



**FEDERAL PUBLIC SERVICE COMMISSION  
COMPETITIVE EXAMINATION-2016  
FOR RECRUITMENT TO POSTS IN BS-17  
UNDER THE FEDERAL GOVERNMENT**

Roll Number

**GEOLOGY**

|                                                                                                                                     |                      |                           |
|-------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------------|
| <b>TIME ALLOWED: THREE HOURS</b>                                                                                                    | <b>PART-I (MCQS)</b> | <b>MAXIMUM MARKS = 20</b> |
| <b>PART-I(MCQS): MAXIMUM 30 MINUTES</b>                                                                                             | <b>PART-II</b>       | <b>MAXIMUM MARKS = 80</b> |
| <b>NOTE: (i) Part-II is to be attempted on the separate Answer Book.</b>                                                            |                      |                           |
| <b>(ii) Attempt ONLY FOUR questions from PART-II by selecting TWO questions from EACH SECTION. ALL questions carry EQUAL marks.</b> |                      |                           |
| <b>(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.</b>                 |                      |                           |
| <b>(iv) Candidate must write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.</b>                                |                      |                           |
| <b>(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.</b>                     |                      |                           |
| <b>(vi) Extra attempt of any question or any part of the attempted question will not be considered.</b>                             |                      |                           |

**PART-II**  
**SECTION-I**

- Q. No. 2.** Weathering is a natural process to break down the rocks and the minerals. This process involves a set of physical, chemical, and biological processes. Explain different types of physical and chemical weathering, and describe the role of water in chemical weathering process. **(20)**
- Q. No. 3.** Global society is heavily dependent on minerals and metals. Earth is the source of all these resources. All minerals are grouped into silicate and non-silicate minerals, and further are divided into seven major classes according to their economic use. For example, class Sulfides has mineral Galena whose chemical formula is PbF, and is a source of LEAD. Make a Table of four columns; 1<sup>st</sup> column should carry the title 'Minerals Class', 2<sup>nd</sup> column 'the Names of Minerals of the classes', 3<sup>rd</sup> column is Chemical formulae of minerals of 2<sup>nd</sup> column, 4<sup>th</sup> column the economic use of minerals of column-2. Mention 10 minerals in that Table, giving their class (1<sup>st</sup> column), mineral name (2<sup>nd</sup> column), chemical composition (3<sup>rd</sup> column), and economic use (4<sup>th</sup> column). **(20)**
- Q. No. 4.** Mountain Belts are made of several mountain ranges, usually with related histories. There are some familiar mountain ranges of the world, mention simply their names and localities. However, discuss in detail the tectonic frame work of Himalayas. **(20)**
- Q. No. 5.** Earth scientists are aware of the fact that metamorphism and plate tectonics are intimately linked and are responsible for the development of different metamorphic facies. Explain with diagram(s) the type of plate tectonic boundary and formation of the related facies. **(20)**

**SECTION-II**

- Q. No. 6.** Pakistan has plenty mineral resources. Massive sulfide bodies are also found in different places. Electromagnetic geophysical methods is considered most suitable for the exploration of such high electrical conductivity bodies buried under surface. Discuss in detail the electromagnetic method, the controlling factors for increasing depth penetration and its other applications. **(20)**
- Q. No. 7.** Earthquakes are produced by fracturing the rocks in the subsurface. How it happens? How tsunamis are produced? What characteristics make the earthquakes dangerous, **(20)**



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**Roll Number**

**GEOLOGY**

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| <b>TIME ALLOWED: THREE HOURS</b>                                                                                                    | <b>PART-I (MCQS)</b> | <b>MAXIMUM MARKS = 20</b> |
| <b>PART-I(MCQS): MAXIMUM 30 MINUTES</b>                                                                                             | <b>PART-II</b>       | <b>MAXIMUM MARKS = 80</b> |
| <b>NOTE: (i) Part-II is to be attempted on the separate Answer Book.</b>                                                            |                      |                           |
| <b>(ii) Attempt ONLY FOUR questions from PART-II by selecting TWO questions from EACH SECTION. ALL questions carry EQUAL marks.</b> |                      |                           |
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| <b>(iv) Candidate must write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.</b>                                |                      |                           |
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**PART-II  
SECTION-I**

