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UNIVERSITY OF THE PUNJAB	
Third Prof. A/2018	••••••
<b>Examination:- B.S. Applied Geology</b>	Roll No

## Subject: Geology & Tectonics of Pakistan PAPER: I

TIME ALLOWED: 3 Hrs. 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 man occur beneath ridges.	tie (12)
	b. Discuss the various occurrences of ultramafic rocks in the earth's crust	i. (13)
Q2.	a. How do you deduce the chemical composition of upper mantle, direc and / are indirectly?	tly (12)
	b. Discuss the behavour of 670 km discontinuity.	(13)
Q3.	a. What are the possible mineral assemblages of upper mantle a transition zone? What type of rocks do you expect from a mage derived from upper mantle?	nd (15) na
	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 o prism govern the sediments?	fa (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)

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	Examination:- B.S. Applied Geology	Roll No.
Subject: Sedin	nentology	** * * * * * * * * * * * * * * * * * *
PAPER: II		TIME ALLOWED: 3 Hrs
		MAX. MARKS: 75

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. ... 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

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	Examination:- B.S. Applied Geology	Roll No.
Subject: Econon	iic Geology	TIME ALLOWED: 3 Hrs.
PAPER: III		MAX. MARKS: 75

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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: i) Limestone deposits of Pakistan ii) Economic importance of feldspar	07 08

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#### UNIVERSITY OF THE PUNJAB Third Prof. A/2018 <u>Examination:- B.S. Applied Geology</u>

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## Subject: Remote Sensing & GIS PAPER: IV

TIME ALLOWED: 3 Hrs. MAX. MARKS: 75

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

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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: i) Spatial Resolution ii) Radiometric Resolution	15 marks
8.	<ul> <li>(a) What is map projection? Define the following projection types</li> <li>i) Azimuthal ii) Conformal iii) Equivalent</li> <li>iv) Equidistant</li> </ul>	15 marks
	b) Write down the significance of ArcGIS software. Furthermore, describe the usage/functionality of different components of ArcGIS Software.	

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	Examination:- B.S. Applied Geology	Roll No.
Subject: Mic	ropaleontology	TIME ALLOWED: 3 Hrs.

PAPER: V

MAX. MARKS: 75

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

<ul> <li>Q1: a) Describe the different types of apertures of foraminifera.</li> <li>b) Give the chamber arrangements in Foraminifera.</li> </ul>	7,8
Q2: Describe at least two Index Fossils of Upper Cretaceous other than Globotruncana.	15
23: Describe Globotruncana lineana in detail.	15
24: Give the salient features of genus Assilina and discuss its species.	15
25: Give the difference between Nummulites mamillatus and Nummulites atacicus and t	heir
	15
26: Describe Alveolina in detail and its stratigraphic significance.	15
7: Discuss the Index Fossil of Upper Paleocene in detail.	15
28: Write short notes on the followings:	
a) Miscellanea b) Operculina c) Discocyclina	15



## **UNIVERSITY OF THE PUNJAB**

Third Prof. A/2018 Examination:- B.S. Applied Geology

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Subject: Geophysics PAPER: VI TIME ALLOWED: 3 Hrs. MAX. MARKS: 75

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

<u> </u>		
Q. 1	Define any TEN of the following geophysical terms: 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>(b)</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.	<u>]</u> 11
Q. 9	Write short notes on any three of the following.	11
	<ul> <li>i. Transient Variations in Geomagnetism</li> <li>ii. Shooting Spreads</li> <li>iii. Drift in Gravity Meter</li> <li>iv. Applications of Electrical Resistivity Method</li> </ul>	

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	<b>Examination:- B.S. Applied Geology</b>	Roll No
Subject: Geochemistry PAPER: VII		TIME ALLOWED: 3 Hrs. MAX. MARKS: 75

## NOTE: Attempt any FIVE questions.

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

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Third Prof. A/2018



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

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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.

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

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Subject: Advance Mineralogy and Applied Lab Techniques PAPER: IX

TIME ALLOWED: 3 Hrs. MAX. MARKS: 75

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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 princip de of scanning electron microscope (SEM) technique? Draw and label different parts of (SEM)



#### UNIVERSITY OF THE PUNJAB Third Prof. A/2018 <u>Examination:- B.S. Applied Geology</u>

Subject:	Environmental	Geology
PAPER:	X	

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TIME ALLOWED: 3 Hrs. 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? (10+5) Describe their assessment and control. 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 (4+2+2+3+4)greenhouse gases.. Q: 5. Describe objectives and scope of Environmental Geology. Enlist naturally occurring Geological Hazards. How landslides are classified and describe (2+2+5+6)their remedial measures. Q: 6. Describe air pollution, industrial pollution, River Lake and marine pollution (3+3+3+6)their impact on human health. Q: 7. Describe several ways in which groundwater can become contaminated. Discuss the difference between porosity and permeability. What is water (5+5+4+1)table? Is it fixed in position? (5+5+5)Q: 8. Write short notes on any three of the following? Waste Disposal **i**) Desertification ii) iii) Liquefaction iv) Seismic Waves Trace elements and health hazards v) Elastic Rebound theory vi)

Subject:	Geology & rectornes of ranstan		
Constant of the second	- I and a Tastonics of Pakistan	Paper: I / GEOL-318	Time: 3 Hrs. Marks: 75
	B.S. Applied Geology / Third	Prof. 2nd Annual 2020	Roll No.
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NOTE: Attempt any THREE questions.

