BHU
GEOLOGY
SOLVED SAMPLE PAPER

* **DETAILED SOLUTIONS**

BHU-GG	GEOLOGY	FMTP

MAX.MARKS : 360   **MARKS SCORED :**   **Time : 2 Hours**

INSTRUCTIONS

Attempt all 120 questions. Each question carries 3 marks. 1 negative mark for each wrong answer.

1. There is a permanent _____ centered over Antarctica.

(A) anticyclone   (B) cyclone

(C) low pressure trough   (D) polar front

2. The pool of cold air that gets pinched off during Rossby wave formation forms a:

(A) high pressure cell   (B) cyclone

(C) anticyclone   (D) none of the above

3. The band of rapidly flowing air found aloft above the polar front is a:

(A) polar easterly   (B) pressure gradient

(C) trade wind   (D) jet stream

4. A mid-latitude cyclone will often have a _____ shape on satellite imagery.

(A) Rectangular   (B) Dumbbell

(C) Comma   (D) Pentagon

5. When was the hole in the Ozone Layer above Antarctica first discovered?

(A) 1985   (B) 1995   (C) 1950   (D) 1890

6. What is the name of a common man-made substance that causes ozone depletion?

(A) TLC   (B) CFC   (C) DDT   (D) MCC

7. Where is the majority of ozone found in the atmosphere?

(A) Thermosphere   (B) Troposphere

(C) Mesosphere   (D) Stratosphere

8. What type of harmful rays are blocked by ozone?

(A) Radio waves   (B) Infrared

(D) Ultraviolet   (C) X-rays

9. What type of cancer can the harmful rays in question 4 cause in humans?

(A) Lung Cancer   (B) Bowel Cancer

(C) Skin Cancer   (D) Stomach Cancer

10. In which layer of Earth's atmosphere does most weather occur?

(A) Troposphere   (B) Stratosphere

(C) Mesosphere   (D) Thermosphere

PART-C

11. Which of the following best explains why polar regions are colder than tropical regions?

(A) Polar regions have lower albedo values.

(B) Polar regions receive less solar energy per unit of surface area.

(C) Tropical regions receive less direct sunlight throughout the year.

(D) Sunlight travels through more atmosphere and loses more energy in tropical regions.

12. Which of the following statements about patterns of temperature and precipitation is not correct?

(A) The air in a Hadley cell rises where sunlight strikes Earth most directly.

(B) The greatest amount of precipitation occurs at the intertropical convergence zone.

(C) The air in a Hadley cell descends near 30° N and S, causing the formation of deserts.

(D) Along Earth's surface, the air of a Hadley cell moves away from the equator.

13. Which of the following processes is not characteristic of oceanic circulation?

(A) Counterclockwise gyres in the Northern Hemisphere

(B) Slow thermohaline circulation of surface and deep ocean waters

(C) Unequal heating of tropical versus polar ocean waters

(D) El Niño-Southern Oscillation

14. Which of the following statements about rain shadows is correct?

(A) They occur on the western sides of mountain ranges in the Northern Hemisphere.

(B) Air gains water vapor as it rises.

(C) As air rises over a mountain range, water vapor condenses into precipitation.

(D) They occur on the eastern sides of mountain ranges in the Southern Hemisphere.

15. Why do scientists use dominant plant growth forms to categorize terrestrial biomes?

(A) Plants with similar growth forms are always closely related genetically.

(B) Different plant growth forms indicate climate differences, whereas different animal forms do not.

(C) Plants from similar climates evolve different adaptations.

(D) Similar plant growth forms are found in climates with similar temperatures and amounts of precipitation.

16. pollutants are emitted directly from identifiable sources.

