phacoliths.
    (d) Flow banding or platy flow layers.

35. In binary system of Diopside-Anorthite, the intersection point (E) of the two converging liquidus curves correspond to 58 wt.% diopside and 42 wt.% anorthite. The eutectic temperature is
    (a) 1553 °C.
    (b) 1445 °C.
    (c) 1392 °C.
    (d) 1274 °C.

36. At 10^5 Pa (1 bar), diopside melts at 1665 K. If the S^0_{1665} of crystalline and liquid diopside are 53.2 and 619.6 J mol^{-1} K^{-1}, respectively, and their volumes are, respectively, 0.06609×10^{-3} and 0.07609×10^{-3} m^3 mol^{-1}, calculate the melting point at 2 GPa (20 kb) using Clapeyron equation.
    (a) 1774 K.
    (b) 1030 K.
    (c) 1652 K.
    (d) 1895 K.

37. In the ophiolite suites, the lower most layers is usually indicated by
    (a) gabbroic cumulates.
    (b) sheeted dykes.
    (c) foliated harzburgite.
    (d) plagiogranite.

38. The characteristic(s) of intraplate oceanic islands is that they are
    (a) tholeiitic and alkaline.
    (b) komatiitic in nature.
    (c) very low in concentrations of incompatible elements compared to MORB.
    (d) the result of high degree of partial melting processes.

39. The occurrences of carbonatites in India are recorded in
    (a) Andhra Pradesh, Gujarat, Rajasthan, Tamil Nadu.
    (b) Goa, Maharashtra, Madhya Pradesh, Sikkim.
    (c) Karnataka, Nagaland, Osdhisa, Uttarakhand.
    (d) Assam, Himachal Pradesh, Jamu & Kashmir, Utter Pradesh.

40. Kimberlite rocks are usually abnormally high in the major oxide weight percentage of

(a) Al_2O_3, Fe_2O_3 and H_2O^-.

(b) Na_2O, FeO and K_2O.

(c) MgO, CaO and CO2.

(d) TiO2, MnO and P_2O_5.

41. Which one of the following is the correct arrangement of rocks as per increasing grade of metamorphism?

(a) Slate-phyllite-granulite-amphibolite.

(b) Phyllite-slate-amphibolite-granulite.

(c) Slate-phyllite-amphibolite-granulite.

(d) Phyllite-slate-eclogite-granulite.

42. Metamorphic facies are defined by

(a) the conditions of temperature and pressure.

(b) a single dominant rock type.

(c) peculiar texture and structures of the rocks types.

(d) critical mineral assemblages.

43. The thermal or contact metamorphism is characterized by

(a) High temperature, low pressure, low strain and variable fluid pressure.

(b) High temperature, high pressure, low strain and variable fluid pressure.

(c) High temperature, low pressure, variable strain and variable fluid pressure.

(d) High temperature, high pressure, high strain and high fluid pressure.

44. The appearance of orthopyroxene in clinopyroxene bearing metamorphic rock indicates

(a) eclogite facies.

(b) amphibolite facies.

(c) granulite facies.

(d) hornfels facies.

45. Which one of the following is a characteristic mineral of metamorphosed limestone?

(a) kyanite.

(b) sillimanite.

(c) wollastonite.

(d) andalusite.

46. A large crystal which has grown in a metamorphic rock is known as

(a) Porphyroblast.

(b) Xenoblast.

(c) Phenoclast.

(d) Poikiloblast.

47. The diagnostic mineral in the blueschist facies is

(a) epidote.

(b) zoisite.

(c) glaucophane.

(d) lawsonite.

48. In eclogite facies of metamorphism, which one of the following minerals occurs as sodic phase instead of sodic-plagioclase?

(a) Riebeckite

(b) Jadeite.

(c) Actinolite.

(d) Pigeonite.

49. In the triangular ACF diagram, the alphabet 'A' represents

(a) Al_2O_3

(b) $Al_2O_3 - (FeO + MnO)$

(c) $Al_2O_3 - (Na_2O + CaO + K_2O)$

(d) $Al_2O_3 + Fe_2O_3 - (Na_2O + K_2O)$

50. Which of the following is the correct sequence of succession of index minerals with increasing metamorphism?

(a) chlorite, biotite, almandine, staurolite, kyanite, sillimanite

(b) chlorite, , sillimanite, biotite, staurolite, almandine, kyanite

(c) sillimanite, chlorite, biotite, staurolite, almandine, kyanite,

(d) kyanite, staurolite, biotite, almandine, sillimanite, chlorite

51. Migmatite is formed by geodynamic process which involves
    (a) Comingling of magma.
    (b) Density inversion.
    (c) Shear stress.
    (d) All of the above.