- Q. No. 2.** Describe structure of neso silicates. Also draw its sketch. Narrate physical and optical properties of olivine group of minerals. **(20)**
- Q. No. 3.** Describe development of different types of metamorphic facies during subduction process. With the help of temperature-pressure diagram, elaborate regimes of metamorphic facies. **(20)**
- Q. No. 4.** What categories of information we depict from the fossils found in sedimentary strata? Give examples. Describe some of common processes of fossilization. **(20)**
- Q. No. 5.** Outline important events of Indian Plate drift and subsequent tectonics from Mesozoic onwards in Pakistan region. Draw sketches. **(20)**

**SECTION-II**

- Q. No. 6.** Enlist methods of surface and near surface prospecting methods of oil and gas. Describe implementation details of any two methods, leading to successful discovery of hydrocarbon in a region. **(20)**
- Q. No. 7.** Discuss the geological conditions that normally trigger land sliding in northern Pakistan. Describe some of the measures to mitigate its effects. **(20)**
- Q. No. 8.** Write notes on any **TWO** of the following: **(10 each) (20)**
- a. Polarizing microscope
  - b. Paleobotany
  - c. Geothermal energy

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**FEDERAL PUBLIC SERVICE COMMISSION  
COMPETITIVE EXAMINATION-2018  
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**Roll Number**

**GEOLOGY**

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| <b>TIME ALLOWED: THREE HOURS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>PART-I (MCQS)</b> | <b>MAXIMUM MARKS = 20</b> |
| <b>PART-I(MCQS): MAXIMUM 30 MINUTES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>PART-II</b>       | <b>MAXIMUM MARKS = 80</b> |
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**PART-II**  
**SECTION-I**

- Q. No. 2.** (a) Briefly describe internal structure and composition of the earth. (10)  
(b) What do you know about Isostasy and Isostatic Adjustment? Explain. (10)
- Q. No. 3.** (a) Describe various modes of fossilization. (15)  
(b) Briefly describe various lithostratigraphic units. (5)
- Q. No. 4.** (a) Describe various sedimentary structures of the clastic rocks. Also write down their importance in the field. (10)  
(b) Describe various types of volcanic material and their characteristic features. (10)
- Q. No. 5.** (a) Write down the genetic classification of faults. Also relate principal stresses with all those faults. (10)  
(b) Briefly describe the various types of plate boundaries and the associated earth features along them. (10)

**SECTION-II**

- Q. No. 6.** Briefly describe various types of gravity anomalies and their corrections. (20)
- Q. No. 7.** (a) What do you know about the trapping mechanism of hydrocarbons? Explain. Also describe various types of traps. (15)  
(b) What do you know about bright spot technique? Explain. (5)
- Q. No. 8.** Write short notes on any **TWO** of the followings:- (10 each) (20)  
(a) Stratigraphic Sequence.  
(b) Copper deposits of Pakistan.  
(c) Earthquakes (Elastic Rebound theory and Locating Epicenter)

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**FEDERAL PUBLIC SERVICE COMMISSION**  
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Roll Number

**GEOLOGY**

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| <b>PART-I(MCQS): MAXIMUM 30 MINUTES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>PART-II</b>       | <b>MAXIMUM MARKS = 80</b> |
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**PART – II**  
**SECTION – I**

- Q. No. 2.** What characteristics a sedimentary strata should contain to be designated as a “Formation”? How the formation is divided into sub-units? Describe the characters of Salt Range Formation. **(20)**
- Q. No. 3.** Elaborate the Plagioclase Series of Feldspar group of rock forming minerals. Describe the physical and optical characteristics of the series. **(20)**
- Q. No. 4.** What is Pull-apart basin? Describe the characteristics of transform movement between two continental blocks. Where you find similar features in Pakistan? **(20)**
- Q. No. 5.** What are Pegmatites? Discuss the texture and mineralogical composition of pegmatites. What precious minerals are associated with acidic pegmatites? **(20)**

**SECTION-II**

- Q. No. 6.** What methods of geophysical exploration are used for metallic ore deposits? What instruments are used for acquisition and interpretation of data? **(20)**
- Q. No. 7.** Differentiate between volcanic and fissure eruptions. Describe types of materials exhaled by volcanoes. How these materials are hazardous to men and environment? **(20)**
- Q. No. 8.** Write short notes on any TWO of the following: **(10 each) (20)**  
**(a)** Source sediments of petroleum.  
**(b)** Site investigation for highway construction.  
**(c)** Site investigation for tunnel construction.