(A) Observable　　　　　　　　(B) Secondary

(C) Primary　　　　　　　　　　(D) Tertiary

17. With the passage of the federal _____ Act, as amended in 1970, major strides were made in reducing air pollution.

(A) Environmental Protection　　(B) Ambient Air Quality

(C) Anti-Pollution　　　　　　　　(D) Clean air

18. Which one of the following is NOT a primary pollutant?

(A) carbon monoxide　　　　　　(B) particulate matter

(C) sulfuric acid　　　　　　　　　(D) sulfur dioxide

19. The source of nearly half our pollution (by weight) is from the _____ category.

(A) industrial processes　　　　　(B) stationary source fuel combustion

(C) agricultural　　　　　　　　　　(D) transportation

20. A pH of 4 is _____ times more acidic than a pH of 5.

(A) 5   (B) 10   (C) 50   (D) 75

21. Which of the following is not a measure of biodiversity?

(A) Economic diversity   (B) Ecosystem diversity

(C) Genetic diversity   (D) Species diversity

22. The table below represents the number of individuals of different species that were counted in three forest communities. Which of the following statements best interprets these data?
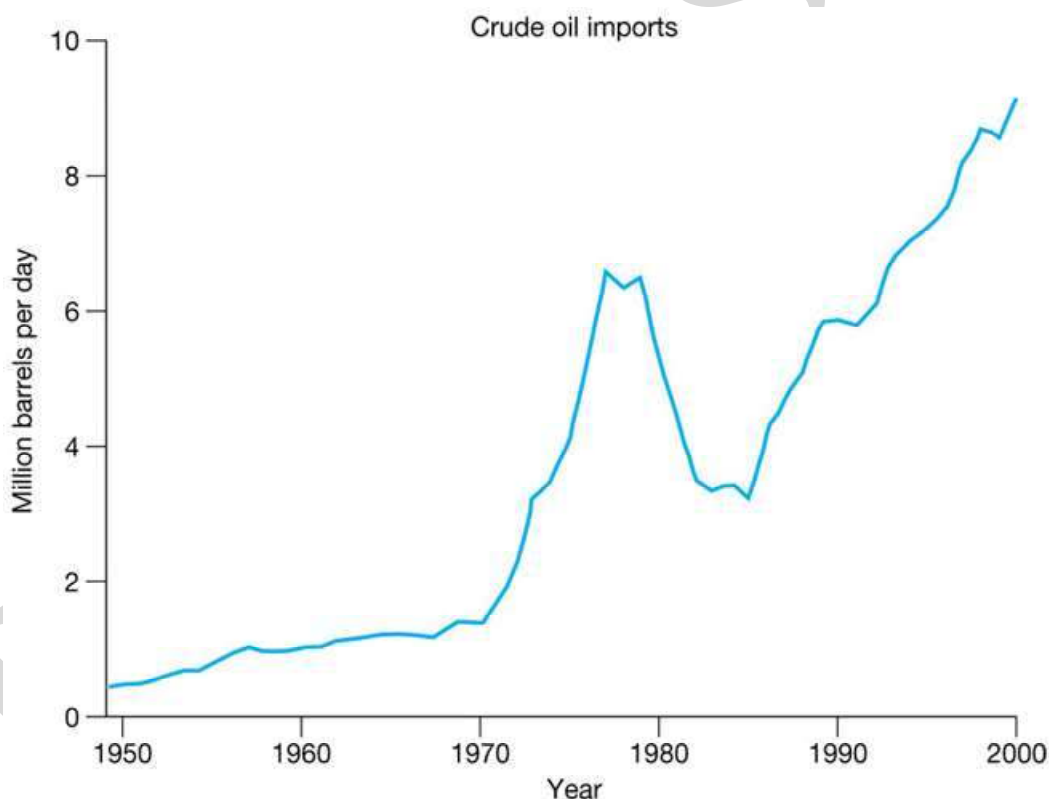
Species	Community A	Community B	Community C
Deer	95	20	10
Rabbit	1	20	10
Squirrel	1	20	10
Mouse	1	20	10
Chipmunk	1	20	10
Skunk			10
Opossum			10
Elk			10
Raccoon			10
Porcupine			10

(A) Community A has greater species evenness than Community B.

(B) Community A has greater species richness than Community B.

(C) Community B has greater species evenness than Community C.

(D) Community C has greater species richness than Community B.

