# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Geology & Tectonics of Pakistan** **TIME ALLOWED: 3 Hrs.**

**PAPER: I** **MAX. MARKS: 75**

***NOTE: Attempt any THREE questions. All questions carry equal marks.***

Q1. a. What are oceanic ridges? How and why do anomalous upper mantle occur beneath ridges. (12)

b. Discuss the various occurrences of ultramafic rocks in the earth's crust. (13)

Q2. a. How do you deduce the chemical composition of upper mantle, directly and / are indirectly? (12)

b. Discuss the behavour of 670 km discontinuity. (13)

Q3. a. What are the possible mineral assemblages of upper mantle and transition zone? What type of rocks do you expect from a magma derived from upper mantle? (15)

b. Write a note on transform faults. Also give an example from Pakistan. (10)

Q4. a. What is an accretionary prism? How does its nature and geometries of a prism govern the sediments? (15)

b. What are the forces that drive a plate? Discuss with examples. (10)

Q5. a. Discuss the evolution of the Core. (10)

b. What are pull apart basins? How do they grow? (10)

c. Write note on MBT and SRT. (5)

# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Sedimentology**
**PAPER: II**

**TIME ALLOWED: 3 Hrs.**
**MAX. MARKS: 75**

***NOTE: Attempt any THREE questions. All questions carry equal marks.***

**Q1.** Discuss in detail classification, origin and occurrence of Conglomerates?

(25)

**Q2.** Sandstone makes up about one-fourth of the total volume of the total volume of sedimentary rocks. Describe major framework component of the Sandstone? Discuss characteristics of the major classes of Sandstone??

(25)

**Q3.** i) Define Roundness and Sphericity. Discuss their different classes and significance? Briefly discuss various method of Grain-Size measurement

(25)

**Q4.** Discuss in detail classification, origin and occurrence of Conglomerates?

(25)

**Q5.** Write note on any five of the followings? (25)

i) Cross-bedding ii) Chemical weathering iii) Grain Size analysis
iv) Porosity and Permeability v) Ripple Marks
vi) Soil development vii) Economic significance of weathering

# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Economic Geology**
**PAPER: III**

**TIME ALLOWED: 3 Hrs.**
**MAX. MARKS: 75**

***NOTE: Attempt any FIVE questions. All questions carry equal marks.***

| | | |
|---|---|---|
| **Q. No.1** | Discuss economic mineral potential of Pakistan. | 15 |
| **Q. No.2** | Explain the economic worth of pegmatites. | 15 |
| **Q. No.3** | Discuss the economic potential of hypothermal mineral deposits. | 15 |
| **Q. No.4** | How early and late economic mineral deposits are formed? | 15 |
| **Q. No.5** | Discuss geology, mineral potential and economic importance of Chiniot iron ore deposits of Pakistan | 15 |
| **Q. No.6** | Discuss genetic classification of Placer deposits | 15 |
| **Q. No.7** | How marine and non-marine clay deposits are formed. Give the economic significance of bentonite deposits. | 15 |
| **Q. No.8** | Briefly explain the followings:<br>i) Limestone deposits of Pakistan<br>ii) Economic importance of feldspar | 07<br>08 |

# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Remote Sensing & GIS** **TIME ALLOWED: 3 Hrs.**

**PAPER: IV** **MAX. MARKS: 75**

***NOTE: Attempt any FIVE questions. Draw diagram where necessary. All questions carry equal marks.***

| | | |
|---|---|---|
| 1. | What is Cartography? Describe the basic elements of a map and further list down the principles of map design. | **15 marks** |
| 2. | What is Georeferencing? Describe the different types of Georeferencing and ground control points along with examples. | **15 marks** |
| 3. | How we can assess the slopes of an area using Contour Lines? Briefly describe contour lines and their properties. | **15 marks** |
| 4. | What is digitization? Elaborate the all types of digitization | **15 marks** |
| 5. | What is interpolation technique? Describe the different methods / types of Interpolation and their significance. | **15 marks** |
| 6. | Differentiate between Vector Data Model and Raster Data Model using valid examples. | **15 marks** |
| 7. | Define and explain the following terms:<br>i) Spatial Resolution ii) Radiometric Resolution<br>iii) Spectral Resolution iv) Temporal Resolution | **15 marks** |
| 8. | (a) What is map projection? Define the following projection types<br>i) Azimuthal ii) Conformal iii) Equivalent<br>iv) Equidistant<br>b) Write down the significance of ArcGIS software. Furthermore, describe the usage/functionality of different components of ArcGIS Software. | **15 marks** |

# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Micropaleontology**
**PAPER: V**

**TIME ALLOWED: 3 Hrs.**
**MAX. MARKS: 75**

***NOTE: Attempt any FIVE questions. All questions carry equal marks.***

Q1: a) Describe the different types of apertures of foraminifera. 7,8
b) Give the chamber arrangements in Foraminifera.

Q2: Describe at least two Index Fossils of Upper Cretaceous other than *Globotruncana.* 15

Q3: Describe *Globotruncana lineana* in detail. 15

Q4: Give the salient features of genus *Assilina* and discuss its species. 15

Q5: Give the difference between *Nummulites mamillatus* and *Nummulites atacicus* and their stratigraphic significance. 15

Q6: Describe *Alveolina* in detail and its stratigraphic significance. 15

Q7: Discuss the Index Fossil of Upper Paleocene in detail. 15

Q8: Write short notes on the followings: 15
a) *Miscellanea* b) *Operculina* c) *Discocyclina*

# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Geophysics** **TIME ALLOWED: 3 Hrs.**

**PAPER: VI** **MAX. MARKS: 75**

***NOTE: Question No. 1 is Compulsory. Attempt any FIVE Questions from Question No. 2 to Question No.9.***

| | | |
|---|---|---|
| Q. 1 | Define any TEN of the following geophysical terms:<br>Critical Distance, Reflection Coefficient, Plastic Deformation, Shear Modulus, Dip Pole, Elastic Rebound, Hooke's Law, Poisson's Ratio, Acoustic Impedance, Huygens' Principle, Isogones, Isoclines, Snell's Law, Seismic Section, Shadow Zone, Bulk Density | 20 |
| Q. 2 | How does the Earth's Magnetic Field look like from space? Give the details of its structure. | 11 |
| Q. 3(a) | What do you mean by Elastic Waves? Di scuss briefly different types of Elastic Waves giving their characteristics. | 8 |
| (b) | What will be the Angle of Incidence if offset is 50 m and depth to the reflector is 100 m. | 3 |
| Q. 4 | Define earthquake magnitude and discuss various scales used to determine earthquake magnitude showing differences between them. | 11 |
| Q. 5 | Give details of Ground Penetrating Radar. Describe its working principle and applications. | 11 |
| Q. 6(a) | Explain Seismic Refraction method. How depth to interface, Intercept Time and Cross Over Distance are found in case of two horizontal layers? | 6 |
| (b) | What will be the Cross Over Distance and Intercept Time if depth to bedrock is 20 meters and velocities of upper and lower layers are 1200 and 1900 m/sec respectively? | 5 |
| Q. 7 | How does the change in latitude change the gravity value keeping all other factors constant and how can the effect of latitude be removed from gravity data. | 11 |
| Q. 8 | Explain Electrical Resistivity method and derive Apparent Resistivity formula for an Isotropic medium using Schlumberger configuration. | 11 |
| Q. 9 | Write short notes on any three of the following.<br>i. Transient Variations in Geomagnetism<br>ii. Shooting Spreads<br>iii. Drift in Gravity Meter<br>iv. Applications of Electrical Resistivity Method | 11 |

# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Geochemistry** **TIME ALLOWED: 3 Hrs.**