- Q.1 What do you know about the tectonic framework of Northwestern Himalayan Fold Thrust Belt? Elaborate your answer with the help of structural map of the area. 25
- Q.2(a) Alfred Wegner proposed a theory regarding Continents using some evidence. What is that theory? Explain the content of the theory using justified evidences from the globe.20 (b) Differentiate the Crust and the Plate based on composition. 05
- Q.3 What do you mean by divergence and convergence? Elaborate your answer with the help of tectonic settings of the Indian Plate.
- Q.4 Briefly explain the concept of hotspot theory. Discuss the concept in the light of Pangea break 25 up.

5X5

- Q.5 Draw and explain the following in detail:
  - a) The volcanic arc and the Trench
  - b) Ocean Ridges

- c) Triple Junction
- d) Back arc regions and back arc basin
- e) Accretionary prism

UNIVERSITY OF B.S. Applied Geology / Thin	THE PUNJAB rd Prof. 2 <sup>nd</sup> Annual 2020	Roll No
Subject: Sedimentology Paper:	: II / GEOL-319	Time: 3 Hrs. Marks: 75

Q1. Explain the different methods of sediment transport in a fluid regime?

Q2. What are sedimentary structures? How they are formed? Explain the post depositional structures in detail?

Q3. What are the different mechanisms and process through which a sediment is converted into a rock? Explain.

Q4. What are limestones? How they are formed? Explain their different mechanisms of classification?

Q5. What is meant by siliciclastic sedimentary rocks? How they are formed? Explain the mechanism of their formation in continental and marine environments?

Q6. What rocks are formed by the evaporation of sea water? Explain their genesis in detail?

Q7. What are dolomites? How they are formed? Explain the formation of secondary dolomites in detail?

Q8. Write notes on the following:

- 1. Maturity Index of sandstone
- 2. Conglomerate
- 3. Shale

B.S. Applied Geology	Y OF THE PUNJAB / Third Prof. 2 <sup>nd</sup> Annual 2020 Paper: III / GEOL-320	Roll No Time: 3 Hrs. Marks: 75
Subject: Economic Geology		

- Q.1. What are hydrothermal deposits? Discuss the mode of formation of mesothermal and xenothermal deposits in detail.
- Q.2. Describe geology, occurrence and economic worth of Chiniot iron ore deposits.
- Q.3. Describe metallic and non-metallic mineral potential of Pakistan.
- Q.4. Discuss the mode of formation and economic significance of pegmatite deposits.
- Q.5. Describe the coal resources of Makarwal area, Trans-Indus Mountains, Mianwali, Pakistan.
- Q.6. What are Placer deposits? Describe their genetic classification and economic importance.
- Q.7. Discuss the mode of formation, occurrence in Pakistan and economic significance of evaporites.
- Q.8. What is metasomatism? Discuss the mode of formation and economic worth of Skarn deposits.

	UNIVERSITY B.S. Applied Geology	OF THE PUNJAB	Roll No	
Subject: F	Remote Sensing & GIS	Paper: IV / SURV-303	Time: 3 Hrs. Marks: 75	

NOTE: Attempt any FIVE questions. All questions carry equal marks. Illustrate the concept with diagrams.

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O1 Define the different types of Remote sensing resolutions, moreov	ver also explain the
advantage and significance of each resolution type.	(15)
Q2.How satellite data is helpful in Geological applications?	(15)
Q3. (a) What is Digitization? Describe its different types.	(08)
(b) Define shapefile and its different extensions.	(07)
O4 How Digital Elevation Model can be useful in different applicat	ion of Earth Sciences?
Q4.110 Digital Dio Canada di	(15)
OS Describe in detail the electromagnetic spectrum along with the	illustration of different
spectral bands.	(15)
O6. What is Georeferencing? Why Georeferencing is important in	mapping the features?
Also describe the different types of Georeferencing.	(15)
Q7. Define the following terms.	(15)
i) Equator ii) Prime meridian iii) Spatial Da	ta

iv) Geoid v) Datum

Subject: Micropaleontology	Paper: V / GEOL-321	Time: 5 His. Marks. 10
B.S. Applied Geolo	gy / Third Prof. 2 <sup>nd</sup> Annual 2020	Times 2 Hro Marke: 75
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O1: Describe the importance of Foraminifera in oil exploration.	15
O2: Describe different types of chamber arrangements in foraminifera with the help of	
diagrams	15
O2. Differentiate with the help of diagrams.	15
Q5. Differentiate with the help of engrise	
a, Nodosaria and Siphonodosaria o, Petitina de tail	15
Q4: Give salient features of Globolruncuna carmata in actain	15
Q5: Differentiate between Assilina granulosa and Assilina taminosa.	e 15
Q6: Describe the genus Nummulites and its species and give its stratigraphic significant	15
Q 7.Discuss K-T boundary in upper Indus basin in detail.	15
Q8: Write short notes on the followings.	3,3,3
a, Operculina b, Miscellanea miscella c, Lenticulina	