23. Which of the following is an example of artificial selection?

(A) Cichlids have diversified into nearly 200 species in Lake Tanganyika.

(B) Thoroughbred racehorses have been bred for speed.

(C) Whales have evolved tails that help propel them through water.

(D) Darwin's finches have beaks adapted to eating different foods.

24. The yellow perch (Perca flavescens) is a fish that breeds in spring. A single female can produce up to 40,000 eggs at one time. This species is an example of which of the key ideas of Darwin's theory of evolution by natural selection?

(A) Individuals produce an excess of offspring.

(B) Humans select for predetermined traits.

(C) Individuals vary in their phenotypes.

(D) Phenotypic differences in individuals can be inherited.

25. Which of the following conditions does not define the fundamental niche of a species?

(A) Humidity　　　　　　　　　(B) Predators

(C) Temperature　　　　　　　(D) Salinity

26. About what percent of earth's water is freshwater?

(A) More than 10%　　　　　　(B) 12.5%

(C) 3%　　　　　　　　　　　(D) 6%

27. Which of the following statements about ecology is correct?

(A) Ecology is the study of animals

(B) Ecology was founded in the 1700s

(C) Ecology has many topics

(D) None of the above

28. What is biodiversity?

(A) A variety of cars　　　　　(B) The variety of species in an area

(C) A variety of health foods　　(D) None of the above

29. What is an invasive species?

(A) A species brought to an area from another place that takes over and chokes out native species

(B) A native species that grows too rapidly

(C) A species with many predators

(D) A species that is endangered

30. What starts every food chain?

(A) Sun

(B) Decomposers

(C) Plants

(D) None of the above

31. The molecular formula for a water molecule is

(A) W

(B) H^2O

(C) 2HO

(D) H_2O

32. Which is not a property of water that helps our bodies function properly?

(A) Water is a natural antibiotic (anti-bacterial) substance

(B) Water dissolves many substances

(C) Water cools when it evaporates

(D) None of these

33. If you dissolve red paint powder into water, the paint powder is the _____.

(A)) Ion

(B) Solute

(C) Solution

(D) Concentration

34. If you made red paint by dissolving dry red paint powder into water, the liquid red paint you make is a _____.

(A) Ion

(B) Solute

(C) Solution

(D) Concentration

35. If you put a sugar cube into a glass of water, at first the sugar molecules will be concentrated in the cube, but after some time, they will spread out throughout the water. This is an example of

(A) Osmosis

(B) Cell membranes

(C) Buffering

(D) Diffusion

36. Which of the following sources provides the least energy for industrialized countries?

(A) coal

(B) gas

(C) petroleum

(D) nuclear fuels

37. Which of the following energy sources provides a substantial amount of the energy needs for developed countries?

(A) solar

(B) wood

(C) charcoal

(D) hydropower

38. Which of the following three major types of coal is known as hard coal and has the highest heat value?

(A) bituminous (B) anthracite

(C) lignite (D) charcoal

39. At the current rate of consumption, how long will the known coal reserves on our planet last?

(A) 2000 years (B) 200 years (C) 20 years (D) 10 years

40. Plutonium-239, one of the most toxic substances known to humans, is a by-product of nuclear fission of Uranium-238. What is the half-life of this isotope?

(A) 5600 years (B) 8 days (C) 24,000 years (D) 28 years

41. Explain the downward dip in the middle of the following graph.

(A) It occurred when the United States was producing so much oil domestically that it did not need much from imported sources.

(B) It was a time of economic downturn following the Iranian hostage crisis, oil embargo, and skyrocketing oil prices.