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**FEDERAL PUBLIC SERVICE COMMISSION**  
**COMPETITIVE EXAMINATION-2020**  
**FOR RECRUITMENT TO POSTS IN BS-17**  
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Roll Number

**GEOLOGY**

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| <b>TIME ALLOWED: THREE HOURS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>PART-I (MCQS) MAXIMUM MARKS = 20</b> |
| <b>PART-I(MCQS): MAXIMUM 30 MINUTES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>PART-II MAXIMUM MARKS = 80</b>       |
| <b>NOTE: (i) Part-II is to be attempted on the separate Answer Book.</b><br><b>(ii) Attempt ONLY FOUR questions from PART-II by selecting TWO questions from EACH SECTION. ALL questions carry EQUAL marks.</b><br><b>(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.</b><br><b>(iv) Write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.</b><br><b>(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.</b><br><b>(vi) Extra attempt of any question or any part of the question will not be considered.</b> |                                         |

**PART – II**  
**SECTION – I**

- Q. No. 2.** Differentiate between weathering, erosion and transportation. Elaborate the various agents and types of weathering. (20)
- Q. No. 3.** What are lithostratigraphic and chronostratigraphic unit? Discuss the various laws of stratigraphy. (20)
- Q. No. 4.** Explain isomorphism and polymorphism through examples. Give a detailed account of classification of silicate minerals. (20)
- Q. No. 5.** Differentiate between lineation and foliation. Discuss various structural controls on the mechanical properties of materials. (20)

**SECTION-II**

- Q. No. 6.** Differentiate between eustatic and relative sea level curve. Discuss the relationship between eustacy, accommodation space and sedimentation. (20)
- Q. No. 7.** Differentiate between hydrocarbon source and reservoir rocks. Elaborate the various trapping mechanisms of hydrocarbons. (20)
- Q. No. 8.** Write short notes on any TWO of the following: (10 each) (20)
- (a)** Coal rank and coal series.
  - (b)** Geological controls on the selection of mega dam sites.
  - (c)** Occurrences of Radioactive deposits in Pakistan.

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# FEDERAL PUBLIC SERVICE COMMISSION

## COMPETITIVE EXAMINATION-2021 FOR RECRUITMENT TO POSTS IN BS-17 UNDER THE FEDERAL GOVERNMENT

Roll Number

### GEOLOGY

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|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------------------|
| TIME ALLOWED: THREE HOURS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PART-I (MCQS) | MAXIMUM MARKS = 20 |
| PART-I(MCQS): MAXIMUM 30 MINUTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | PART-II       | MAXIMUM MARKS = 80 |
| <p><b>NOTE: (i) Part-II is to be attempted on the separate Answer Book.</b></p> <p><b>(ii)</b> Attempt <b>ONLY FOUR</b> questions from <b>PART-II</b> by selecting <b>TWO</b> questions from <b>EACH SECTION</b>. <b>ALL</b> questions carry <b>EQUAL</b> marks.</p> <p><b>(iii)</b> All the parts (if any) of each Question must be attempted at one place instead of at different places.</p> <p><b>(iv)</b> Write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.</p> <p><b>(v)</b> No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.</p> <p><b>(vi)</b> Extra attempt of any question or any part of the question will not be considered.</p> |               |                    |

### PART – II

#### SECTION – I

- Q. No. 2.** Classify pyroxene group of minerals based on chemical composition. Also mention their physical and optical properties. (20)
- Q. No. 3.** Elaborate various laws of stratigraphy, use suitable sketches/examples in support of your answer. (20)
- Q. No. 4.** Elaborate the fundamental silica tetrahedral structure ( $\text{SiO}_4$ ). Give possibilities of  $\text{SiO}_4$  linkage to give rise to six silicate structural groups. (20)
- Q. No. 5.** Describe the test compositions of order Foraminiferida. Discuss their ecology and how it plays important role in Tertiary biostratigraphy. (20)

