FEDERAL PUBLIC SERVICE COMMISSION
COMPETITIVE EXAMINATION FOR RECRUITMENT TO POSTS IN BPS-17 UNDER THE FEDERAL GOVERNMENT, 2009

GEOLOGY, PAPER-I

S.No.	
R.No.	

TIME ALLOWED:	**(PART-I) 30 MINUTES**	**MAXIMUM MARKS:20**
	(PART-II) 2 HOURS & 30 MINUTES	**MAXIMUM MARKS:80**

NOTE: (i) **First** attempt **PART-I (MCQ)** on separate **Answer Sheet** which shall be taken back after **30 minutes.**
(ii) Overwriting/cutting of the options/answers will not be given credit.

PART – I (MCQ)
(COMPULSORY)

Q.1. Select the best option/answer and fill in the appropriate box on the Answer Sheet. (20)

(i) Which of the following is a part of the definition of a mineral?
(a) a liquid that may become solid
(b) man-made
(c) definite chemical composition
(d) unorganized structure
(e) All of these

(ii) Which of the following minerals are arranged in order of *increasing hardness*?
(a) talc, apatite, corundum, diamond
(b) topaz, quartz, fluorite, corundum
(c) talc, quartz, calcite, diamond
(d) quartz, topaz, diamond, fluorite
(e) fluorite, calcite, gypsum, talc

(iii) How do the crystal structures of micas and feldspars differ from each other?
(a) feldspars are framework silicates, micas are double chain silicates
(b) feldspars are double chain silicates, micas are sheet silicates
(c) micas and feldspars have the same crystalline structure
(d) feldspars are single chain silicates, micas are double chain silicates
(e) micas are sheet silicates, feldspars are framework silicates

(iv) "Sima" is a general term used to refer to:
(a) rocks of the ocean basins
(b) rocks of the continents
(c) None of these
(d) all rocks that compose Earth's crust
(e) rocks that compose the crust of terrestrial planets

(v) Which of the following parameters influences the viscosity of magma?:
(a) temperature of the magma
(b) oxygen content of the magma
(c) depth of the magma beneath Earth's surface
(d) quantity of minerals in the magma
(e) all of these

(vi) The Continuous Series of Bowen's Reaction Series is composed of minerals.
(a) with different chemical compositions but the same mineral structures
(b) with different chemical compositions and different mineral structures
(c) with similar chemical compositions and different mineral structures
(d) with similar chemical compositions and similar mineral structures
(e) None of these

(vii) Plutonic igneous rocks always have:
(a) olivine, calcium feldspar, pyroxene
(b) amphibole, sodium feldspar, biotite
(c) quartz, muscovite, potassium feldspar
(d) phaneritic texture
(e) None of these

(viii) Weathering processes:
(a) only affect igneous rocks
(b) only affect sedimentary rocks
(c) affect all rocks at Earth's surface
(d) do not adversely affect rocks
(e) cannot be observed directly at Earth's surface.

(ix) Mud cracks preserved in sedimentary rocks:
- (a) are indicative of arid environments characterized by occasional rain
- (b) occur only in rain forests
- (c) occur whenever plants germinate in rocks
- (d) have never been observed in nature

(x) Which of the following lists is arranged in order from lowest to highest grade of metamorphic rock?
- (a) gneiss, slate, schist, phyllite
- (b) gneiss, schist, phyllite, slate
- (c) slate, gneiss , phyllite, schist
- (d) slate, phyllite, schist, gneiss
- (e) phyllite, gneiss, slate, schist

(xi) The asthenosphere is:
- (a) that portion of Earth where rocks behave as brittle solids
- (b) that portion of Earth where rocks behave as plastic solids
- (c) that portion of Earth where rocks behave as fluids
- (d) that portion of Earth where rocks can be found
- (e) None of these

(xii) Which of the following is associated with continent-continent convergent plate boundaries?
- (a) explosive volcanism
- (b) andesite volcanism
- (c) large, damaging earthquakes
- (d) volcanic mountain chain
- (e) All of these

(xiii) An example of a convergent plate boundary is:
- (a) the Ouachita Mountains
- (b) the Appalachian Mountains
- (c) the Himalaya Mountains
- (d) the Cascade Mountains
- (e) All of these

(xiv) The strike of a layer is:
- (a) the angle at which that layer intercepts a horizontal surface
- (b) the degree to which the layer has compressed during mountain building
- (c) a line formed by the intersection of the layer with the Earth's surface