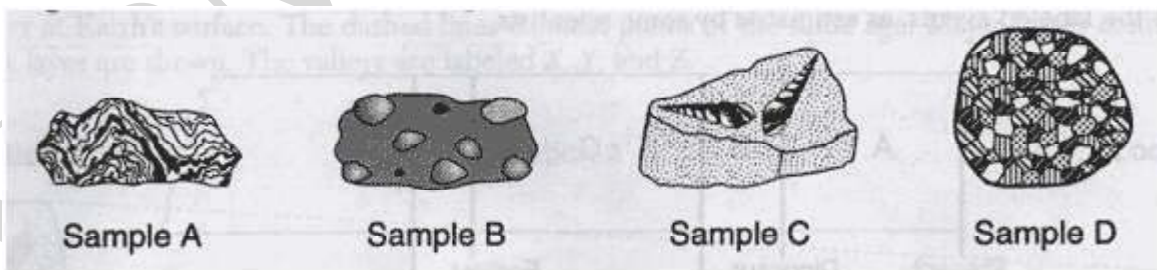(C) It occurred during the Great Depression, when oil was very expensive.

(D) Not Determined

42. Which item on the list is not a conventional fossil fuel?

(A) oil shale
(B) bituminous coal

(C) petroleum
(D) anthracite coal

43. Which continent is notably deficient in coal?

(A) Australia
(B) South America

(C) North America
(D) Eurasia

44. What posed the main danger during the Three Mile Island accident?

(A) radioactive steam

(B) nuclear isotopes leaking underground

(C) nuclear explosion

(D) contaminated water leaking from the reactor

45. Two members of the same species fight over who gets a certain food. Members of different species try to take over a certain nesting area. These are both examples of

(A) community.
(B) competition.

(C) mutualism.
(D) commensalism

46. In developing countries, the use of wood, charcoal, and dung as major sources of energy has created an increase in

(A) economic dependence on industrialized nations

(B) sales an profits for international oil corporations

(C) deforestation and other environmental problems

(D) nuclear waste products

47. A negative impact of the use of modern technology is that

(A) levels of air and water pollution often increase

(B) economic opportunities are frequently limited

(C) contacts with other cultures decrease

(D) international trade is limited

48. A major factor contributing to the destruction of the Amazon rain forests is the

(A) movement of people from rural to urban areas

(B) attempt of native peoples to end illegal drug traffic

(C) need for more farmland

(D) spread of Christianity

49. The largest wave during a tsunami event is _____.

(A) the first

(B) the third

(C) the fifth

(D) unpredictable, it could be any of them

50. The destructive powers of tsunami result mainly from their _____.

(A) incredible height

(B) unpredictablility

(C) cold water

(D) momentum and long wavelength

51. In the open ocean, tsunami can travel _____ miles per hour with periods up to _____ minutes.

(A) 50; 20   (B) 50; 60   (C) 485; 20   (D) 485; 60

52. Which event produces the biggest tsunami?

(A) Earthquake

(B) Underwater landslides

(C) Hurricanes

(D) Impacts of asteroids and comets

53. Powerful tsunami are most frequently produced by _____.

(A) volcanoes

(B) underwater landslides

(C) Earthquakes

(D) impacts of asteroids

54. The global increase in greenhouse gases has been attributed to

(A) industrial pollution in developing countries.

(B) coal mining and electricity generation.

(C) reduced rainfall in many parts of the world.

(D) trends in population and lifestyle.

55. The proportion of all greenhouse gases created by coal is approximately

(A) 14 per cent.

(B) 18 per cent.

(C) 27 per cent.

(D) 90 per cent.

56. Current research aims to increase the energy-producing efficiency of coal by

(A) burning it at a lower temperature.

(B) developing new gasification techniques.

(C) extracting CO_2 from it.

(D) recycling greenhouse gases.

57. Compared with ordinary coal, new, 'clean' coals may generate power

(A) more cleanly and more efficiently.

(B) more cleanly but less efficiently.

(C) more cleanly but at higher cost.

(D) more cleanly but much more slowly.

58. To control dust at mine sites, mining companies often use

(A) chemicals which may be toxic.

(B) topsoil taken from the site before mining.

(C) fresh water from nearby dams.