#### SECTION-II

- Q. No. 6.** Elaborate characteristics of effective trap-rocks. Describe principal types of hydrocarbon traps with examples. (20)
- Q. No. 7.** What are the possible causes of land sliding in the northern mountainous region of Pakistan and how it can be reduced? (20)
- Q. No. 8.** Write short notes on any TWO of the following: (10 each) (20)
- (a) Geothermal energy
  - (b) Eustatic curve
  - (c) Physical weathering

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**FEDERAL PUBLIC SERVICE COMMISSION**  
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**Roll Number**

**GEOLOGY**

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| <b>TIME ALLOWED: THREE HOURS</b><br><b>PART-I(MCQS): MAXIMUM 30MINUTES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>PART-I (MCQS)      MAXIMUM MARKS = 20</b><br><b>PART-II                MAXIMUM MARKS = 80</b> |
| <b>NOTE: (i) Part-II is to be attempted on the separate Answer Book.</b><br><b>(ii) Attempt ONLY FOUR questions from PART-II by selecting TWO questions from EACH SECTION. All questions carry EQUAL marks.</b><br><b>(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.</b><br><b>(iv) Write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.</b><br><b>(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.</b><br><b>(vi) Extra attempt of any question or any part of the question will not be considered.</b> |                                                                                                  |

**PART-II**  
**SECTION-I**

- Q. No. 2.** Describe the principal of plate tectonic with evidences. Explain the Wilson cycle in detail. **(20)**
- Q. No. 3.** Explain the vertical stacking pattern and parasequences set. How does the vertical stacking pattern of parasequences allow for the recognition of systems tracts? **(20)**
- Q. No. 4.** Explain the tectonic framework of Pakistan with an example of Indian-Eurasian and Indian-African plate drifting. **(20)**
- Q. No. 5.** Describe Polarized Light Microscopy along with optical properties of opaque and non-opaque mineral? How to identify the Gout crystal and Pseudo-Gout? **(20)**

**SECTION-II**

- Q. No. 6.** Explain different geophysical methods such as gravity, magnetic, electrical resistivity, electromagnetic and seismic. Explain the application of each method, its strength and its limitations. **(20)**
- Q. No. 7.** What are the merits and demerits of refraction seismology, magnetic surveying, resistivity surveying and gravity to probe the depth of bedrock, bedrock lithology and crustal thickness? **(20)**
- Q. No. 8.** Write short notes on any **TWO** of the following: **(10 each)      (20)**
- (a)** Radioactivity and types with reaction
  - (b)** Hadley cell, Ferrell cell and polar cell of air movement
  - (c)** Sedimentary Basin of Pakistan

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**FEDERAL PUBLIC SERVICE COMMISSION**  
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**GEOLOGY**

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| <b>TIME ALLOWED: THREE HOURS</b><br><b>PART-I(MCQS): MAXIMUM 30MINUTES</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>PART-I (MCQS)    MAXIMUM MARKS = 20</b><br><b>PART-II            MAXIMUM MARKS = 80</b> |
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**PART-II**  
**SECTION-I**

- Q. No. 2.** Discuss the history and component of geological time scale. (20)
- Q. No. 3.** Discuss the trilobites and their significance in Paleozoic stratigraphy. (20)
- Q. No. 4.** Write a comprehensive note on IUGS classification of volcanic rocks. (20)
- Q. No. 5.** How salt can be identified in the field? Discuss the stratigraphic, physiographic, and geometric criteria. (20)

**SECTION-II**

- Q. No. 6.** Discuss in detail the mostly applied geophysical techniques in mineral exploration. (20)
- Q. No. 7.** Explain the primary and secondary migration of Hydrocarbons. (20)
- Q. No. 8.** What are mostly conducted modes of subsurface investigations at dam sites? Discuss comprehensively with figures where required. (20)

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**FEDERAL PUBLIC SERVICE COMMISSION**  
**COMPETITIVE EXAMINATION-2024 FOR RECRUITMENT**  
**TO POSTS IN BS-17 UNDER THE FEDERAL GOVERNMENT**