52. Which one of the following is the pioneering worker in understanding the relations between mineral assemblages, rock compositions and P-T conditions of metamorphism?
    (a) C. E. Tilley
    (b) G. Barrow
    (c) P. Eskola
    (d) V. M. Goldschmidt

53. The understanding of metamorphic mineral assemblages and chemical equilibrium under same P-T conditions give rise to the concept of
    (a) isograd
    (b) metamorphic zones
    (c) metamorphic grades
    (d) metamorphic facies

54. The most prominent textural feature exhibited by regionally metamorphosed rocks is a planer fabric referred to as
    (a) crenulation cleavage
    (b) slaty cleavage
    (c) foliation
    (d) lineation

55. Fold patterns preserved as inclusion trails within porphyroblasts are known as
    (a) syn-tectonic folds
    (b) post-tectonic folds
    (c) micro-seismites
    (d) helicitic folds

56. Which one of the following is metamorphic texture found in shear zones?
    (a) restite
    (b) fluxion
    (c) strain-slip cleavage
    (d) beards

57. The reaction involving 'Tremolite-out' in Lherzolite assemblage in the CMSH system is represented by
    (a) $2\text{Tremolite} + 2\text{Forsterite} = 5\text{Enstatite} + 4\text{Diopside} + 2H_2O$
    (b) $4\text{Spinel} + 2\text{Tremolite} = 6\text{Forsterite} + \text{Enstatite} + 4\text{Anorthite} + 2H_2O$
    (c) $\text{Antigorite} + 8\text{Diopside} = 18\text{Forsterite} + 4\text{Tremolite} + 27H_2O$
    (d) both (a) and (b)

58. The Eclogite facies comprises the widest P=T region of any of the metamorphic facies fields with a T-range from
    (a) 300 to 900 °C
    (b) 500 to 1200 °C
    (c) 420 to 1100 °C
    (d) 400 to 1000 °C

59. The transition from Amphibolite to Granulite facies is represented by the mineral reaction
    (a) $4\text{Tremolite} + 3\text{Anorthite} = 3\text{Pyrope} + 11\text{Diopside} + 7\text{Quartz} + 4H_2O$
    (b) $7\text{Tremolite} = 3\text{Anthophyllite} + 14\text{Di} + 4\text{Quartz} + 4H_2O$
    (c) $\text{Tremolite} + \text{Grossular} = 4\text{Clinoproxene} + \text{Orthoproxene} + \text{Anorthite} + H_2O$
    (d) $4\text{Enstatite} + \text{Anorthite} = \text{Diopside} + \text{Quartz} + \text{Pyrope}$

60. During metamorphism of pelitic rocks, the reaction of minerals with excess of quartz and water in KFMASH system can be represented by
    (a) $2\text{Almandine} + 2\text{Aluminosilicate} + 5\text{Quartz} + nH_2O = 3\text{Cordierite}$
    (b) $\text{Cordierite} + \text{Garnet} + \text{Sillimanite} = \text{Spinel} + \text{Quartz}$
    (c) $\text{Orthopyroxene} + \text{Sillimanite} + \text{Quartz} = \text{Cordierite} + \text{Garnet}$
    (d) $\text{Cordierite} + \text{Sillimanite} + \text{K-feldspar} + \text{Quartz} = \text{Osumilite} + \text{Orthopyroxene}$

61. In sedimentary rocks, the authigenic components are those
- (a) formed during diagenesis.
- (b) directly derived from the provenance.
- (c) economically mineable components.
- (d) containing trace fossils.

62. In Mizoram, the oldest stratigraphic horizon is represented by Oligocene Barail Group, and the sandstones are typically of
- (a) Greywacke.
- (b) Arkose.
- (c) Quartz arenite.
- (d) Litharenite.

63. In Udden-Wentworth size classes, ö values of shale ranges between
- (a) 9 to 14
- (b) 8 to 8.
- (c) 4 to 1.0.
- (d) 0.75 to 0.0.

64. Which of the following is the erosional sedimentary structure?
- (a) Flute marks.
- (b) convolute lamination.
- (c) Parting lineation.
- (d) flame structures.

65. Wave dominated delta has one of the following sequence characteristic
- (a) Normal grading.
- (b) Reverse grading.
- (c) Multiple grading.
- (d) Massive bedding.

66. The alluvial depositional feature which are related to vertical accretionary deposits are
- (a) point bars.
- (b) channel lag deposits.
- (c) channel bar deposits.
- (d) levee deposits.