(D) runoff water containing sediments

59. A natural hazard is:

(A) a flood, earthquake or similar unpredictable natural event

(B) an extreme natural phenomenon that causes death and destruction

(C) people located in a natural environment that may disrupt or threaten their safety and property

(D) any natural catastrophe targeted by government agencies as threatening to a population

60. The people living in Tokyo, Japan, are less vulnerable to earthquakes than those living in Nicaragua because:

(A) they have a higher standard of living

(B) they live farther away from the earthquake belt

(C) fewer earthquakes take place in Japan

(D) Japan has good building codes and earthquake training

61. A disaster is defined according to

(A) its human consequences

(B) its cause

(C) the number of deaths it causes

(D) its measurable severity

62. The largest annual death toll during the 1970s was caused by

(A) floods

(B) earthquakes

(C) tropical cyclones

(D) drought

63. Technology can now identify hazards and estimate their impact on an area. This permits

(A) planning evacuation routes

(B) applying for government aid and setting up monitoring stations

(C) preventing the disaster or reducing its impact

(D) reacting to the disasters when they occur

64. Pre-disaster planning will make possible

(A) the prevention of the disaster

(B) the effective application of aid where prevention is not possible

(C) self-sufficiency in dealing with natural hazards

(D) all of the above

65. Effective hazard management will largely rely on

(A) volunteers

(B) government agencies

(C) emergency responses

(D) pre-disaster planning

66. The largest scale of the following is

(A) 1:24000.

(B) 1:62500.

(C) 1:100000.

(D) 1:500000.

67. With which type of remote sensing imagery would a baseball field of artificial turf be differentiated from natural grass?

(A) radar imagery

(B) color infrared

(C) black and white photography

(D) color photography

68. A line connecting points of equal precipitation is

(A) an isobar.

(B) a contour line.

(C) an isohyet.

(D) an isotherm.

69. When topographic maps produced by the United State Geological Survey have been updated, the revisions are done in

(A) black.

(B) white.

(C) green.

(D) purple.

70. Which of the following remote sensing technologies uses sound?

(A) radar

(B) color infrared imaging

(C) thermal infrared imaging

(D) sonar

71. Compared to felsic igneous rocks, mafic igneous rocks contain greater amounts of

(A) white quartz

(B) aluminum

(C) pink feldspar

(D) iron

72. What are the two most abundant elements by mass found in Earth's crust?

(A) aluminum and iron

(B) sodium and chlorine

(C) calcium and carbon

(D) oxygen and silicon

73. Which sample best shows the physical properties normally associated with regional metamorphism?

Sample A   Sample B   Sample C   Sample D

(A) A

(B) B

(C) C

(D) D

74. Which mineral is white or colorless, has a hardness of 2.5, and splits with cubic cleavage?

(A) calcite

(B) halite

(C) pyrite

(D) mica

75. Compared to dull and rough rock surfaces, shiny and smooth rock surfaces are most likely to cause sunlight to be

(A) reflected

(B) refracted

(C) scattered

(D) absorbed

76. Which sedimentary rock is most likely to be changed to slate during regional metamorphism?

(A) breccia

(B) conglomerate

(C) dolostone

(D) shale

77. Name the mineral which is used to reduce cavity.

(A) Silicon

(B) Fluorite

(C) Aluminium oxide

(D) Limestone

78. Which out of the following metallic minerals is obtained from veins and lodes?

(A) Zinc

(B) Limestone

(C) Rutile

(D) Mica

79. In which kind of rocks are the minerals deposited and accumulated in the strata's?

(A) Igneous rocks

(B) Metamorphic rocks

(C) Sedimentary rocks

(D) None of these

80. 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

81. Which out of the following minerals is formed by the decomposition of surface rocks, and leaves a residual mass of weathered material?