Roll Number

**GEOLOGY**

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|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| TIME ALLOWED: THREE HOURS                                                                                                                                                                                                                                      | (PART-I MCQs) MAXIMUM MARKS: 20 |
| PART-I (MCQs) : MAXIMUM 30 MINUTES                                                                                                                                                                                                                             | (PART-II) MAXIMUM MARKS: 80     |
| NOTE: (i) First attempt PART-I (MCQs) on separate OMR Answer Sheet which shall be taken back after 30 minutes.<br>(ii) Overwriting/cutting of the options/answers will not be given credit.<br>(iii) There is no negative marking. All MCQs must be attempted. |                                 |

**PART-I (MCQs) (COMPULSORY)**

- Q.1. (i) Select the best option/answer and fill in the appropriate Box on the OMR Answer Sheet. (20x1=20)  
(ii) Answers given anywhere else, other than OMR Answer Sheet, will not be considered.

1. The maturity of a rock is a measure of its \_\_\_\_\_ in terms of hydrocarbon generation.  
(A) Density (B) Temperature (C) State (D) Pressure
2. Oil derived from coal, oil shales or tar sands is called:  
(A) Natural gas (B) Biomass (C) Syn-crude (D) None of these
3. Which of the following rock types would most likely be the best oil reservoir?  
(A) Granite (B) Shale (C) Sandstone (D) Salt
4. A trap formed by varying permeability within the layers of rocks is a:  
(A) Stratigraphic trap (B) Angular traps (C) Structural trap (D) Physical trap
5. The process of sea rising to cover the land is called:  
(A) Weathering (B) Regression (C) Transgression (D) Erosion
6. Energy resources derived from natural organic materials are called:  
(A) Geothermal energy (B) Biomass (C) Fossil Fuel (D) All of these
7. Which shape of earth is used for Geographic Coordinate System?  
(A) Ellipsoid (B) Circle (C) Flat plane (D) Geoid
8. In case of R.F. the denominator of the fraction shows the:  
(A) Map Distance (B) Ground distance (C) Scale (D) Number
9. Latitudes and longitudes refer to:  
(A) Relative location (B) Absolute location (C) Topology (D) Projection
10. Quartzite is metamorphosed from:  
(A) Shale (B) Limestone (C) Both (A) & (B) (D) Sandstone
11. A sedimentary rock composed of rounded gravel is called a:  
(A) Boulder (B) Cobble (C) Breccia (D) Conglomerate
12. Black coloured soil indicates abundant of:  
(A) Sandstone (B) Iron content (C) Clay content (D) Organic content
13. Which of the following process shows chemical weathering?  
(A) Spheroidal weathering (B) Hydrolysis and hydration  
(C) Thermal expansion (D) Frost heaving
14. The sea breeze blows during:  
(A) Day from land to sea (B) Day from sea to land  
(C) Night from land to sea (D) Night from sea to land
15. The reason behind the drifting away of continents is:  
(A) Volcanic eruptions (B) Tectonic activities (C) Folding and faulting (D) Change in landform
16. Which of the following process are involved in the formation of sedimentary rocks?  
(A) Fractional crystallization (B) Lithification (C) Weathering (D) Mountain building
17. The study of movement inside earth is called:  
(A) Plate Tectonics (B) Seismology (C) Geodesy (D) Structure Geology
18. Ox-bow lakes are formed due to:  
(A) Flooding (B) Intense meandering (C) Erosion (D) Flow of water
19. A stretch of land surrounded by water on all sides is called:  
(A) An island (B) A strait (C) A peninsula (D) A bay
20. Core of the Earth is the:  
(A) Innermost layer (B) Outer zone (C) Atmosphere over the layers (D) Middle zone

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## **GEOLOGY**

### **PART-II**

**NOTE: (i) Part-II is to be attempted on the separate Answer Book.**

- (ii)** Attempt **ONLY FOUR** questions from **PART-II** by selecting **TWO** questions from **EACH SECTION**. **ALL** questions carry **EQUAL** marks.
- (iii)** All the parts (if any) of each Question must be attempted at one place instead of at different places.
- (iv)** Write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.
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- (vi)** Extra attempt of any question or any part of the question will not be considered.