**PAPER: VII** **MAX. MARKS: 75**

***NOTE: Attempt any FIVE questions.***

| Sr # | Question | Marks |
|---|---|---|
| 1 | Explain human influence on Geochemical cycle | 15 |
| 2 | How Age of Universe is determined. Explain it? | 15 |
| 3 | e) Differentiate between Siderites, Siderolites and Aerolites Meteorites.<br>f) How Nitrogen cycle play an important role in environment | 06<br>09 |
| 4 | How elements are originated in the universe? | 15 |
| 5 | a) How geological events are explored by carbon dating methods?<br>b) How Geochemical cycle is helpful for migration of elements in earth. | 08<br>07 |
| 6 | Write note on origin and cosmic abundance of element | 15 |
| 7 | f) Differentiate between Isomorphism and polymorphism<br>g) Explain the Zonal structure of Earth<br>h) State the composition of Sun | 05<br>05<br>05 |
| 8 | a) Discuss the scope, objective and main task of Geochemistry?<br>b) What do you know about origin of Solar system? | 07<br>08 |

# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Engineering Geology & Hydrogeology**
**PAPER: VIII**

**TIME ALLOWED: 3 Hrs.**
**MAX. MARKS: 75**

***NOTE: Attempt any FIVE questions. All questions carry equal marks.***

Q.1 What are physical properties of soils, discuss any five.

Q 2 Write a note on following;

- Groundwater movement
- Laminar and turbulent flow
- Recharge and discharge areas
- Water level fluctuations

Q 3 Briefly discuss engineering geological mapping.

Q.4 How rock and soil sampling is executed in subsurface drilling?

Q 5 How strength of rocks can be measured? Explain briefly.

Q 6 Discuss site investigations in detail with its objectives and stages.

Q 7 What are types of rock slope failures, briefly discuss any two types with illustration.

# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Advance Mineralogy and Applied Lab Techniques** **TIME ALLOWED: 3 Hrs.**

**PAPER: IX** **MAX. MARKS: 75**

***NOTE: Attempt any FIVE questions. All questions carry equal marks.Neat Diagram must be drawn wherever necessary .***

Q.1. Define the Silicate group of minerals. Write its classification with examples

Q.2. Write the physical properties, composition and structure and uses of olivine.

Q.3. Discuss the feldspar group of minerals in detail.

Q.4. Discuss any two minerals of sulphides group with reference to their composition and structure. Occurrence and uses

Q.5. Write notes of the following

a). oxides

b). Phosphates

c). Carbonates

Q.6. Discuss the XRD techniques and its application in Mineralogy.

Q.7. Write a note or Electron probe Microanalysis (EPMA) technique

Q.8. what is basic principle of scanning electron microscope (SEM) technique? Draw and label different parts of (SEM)

# UNIVERSITY OF THE PUNJAB

**Third Prof. A/2018**

**Examination:- B.S. Applied Geology**

**Roll No. .....**

**Subject: Environmental Geology** **TIME ALLOWED: 3 Hrs.**

**PAPER: X** **MAX. MARKS: 75**

***NOTE: Attempt any FIVE questions. All questions carry equal marks.***

Q:1. How earthquakes are globally distributed? How do earthquake contribute to the advancement of science? Name any six earthquakes with magnitude in the range of 8.0 to 9.3. (4+5+6)

Q:2. What are the environmental impact of mining, dams and reservoirs? Describe their assessment and control. (10+5)

Q: 3. Compare the hazards of lava flows to pyroclastic flows. Describe the positive and negative environmental effects of volcanic eruption. (7+8)

Q: 4. What is global Warming and describe causes of global warming. Give the scientific evidences of global warming Describe Greenhouse effect and greenhouse gases.. (4+2+2+3+4)

Q: 5. Describe objectives and scope of Environmental Geology. Enlist naturally occurring Geological Hazards. How landslides are classified and describe their remedial measures. (2+2+5+6)

Q: 6. Describe air pollution, industrial pollution, River Lake and marine pollution their impact on human health. (3+3+3+6)

Q: 7. Describe several ways in which groundwater can become contaminated. Discuss the difference between porosity and permeability. What is water table? Is it fixed in position? (5+5+4+1)

Q: 8. Write short notes on any three of the following? (5+5+5)

i) Desertification ii) Waste Disposal

iii) Liquefaction iv) Seismic Waves

v) Trace elements and health hazards

vi) Elastic Rebound theory