(A) Gold

(B) Bauxite

(C) Zinc

(D) Coal

82. Nagarcoil and Jaisalmer are well-known for the effective use of

(A) tidal energy

(B) geothermal energy

(C) wind energy

(D) biogas

83. Biogas plants using cattle dung are called:

(A) hydel plants

(B) gobar gas plants

(C) thermal power station

(D) gas station

84. Which place in India is ideal for utilising tidal energy?

(A) Gulf of Kachchh　　　　(B) Gulf of Khambhat

(C) Gulf of Mannar　　　　(D) None of these

85. What are the Khetri mines famous for?

(A) Coal　　(C) Cooper　　(C) Iron　　(D) Gold

86. Which out of the following is derived from the ocean waters?

(A) Limestone　　　　(B) Sandstone

(C) Cobalt　　　　(D) Bromine

87. As the water content of rock increases, the melting point _____.

(A) first increases, then decreases

(B) remains the same

(C) decreases

(D) increases

88. A model that illustrates the predictable patterns of mineral formation from cooling magma is _____.

(A) Bowen's reaction series　　(B) crystal separation

(C) layered intrusion formation　　(D) mineral composition

89. Intrusive igneous rocks form _____.

(A) fine-grained rocks

(B) when a molten mass of rocks cools quickly

(C) on Earth's surface

(D) coarse-grained rocks

90. Michelangelo carved statues with Carrara marble because

(A) the marble was soft　　(B) the marble was fine grained

(C) the marble was pure in color　　(D) all of the above

91. Which characteristics describe serpentine?

(A) green, with a greasy feel　　(B) red with fibrous texture

(C) harder than a steel nail　　(D) None of the above

92. Which metamorphic rocks are easy to identify?

(A) nonfoliated rocks
(B) foliated rocks

(C) green rocks
(D) greasy rocks

93. The outermost layer of Earth's geosphere is known as:

(A) The hydrosphere
(B) The asthenosphere

(C) The exosphere
(D) The crust

94. Zinc, an element, has an atomic number of 30 and an atomic weight of 65.38. This means it must have:

(A) 30 electrons, 35 protons, 30 neutrons

(B) 35 electrons, 35 protons, 38 neutrons

(C) 38 electrons, 38 protons, 35 neutrons

(D) 30 electrons, 30 protons, 35 neutrons

95. Migmatites are "mixed rocks" which contain features of both:

(A) Pyroclastic and sedimentary rocks

(B) Plutonic and regional metamorphic rocks

(C) Contact metamorphic and diagenetic rocks

(D) Regional metamorphic and igneous extrusive rocks

96. The primary mineral constituents of rocks of mafic and ultramafic composition necessarily contain the following elements.

(A) magnesium, silicon, aluminum, oxygen

(B) iron, aluminum, silicon, oxygen

(C) silicon, oxygen, iron, manganese

(D) oxygen, magnesium, silicon, iron

97. Consolidated sediment preserving an impression of the outer surface of an ancient organism's remains is known as:

(A) a trace fossil
(B) an external cast

(C) an external mould
(D) a coprolite

98. A sedimentary rock layer A is underlain by a flow basalt layer dated at 255 Ma. Layer A, a quartz-cemented sandstone, lacks fossils which allow it to be dated, however, similar sandstone strata underlying the flow basalt contain fossils of mammal-like reptiles suggestive of a mid to Late Permian (late Paleozoic) age. Layer A is directly overlain by poorly consolidated sandstones which contain dinosaur fossils suggestive of Late Cretaceous (late Mesozoic) age. What can we infer about the age of Layer A?

(A) Layer A is older than 255 Ma

(B) Layer A is of Cretaceous age

(C) Layer A is of Late Permian-Triassic age

(D) Layer A is between 255 Ma and 65 Ma old

99. Fossils may be found in an unaltered state in:

(A) Limestones   (B) Shales

(C) Amber   (D) All of the above

100. Analysis of a rock sample selected for dating using radiometric techniques revealed that the concentration of the daughter isotope (for the isotope system used) was nearly eight times greater than the concentration of the parent isotope. The parent isotope is known to decay to the daughter isotope with a half-life of approximately 0.5 billion years.