### **SECTION-A**

- Q. No. 2.** What is the difference between fracture and joints? Discuss importance of fracture and joint analysis. **(20)**
- Q. No. 3.** Discuss in detail the concept and terminology of faults. Discuss criteria for identification of faults. **(20)**
- Q. No. 4.** What are igneous rocks? Give in short, the mineralogical and textural classification of igneous rocks. **(20)**
- Q. No. 5.** Write briefly an overview of the major tectonics features of Pakistan. **(20)**

### **SECTION-B**

- Q. No. 6.** Describe characteristic features for occurrence of Petroleum System in any Basin. **(20)**
- Q. No. 7.** Write in detail types, occurrence and uses of economic mineral deposits of Punjab. **(20)**
- Q. No. 8.** What is a landslide? Explain the types of slides and the factors that trigger landslides. **(20)**

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**FEDERAL PUBLIC SERVICE COMMISSION**  
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Roll Number

**GEOLOGY**

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| <b>(ii) Overwriting/cutting of the options/answers will not be given credit.</b>                                      |                                        |
| <b>(iii) There is no negative marking. All MCQs must be attempted.</b>                                                |                                        |

**PART-I (MCQs)(COMPULSORY)**

**Q.1. (i) Select the best option/answer and fill in the appropriate Box ☐ on the OMR Answer Sheet.(20x1=20)**  
**(ii) Answers given anywhere else, other than OMR Answer Sheet, will not be considered.**

1. **S- wave is terminated at:**  
(A) Crust—Mantle boundary (B) Lithosphere—Asthenosphere boundary  
(C) Mantle—Core boundary (D) Inner and Outer core boundary
2. **Hydrothermal deposits are mostly:**  
(A) Syngenetic (B) Epigenetic (C) Residual (D) Placer
3. **Exothermal deposits are characterized by:**  
(A) High initial temperature and pressure (B) Shallow depth of formation  
(C) Rapid cooling (D) All of these
4. **The zone of leaching in a soil is also called:**  
(A) A-horizon (B) B-horizon (C) C-horizon (D) O-horizon
5. **Altitude of a bed can be measured by:**  
(A) Finding strike and dip direction by compass and angle or dip by clinometer.  
(B) Reading the position of the magnetic needle on the outer circle.  
(C) Reading the angle by clinometer. (D) Ending strike direction by compass and dip by clinometer.
6. **The process by which atomic nuclei spontaneously decay is termed as:**  
(A) Ionization (B) Fusion (C) Nucleation (D) None of these
7. **Staining technique is used to differentiate between calcite and:**  
(A) Aragonite (B) Dolomite (C) Siderite (D) Malachite
8. **Which one of the following mountain ranges have formed where continental crusts have converged?**  
(A) Andes (B) Alps (C) Himalaya (D) None of these
9. **The apparent dip of any bed towards any direction is:**  
(A) Greater than true dip (B) Equal to the true dip  
(C) Less than the true dip (D) Above conditions depend upon the amount of dip
10. **The density of the rock with natural moisture content is:**  
(A) Bulk density (B) Dry density (C) Wet density (D) Natural density
11. **The maps which place rocks in their presume position before folding and thrusting are known as:**  
(A) Paleogeologic map (B) Paleotectonic map (C) Paleogeographic map (D) Palinspastic map.
12. **The capacity of a rock particle to withstand bending loads is termed as:**  
(A) Bending strength (B) Shear strength (C) Transverse strength (D) Lateral strength
13. **If a fault plane is inclined with an angle of 35°, then the hade will be:**  
(A) 45° (B) 55° (C) 145° (D) 125°
14. **The rate that temperature increases with increasing depth inside the earth is called:**  
(A) Geothermal gradient (B) Isothermal gradient (C) Hydrothermal gradient (D) Mesothermal gradient
15. **“Sima” is a general term used to refer to:**  
(A) Rocks of the oceanic crust (B) Rocks of the continental crust  
(C) Rocks of the terrestrial planet (D) None of these
16. **Which of the following group of fossils became extinct at the Permo-Triassic boundary?**  
(A) Graptolite (B) Trilobite (C) Ammonite (D) Ediacaran
17. **A mine excavation made along the strike of a 2 meter thick tabular ore body dipping 30° is called:**  
(A) Crosscut (B) Raise (C) Drive (D) Shaft
18. **Identify the correct sequence for the rank of coal from lowest to highest:**  
(A) Bituminous - anthracite - lignite – peat (B) Peat - lignite - bituminous - anthracite  
(C) Peat - lignite - anthracite – bituminous (D) Anthracite - bituminous - lignite – peat
19. **Which of the following is the agent of metamorphism?**  
(A) Fluid (B) Heat-Temperature (C) Pressure (D) All of these
20. **Which earthquake body waves have the greatest velocity?**  
(A) L waves (B) P waves (C) S waves (D) 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** by selecting **TWO** questions from **EACH SECTION**. **ALL** questions carry **EQUAL** marks.  
(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.  
(iv) Write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.  
(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.  
(vi) Extra attempt of any question or any part of the question will not be considered.