(xv) An anticline is a structure in which:
- (a) the oldest rock layers are located at the top of the structure
- (b) the rock layers dip away from the axis of the structure
- (c) rock layers are down warped
- (d) All of these

(xvi) The V-shaped outcrop pattern of a plunging syncline will:
- (a) be tilted
- (b) close in the direction of plunge
- (c) open in the direction of plunge
- (d) not be observed
- (e) point toward the axis

(xvii) Which of the following is not a feature of an anticline?
- (a) youngest rocks on the flanks
- (b) oldest rocks near the axis
- (c) layers dip toward the axis
- (d) upwarped rock layers
- (e) All of these

(xviii) Which of the following is not a principle used in relative dating?
- (a) the Principle of Superposition
- (b) the Principle of Original Horizontality
- (c) the Principle of Faunal Succession
- (d) the Principle of Cross-Cutting Relationships
- (e) The Theory of Evolution

(xix) What is the half-life of a radioactive element?
- (a) the time required for one-half of a given quantity of the element to decay to its daughter element
- (b) the time required for all of the radioactive element to decay to its daughter element
- (c) half of the time required for a given quantity of the element to decay to its daughter element
- (d) the time required for the radioactive element to decay half of the time
- (e) if you observe a radioactive element, half the time it decays, half the time it doesn't

(xx) The Principle of Faunal Succession states that:
- (a) fossils preserved in rock layers are less complex in older rocks
- (b) the Theory of Evolution is proven by the succession of fossils observed in rocks
- (c) the fossil record of life proves that life has succeeded on Earth
- (d) it is unlikely that life could have succeeded on other planets
- (e) None of these

PART – II

NOTE:	**(i)** **PART-II** is to be attempted on the separate **Answer Book.** **(ii)** Attempt **ONLY FOUR** questions from **PART-II**. All questions carry **EQUAL** marks. **(iii)** Extra attempt of any question or any part of the attempted question will not be considered.

Q.2. How many Tectonic Plate Boundaries are found? Describe them briefly with emphasis to Indian Plate. **(20)**

Q.3. Describe Volcanic processes in detail with emphasis to volcanic activity in Indus and Balochistan Basins. **(20)**

Q.4. What do you understand with rock failure theory? Describe various features result due tectonic forces. **(20)**

Q.5. What importance has micro fossils in stratigraphy? Give the Classification of Phylum Sarcodina up to Family level. **(20)**

Q.6. Describe the succession (Various Formations) of Mesozoic Era from Salt Range. **(20)**

Q.7. Describe principal types of metamorphic rocks in details. **(20)**

Q.8. Define/describe briefly the following terms: **(20)**

(i)	Horst and Graben Fault	(ii)	Range Fossils	**(1 each)**
(iii)	Law of superposition	(iv)	Lithosphere	
(v)	Type section	(vi)	Continental Rise	
(vii)	Disconformity	(viii)	Jhlum Group	
(ix)	Alluvial Fan	(x)	Jasper	
(xi)	Moh’s Scale	(xii)	Differential Weathering	
(xiii)	Primary structures	(xiv)	Meandering Stream	
(xv)	Detritus Rocks	(xvi)	Geosyncline	
(xvii)	Petrifaction	(xviii)	Panel Diagram	
(xix)	Transform Fault	(xx)	Graded Bedding	

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GEOLOGY, PAPER-II

S.No.	
R.No.	

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PART – I (MCQ)
(COMPULSORY)

Q.1. Select the best option/answer and fill in the appropriate box on the Answer Sheet. (20)

(i) Diamonds are stronger than graphite because they have:
(a) Van der Waals bonds (b) covalent bonds
(c) ionic bonds (d) metallic bonds

(ii) Bauxite, the principal ore of aluminum is actually which type of soil:
(a) pedalfer (b) pedocal (c) caliche (d) laterite

(iii) The term "groundwater recharge" refers to:
(a) the supply of groundwater that remains stored in the ground for long periods of time
(b) the infiltration and addition of water into the groundwater aquifer
(c) absorption of water by the soil
(d) how fast the groundwater is flowing

(iv) Which of the following aquifers are most at risk to contamination?
(a) deep, confined aquifers
(b) aquifers in igneous rocks
(c) shallow, unconfined aquifers recharged by rivers that drain agricultural or industrial areas
(d) All of these