This suggests that the sample is at least:

(A) 500 million years old   (B) 1 billion years old

(C) 1.5 billion years old   (D) 2 billion years old

101. An igneous rock consisting of the minerals orthoclase (potassium feldspar), quartz, muscovite (mica), hornblende (amphibole), biotite (mica) and plagioclase (in that order or relative abundance) is likely, upon significant physical and chemical weathering, to produce sediment containing:

(A) clay minerals, quartz and muscovite

(B) clay minerals, hornblende and iron oxide/hydroxide minerals

(C) quartz, clay and ferromagnesian minerals

(D) plagioclase, orthoclase and clay minerals

102. The process by which sediment becomes a sedimentary rock is known as:

(A) petrification

(B) carbonization

(C) compaction

(D) lithification

103. Quartzite is composed largely of

(A) calcite

(B) mica

(C) quartz

(D) clay

104. Granite can be metamorphosed into

(A) gneiss

(B) schist

(C) slate

(D) serpentinite

105. Which is not a cause of metamorphism?

(A) temperature

(B) Pressure

(C) faulting

(D) hydrochloric acid

106. Contact metamorphism is found near

(A) water

(B) magma

(C) pyroclastic ejections

(D) trees

107. Regional metamorphism is found mainly in

(A) volcanoes

(B) magma

(C) convergent zones

(D) divergent zones

108. Slate is a metamorphic rock. It may have formed from

(A) granite

(B) gneiss

(C) shale

(D) sandstone

109. Schist is easy to identify because it

(A) has foliation

(B) reacts with HCl

(C) has mineral bands

(D) is harder than a steel nail

110. Rocks are formed when magma ____.

(A) erodes

(B) undergoes radioactive decay

(C) crystallizes

(D) weathers

111. Igneous rocks that cool slowly beneath Earth's crust are ____.

(A) extrusive   (B) intrusive

(C) sedimentary   (D) always magnetic

112. Igneous rocks that cool quickly on Earth's surface are ____.

(A) extrusive   (B) intrusive

(C) metamorphic   (D) always magnetic

113. Extrusive rocks, which cool more rapidly than intrusive rocks, are generally more ____.

(A) coarsely grained   (B) finely grained

(C) radioactive   (D) magnetic

114. Factors that affect a rock's melting point include ____.

(A) pressure and water content

(B) value as a gem

(C) rarity

(D) usefulness as a building material

115. Valuable ore deposits and gem crystals are often associated with ____.

(A) oceans   (B) oil deposits

(C) thin crustal areas   (D) igneous intrusions

116. Which out of the following minerals occurs in the sands of valley floors and the base of hills?

(A) Gold   (B) Copper

(C) Sulphur   (D) Marble

117. What is 'Rat hole' mining?

(A) Mining in places where there are lots of rats

(B) Mining done by family members in the form of a long narrow tunnel

(C) Mining that kills rats

(D) None of these

118. Match the following:

I	II
1. Leucocratic.	i. Dark coloured rock.
2. Mesocractic.	ii. Light coloured rock.
3. Melanocratic.	iii. Extremely dark coloured rock.
4. Hypermolanocratic.	iv. Intermediate in colour.

(A) 1-ii, 2-iv, 3-i, 4- iii.   (B) 1-iii, 2-ii, 3-iv, 4-i.

(C) 1-i, 2-ii, 3-iii, 4-iv.   (D) 1-iv, 2-iii, 3-ii, 4-i.

119. The larger crystals in the core of zoned pegmatites are the result of the .... of the magma:

(A) Higher viscosity.   (B) Lower viscosity.

(C) More ion concentration.   (D) None of these.

120. The grain-size variation is more or less continuous from smallest to largest, the texture is called:

(A) Seriate.   (B) Porphyritic.

(C) Poikilitic.   (D) Miarolitic.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
B	A	D	C	A	B	D	C	C	A	B	D	A	C	D	C	D	C	D	B
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
A	D	B	A	B	C	C	B	A	A	D	A	B	C	D	D	D	B	B	C
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
B	A	B	A	B	C	A	C	D	D	D	D	C	D	B	B	A	D	C	D
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
A	B	C	D	D	A	B	C	D	D	D	D	A	B	A	D	A	A	C	A
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
B	A	B	A	B	D	C	A	D	D	A	B	D	D	B	D	C	D	D	C
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
A	D	C	B	D	B	C	C	A	C	B	A	B	A	D	A	B	A	B	A