**SECTION-A**

- Q. No. 2.** (a) Discuss the interior of earth in detail. Also describe the processes (10)  
involved in the formation of igneous rocks.  
(b) What are laws of superposition and faunal succession? Describe (10) (20)  
classification and nomenclature of stratigraphic units in detail.
- Q. No. 3.** (a) What are main types of sedimentary rocks and how are they formed? (10)  
Also describe the classification scheme of these sedimentary rocks in  
detail.  
(b) Discuss optical properties of common rock-forming minerals in detail. (10) (20)
- Q. No. 4.** Write comprehensive note on the following topics. (10 each) (20)  
(a) Tectonic framework of Pakistan  
(b) Geothermal energy resource potentials of Pakistan

**SECTION-B**

- Q. No. 5.** (a) Write a detailed note on “Geophysical techniques utilized in exploration (10)  
of mineral deposits, oil/gas and groundwater”.  
(b) Discuss migration types in hydrocarbon exploration. Also describe (10) (20)  
secondary and enhanced oil recovery techniques in detail.
- Q. No. 6.** (a) What is Walther’s law of superposition? Discuss concepts and (10)  
significance of sequence stratigraphy.  
(b) Describe “Upper Indus basin with respect to its hydrocarbon potentials” (10) (20)  
in detail.
- Q. No. 7.** What is the role of Engineering Geology in the development of CPEC projects? (20)  
Explain it with suitable examples.
- Q. No. 8.** (a) Discuss various classification schemes of mineral deposits in detail. (10)  
(b) Describe various metallic and non-metallic mineral deposits of Pakistan. (10) (20)  
Also discuss their significance and abundance in detail.

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FEDERAL PUBLIC SERVICE COMMISSION  
COMPETITIVE EXAMINATION-2026 FOR RECRUITMENT  
TO POSTS IN BS-17 UNDER THE FEDERAL GOVERNMENT

Roll Number

**GEOLOGY**

|                                                                                                                                                                                                                                                                |                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|
| TIME ALLOWED: THREE HOURS                                                                                                                                                                                                                                      | (PART-I MCQs) MAXIMUM MARKS: 20 |
| PART-I (MCQs) : MAXIMUM 30 MINUTES                                                                                                                                                                                                                             | (PART-II) MAXIMUM MARKS: 80     |
| NOTE: (i) First attempt PART-I (MCQs) on separate OMR Answer Sheet which shall be taken back after 30 minutes.<br>(ii) Overwriting/cutting of the options/answers will not be given credit.<br>(iii) There is no negative marking. All MCQs must be attempted. |                                 |

**PART-I (MCQs)(COMPULSORY)**

- Q.1. (i) Select the best option/answer and fill in the appropriate Box ☐ on the OMR Answer Sheet.(20x1=20)  
(ii) Answers given anywhere else, other than OMR Answer Sheet, will not be considered.