(v) Doubling of the greenhouse gases in the atmosphere is predicted to cause:
(a) change in rainfall patterns
(b) increase in average global temperature of 1.2 *C
(c) northward movement of optimal growing zones
(d) All of these

(vi) Platinum and chromium deposits are typically associated with:
(a) pegmatites (b) hydrothermal deposits
(c) black smokers (d) igneous mafic layered intrusions

(vii) With increasing metamorphism, a shale will go through which of the following textural changes:
(a) phyllite, gneiss, schist, slate (b) schist, slate, gneiss, phyllite
(c) slate, phyllite, gneiss, schist (d) slate, phyllite, schist, gneiss

(viii) Most petroleum is generated from source rocks deposited:
(a) in oxic to dysoxic (b) dysoxic-to-suboxic
(c) suboxic-to-anoxic (d) dysoxic-to-oxic environments

(ix) The main driving force behind secondary migration in absence of hydrodynamics is:
(a) buoyancy (b) capillarity (c) surface tension

(x) Mendeleer proposed that, metallic carbides deep within the Earth reacted at high temperature with H_2O, to form hydrocarbons:
(a) methane (b) ethane (c) acetylene (d) benzene

(xi) Good hydrocarbon source rocks are usually:
(a) Coarse grained (b) fine grained (c) medium grained

(xii) Oil and Gas Development Corporation was established in:
(a) 1956 (b) 1965 (c) 1961 (d) 1971

(xiii) First discovery of oil Field was made at Khaur in Potwar Basin in:
(a) 1885 (b) 1951 (c) 1915 (d) 1947

(xiv) The zone of leaching in a soil is also called the:
(a) A-horizon (b) B-horizon (c) C-horizon (d) O-horizon

(xv) To be an aquifer, a rock unit must have::
(a) both permeability and porosity (b) neither permeability nor porosity
(c) permeability, but not porosity (d) porosity, but not permeability

(xvi) Which formation is most objective as reservoir rock in Potowar region?
(a) Khewra sand stone (b) Datta sand stone
(b) Pab sand stone (d) Sakesar Lime stone

(xvii) Geologists use the equation called Darcy's Law to calculate:
(a) the depth to the water table (b) the discharge through an aquifer
(c) the water pressure in an aquifer (d) the porosity of an aquifer

(xviii) Kalabagh Dam was proposed to built on:
(a) Swat River (b) Kabul River (c) Indus River (d) Nilam River

(xix) Chromite ore mines are located in:
(a) Axial folded Belt (b) Sulaiman Ranges (c) Trans Indus Ranges
(d) Kharan Ranges (e) None of these

(xx) Most of the Oil and Gas Fields of Indus Basin discovered in:
(a) Punjab Platform Area (b) Thar Platform Area (c) Sargodha High
(d) Kohat-Potwar Basin (e) None of these

PART – II

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Q.2. Describe the characteristics of reservoir rocks and enlist producing reservoir rocks of Indus Basin. **(20)**

Q.3. Describe the Trap mechanism and classify the kinds of traps according to Allen Allen. **(20)**

Q.4. Describe the Seismic method of Exploration and briefly discuss the mechanism of seismograph and geophones. **(20)**

Q.5. Discuss with reference to geographical distribution, economic value and occurrences of Non-Metallic Minerals of Pakistan. **(20)**

Q.6. Discuss the characteristics features of Building Material and enlist all those factors consider for construction of a Dam. **(20)**

Q.7. Discuss the future prospect of coal mining in Pakistan with reference to Sindh region especially. **(20)**

Q.8. Define/describe briefly the following terms: **(20)**

(i)	Photosynthesis	(ii)	Bitumen Shale	**(1 each)**
(iii)	Hematite Ore	(iv)	Seal Rock	
(v)	Career Bed	(vi)	Buoyant Force	
(vii)	Buckle Fold Trap	(viii)	Directional Drilling	
(ix)	Fuel Minerals	(x)	Drilling Mud	
(xi)	Oil Fields of Kohat	(xii)	Stable Slopes	
(xiii)	Remote sensing	(xiv)	Water Logging	
(xv)	Aquifer Well	(xvi)	Expulsion of soil	
(xvii)	Vuggy Porosity	(xviii)	Exinite Matter	
(xix)	Gas Chromatography	(xx)	Gravity Method of Exploration	

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