67. In the fluvial cycle, the maturity stage is indicated by
- (a) existence of maximum possible relief.
- (b) broad and poorly defined stream divides.
- (c) presence of lakes, swamps or marshes on the flood-plains.
- (d) dominant mass wasting and chemical denudation in fluvial process.

68. Sedimentary structures having directional features help in Paleocurrent analysis which are presented as
- (a) cross-stratification.
- (b) asymmetric ripples.
- (c) groove marks.
- (d) rose diagram.

69. The idealized Bauma sequence is characterised by
- (a) normal grading at the bottom followed by parallel lamination, current ripples and convolute lamination, parallel lamination and shale at the top.
- (b) reverse grading at the bottom followed by ripple marks and parallel lamination.
- (c) normal grading at the bottom followed by ripple marks and parallel lamination.
- (d) reverse grading at the bottom followed current ripples and convolute laminations, parallel lamination and shale at the top.

70. Which one of the following is not biogenic structure?
- (a) liesegang.
- (b) oncolites.
- (c) reefs.
- (d) Cruziana.

71. According to Folk and Ward (1957), fine-skewed sediments fall between ö values of
- (a) 0.1 to 0.1.
- (b) 1.0 to 0.3
- (c) 0.3 to 0.1
- (d) 0.1 to 0.3

72. The ultimate goal of sedimentary basin analysis is
   (a) to find out stages of basin evolution and architecture.
   (b) to unravel complete history and hydrocarbon prospects.
   (c) to investigate nature of sediment fills and feasibility of oil and gas deposits.
   (d) to determine basin floor patterns, paleo-hydraulics and maturation of sediments.

73. The history of the Appalachian Basin in terms sedimentation rates, sea-level change, orogenic events and time scale of basin evolution, the rate of sedimentation is highest during
   (a) Permian-Pennsylvanian
   (b) Devonian
   (c) Late Silurian
   (d) Early Canbrian

74. The Indian example of a type of remnant ocean basins under the tectonic class of Convergent Settings is
   (a) Cuddapah Basin
   (b) Cambay Basin
   (c) Bay of Bengal Basin
   (d) Vindhyan Basin

75. Sea-level fall results in a Forced regression, the resultant sediment pattern is
   (a) aggradational
   (b) retrogradational, with erosional surfaces
   (c) retrogradational, without erosional surfaces
   (d) progradational

76. Diagenesis is commonly regarded to take place at
   (a) temperature 180-200 °C and pressure below ~4 kb
   (b) temperature below 230 °C and pressure below ~6 kb
   (c) temperature below 200-250 °C and pressure below ~5 kb
   (d) temperature below 150-180 °C and pressure below ~3 kb

77. The earliest stage of diagenesis which takes place at very shallow depth under the influence of depositional environment is called
   (a) telogenesis
   (b) eogenesis
   (c) mesogenesis
   (d) protogenesis

78. The process of diagenesis in sandstone and shale result in the transformation of K-feldspar and Ca-Plagioclase into
   (a) illite
   (b) chlorite
   (c) kaolinite
   (d) smectite

79. In limestone, the ionic substitution of Mg^{2+} for Ca^{2+} commonly takes place in Calcite mineral and the calcite is called Mg-calcite when the mineral contains
   (a) less than 4 mol% $MgCO_3$
   (b) more than ~4 mol% $MgCO_3$
   (c) approximately of 4 mol% $MgCO_3$
   (d) more than 35 mol% $MgCO_3$

80. The structure in limestone with large-scale, mound-like or lens-like mass built by sedentary organisms is called
   (a) bioherms.
   (b) stylolites.
   (c) stromatactis.
   (d) tepee structure.

81. In the concept of environmental geology, the Gaia Hypothesis is related to
   (a) Concept I.
   (b) Concept II.
   (c) Concept III.
   (d) Concept IV and V.

82. In the current seismic hazard map of India, Mizoram falls under
   (a) Zone II.
   (b) Zone III.
   (c) Zone IV.
   (d) Zone V.

83. The immediate cause of landslide in Mizoram and other hilly sedimentary terrains prevailed by monsoon climate is

(a) geological structures.

(b) rock types present.

(c) heavy rainfall.

(d) uncontrolled slope modification and dumping.

84. In the concept of ecosystem, an orderly and sometimes not-so-orderly change of species as an ecosystem evolves is called

(a) flow of energy.

(b) recycling of nutrients.

(c) succession.

(d) structure.

85. Due to absorption energy radiating from the earth's surface by the greenhouse gases, the lower atmosphere of the earth gets warmer by about

(a) 40 °C than it would be if all radiations escaped.