- Kyanite is the polymorph of:  
(A) Sillimanite (B) Cerussite (C) Siderite (D) None of these
- An intermediate stress acts \_\_\_\_\_ to the plane containing the largest and smallest stress.  
(A) Parallel (B) Oblique (C) Normal (D) None of these
- Groove cast, Flute and Tool marks are found on the \_\_\_\_\_ of the bed.  
(A) Bottom (B) Top (C) Within bed (D) All of these
- Which mineral is exploited from the Dudar Mine of Lasbela District?  
(A) Sphalerite (B) Pyrite (C) Galena (D) All of these
- On a thrust fault, the hanging wall moves \_\_\_\_\_ relative to the foot wall.  
(A) Horizontal (B) Up (C) Down (D) None of these
- A concordant lens-shaped pluton occupying the crest of an anticline or the bottom of a syncline and being fed by a conduit from beneath is:  
(A) Laccolith (B) Phacolith (C) Lopolith (D) None of these
- Progradational stacking patterns indicate:  
(A) Sea-level rise > sediment supply (B) No change in base level  
(C) Sediment supply > accommodation (D) None of these
- Titanosaurian sauropod and Abelisaurid theropod fossils have been discovered in \_\_\_\_\_ area of Pakistan. (A) Kirthar Range (B) Pab Range (C) Salt Range (D) All of these
- Which mineral/s exhibit strong uniaxial negative optical character:  
(A) Zircon (B) Quartz (C) Apatite (D) All of these
- In a geological map, if topographic contours and geological contacts are parallel to each other, then beds are:  
(A) Vertical (B) Horizontal (C) Inclined (D) Folded
- Following can be used as raw material for the cement.  
(A) Limestone (B) Hematite (C) Shells (D) All of these
- In stratigraphic classifications, Unconformity bounded strata are classified as \_\_\_\_\_ unit.  
(A) Allostratigraphic (B) Biostratigraphic (C) Chronostratigraphic (D) None of these
- For shallow site investigation, the most suitable geophysical method is:  
(A) Gravity (B) Magnetic (C) Seismic refraction (D) None of these
- Expansive clay soils pose engineering problems mainly due to high:  
(A) Permeability (B) Shrink-swell potential (C) Density (D) High silica content
- An oil discovery of 2000 barrels with the oil price being 40 \$/bbl. Suppose that \$8000 were spent on this oil field. Therefore, at least \_\_\_\_\_ barrels are required to break even.  
(A) 200 (B) 100 (C) 50 (D) None of these
- Material/s with high compressive suitable for construction purpose is/are:  
(A) Concrete (B) Granite (C) Steel (D) All of these
- The quantity of Calcium (Ca) in a carbonate rock is commonly measured by using \_\_\_\_\_ technique. (A) Gravimetric (B) Volumetric (C) Flame photometer (D) None of these
- A Lowstand Systems Tract (LST) typically develops during:  
(A) Rapid relative sea-level rise (B) Maximum transgression  
(C) Relative sea-level fall (D) Highstand stability
- The most reliable biostratigraphic markers are:  
(A) Ichnofossils (B) Derived fossils (C) Pseudofossils (D) Index fossils
- In the Cretaceous petroleum system of Lower Indus Basin, \_\_\_\_\_ Formation serves as seal rock. (A) Upper Goru Shales (B) Ranikot (C) Ghazij (D) None of these

**PART-II**

- NOTE:** (i) **Part-II** is to be attempted on the separate **Answer Book**.  
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(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.  
(vi) Extra attempt of any question or any part of the question will not be considered.

**SECTION-A**

- Q. No. 2.** Describe how metamorphic facies are different from metamorphic zones. (20)  
Discuss the role of pressure-temperature (P–T) conditions in defining metamorphic facies and their significance in tectonic settings.
- Q. No. 3.** (a) Discuss the significance of micropaleontology in petroleum exploration and stratigraphic correlation. (10)  
(b) Briefly describe the stratigraphy of Lower Indus Basin. (10) (20)
- Q. No. 4.** Discuss in detail, the major tectonic zones of Pakistan. (20)
- Q. No. 5.** Write comprehensive note on any FOUR of the following:- (5 each) (20)  
(i) Scope of Geology (ii) Optical Properties of Feldspar Group  
(iii) Modes of Fossilization (iv) Gemstones of Pakistan  
(v) Khewra Salt Mine (vi) Atterberg Limit Tests

**SECTION-B**

- Q. No. 6.** Discuss various geophysical techniques used in petroleum, mineral, and water exploration, highlighting their advantages and limitations. (20)
- Q. No. 7.** Define differential entrapment of hydrocarbons. Discuss how migration pathways and timing lead to differential entrapment of oil and gas in a single trap. (20)
- Q. No. 8.** Define geological hazards. Explain the phenomenon of Glacial Lake Outburst Floods (GLOFs) and its increasing risk in Pakistan. (20)

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