(b) 35 °C than it would be if all radiations escaped.

(c) 30 °C than it would be if all radiations escaped.

(d) 25 °C than it would be if all radiations escaped.

86. During earthquake incidences, damage to structures and buildings are caused by the

(a) P wave.

(b) S wave.

(c) Surface waves.

(d) Rayleigh wave.

87. The moment magnitude of an earthquake is a measure of the energy released by the earthquake. It is based upon

(a) damage caused by an earthquake.

(b) amount of movement or fault slip.

(c) human perception of seismic shock.

(d) the potential energy of crustal segment.

88. When earthquake is felt by all, many frightened and run outdoors, some heavy furniture moved and a few instances of fallen plaster, what will be the Mercalli Intensity Scale?

(a) V.

(b) VI.

(c) VII.

(d) VIII.

89. Flood stage is the height at which a river begins to overflow its banks. Which one of the following will be the best flood-monitoring effort in real time?

(a) monitoring of amount of discharge required for a river to leave its channel on time interval basis and making data available to the public.

(b) construction of check dams and flood barriers along lower elevation of stream and river channels.

(c) installation of hundreds of automatic gauge in flood prone river to measure stage in continuous basis and making the data available over internet.

(d) deployment of disaster response teams with complete set of equipments during flood and rainy seasons.

90. The maximum yearly discharge over a 102-year period for the Tar River at Tarboro, North Carolina indicated that the 1999 event of 70,600ft^3/sec score the highest rank. The Recurrence Interval of this record will be

(a) 202 years

(b) 103 years

(c) 102 years

(d) 1.2 years.

91. For a given segment of shoreline, the total volume of sand added to the beach can be balanced to losses. The "beach budget" is in deficit and coastal erosion took place when

(a) Influx exceeds losses.

(b) there is a sea level fall.

(c) Dam is constructed in the river mouth.

(d) Both (a) and (b)

92. The current practice of uncontrolled solid earth-waste disposal and dumping in Mizoram will immediately led to

    (a) groundwater and spring water pollution.

    (b) siltation and disturbance in aquatic ecosystem.

    (c) soil pollution and soil quality degradation.

    (d) disturbance in bio-geochemical cycles.

93. Nowadays, water is parts of commodity which can be bought and sold. The constructions of Dam and reservoirs are essential part of water management which, however, have adverse effects in terms of

    (a) fragmentation of ecosystem.
    (b) loss of cultural and biological resources.

    (c) degradation of water qualities.
    (d) both (a) and (b).

94. Itai-Itai is a chronic disease which claimed many lives in Japan's Zintsu River Basin. The incidence was related to ignored mine waste disposal of mining operation for

    (a) lead, zinc and cadmium.
    (b) copper, molybdenum and boron.

    (c) uranium, sulphur and chromium.
    (d) thorium, osmium and mercury.

95. Acid mine drainage is a severe environmental issue related to

    (a) all types of abandoned open caste mining irrespective of type of remnant ores present.

    (b) Acidic leachate, rich in heavy metals, that drains from tailing or underground mines.

    (c) the release of acid waste from mining equipments in a controlled manner of drainage.

    (d) controlled disposal of acids evolved from reaction between sulfide ores and water.

96. Which one of the following is the most abundant air pollutant emitted from burning of fossil fuels?

    (a) CO_2
    (b) CO

    (c) NO_x
    (d) SO_2

97. The most important strategic methods to solve for solid waste problem in current scenario of development and technology may be

    (a) Source reduction.
    (b) Recycling *or* reuse.

    (c) Incineration.
    (d) Landfilling.

98. One of the most ideal locations for disposal strategies of high-level waste from nuclear power plants is

    (a) Stored in underground storage tanks made of steel and concrete.

    (b) Burial in very deep geologic formation.

    (c) Permanently isolate place from the biosphere.

    (d) Geologically stable area where geologic hazards are highly unlikely.

99. Which one of the following is not related to global climate change?

    (a) General Circulation Models.

    (b) Burial in very deep geologic formation.

    (c) Permanently isolate place from the biosphere.

    (d) Geologically stable area where geologic hazards are highly unlikely.

100. Depending on the rate at which humans continue to emit greenhouse gases, the Intergovernmental Panel on Climate Change (IPCC) reports that by 2100, global average temperatures will likely increase somewhere between

    (a) 1.2 and 3.1 °F
    (b) 2.2 and 5.1 °F

    (c) 3.2 and 7.1 °F
    (d) 5.2 and 9.1 °F

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