B.S. Applied Geology	OF THE PUNJAB	Roll No
Subject: Geophysics	Paper: VI / GEOL-322	Time: 3 Hrs. Marks: 75

NOTE: Attempt any FIVE Questions in all, while Question No. 1 is Compulsory.

- 1. Discuss briefly any Five of the following.
  - A) Body waves
  - B) Surface Waves
  - C) Seismograph and Seismogram
  - D) Dipole-dipole electrode configuration
  - E) Gravity Profile
  - F) Magnetic Poles and Geomagnetic Poles
- 2. Discuss Diurnal variations. How these are produced and what is the strategy to remove the effect of these variations from geomagnetic field data?
- 3. Which geophysical method is most suitable for exploration of denser minerals? Also discuss how the data is acquired in the field and processed in the lab?
- 4. How the size of an earthquake is measured. Discuss the differences between the intensity scale and magnitude scale of earthquakes.
- 5. A) Which seismic method is most suitable for shallow focusing of the Earth? Discuss its applications and limitations.
  - B) If the thickness of upper layer is 100 meter, and velocities of seismic wave in upper and lower layers are 1500 m/sec and 3000 m/sec, then what will be the intercept time and crossover distance for critically refracted waves? .
- A) Which seismic method is most suitable for deep focusing of the Earth? Discuss its applications and limitations.

B) Calculate the two way reflection time at offset equal to zero meter and 1500 meters, if the reflection survey indicates upper layer thickness 750 meters. The seismic wave velocities in upper and lower layers are 1500 meters/second and 2500 meters/second respectively. The reflecting interface is the horizontal boundary between both layers.

- 7. How the observations acquired by gravity meter are changed with time even at the same place? Discuss how these effects can be removed from gravity field data?
- 8. Discuss differences between any three of the following.
  - A) Free air correction and Bouguer correction
  - B) Richter Magnitude and Moment magnitude
  - C) Active geophysical methods and Passive geophysical methods
  - D) Magnetic inclination and magnetic dip



UNIVERSITY OF THE PUNJAB

B.S. Applied Geology / Third Prof. 2nd Annual 2020

Roll No. ..... Time: 3 Hrs. Marks: 75

Subject: Geochemistry

Paper: VII / GEOL-323

#### NOTE: Attempt any FIVE questions.

	Define indicator minerals. Give an example to trace the diamond	15
<u>1</u> ·	prospects.	1.15
2	Describe carbon Cycle and explain main processes in the Water cycle	15
	a) What is meant by term pseudomorphism?	7
	b) What is meant by $e$ -process s-process and $r$ - process	1
3	b) What is mount by b process, s process and b process	08
	Define the term Meteorite and explain its types and what do	15
4	Meteorite look like.	1
	(a) Explain the between nitrification and denitrification	10
5	processes?	
	(b) What do you understand by the term Geochemical anomaly and mineral exploration?	05
6	a) Explain various composition of zonal structure of earth	8
	b) How age of universe is determined by radioactivity	7
	Describe the following terms	
7	a) Catastrophic, Moho, Sima, Sial, Ultrmafic, Obduction and	10
	ophiolite in relation to geochemistry.	05
	b) Define Polymorph and explain Al <sub>2</sub> SiO <sub>3</sub> and SiO <sub>2</sub>	05
8	a) Define the term Geochemistry. Discuss the composition of	10
	sun	
	b) What do you know about igneous and metamorphic rocks?	05

<b>UNIVERSITY OF T</b>	HE PUNJAB	Roll No
B.S. Applied Geology / Third	Prof. 2 <sup>nd</sup> Annual 2020 Paper: VIII / GEOL-324	Time: 3 Hrs. Marks: 75
Subject: Engineering Geology & Hydrogeology	Faper: Viii / Ololo	

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

Q.1	i. D ii. W	Discuss the fields of applications of rock mechanics for the industry. Write a detail note on road aggregates.	(5 Marks) (10 Marks)
Q.2	Wr i. ii.	ite a note on following properties of groundwater movement. Permeability Hydraulic conductivity	(15 Marks)
Q.3	iii. Wi i. ii.	Transmissivity rite a note on following properties of the soil. Particle size distribution. Consistency of clay soils Soil water content	(15 Marks)
	iv. v.	Soil specific gravity Soil density	
<b>Q.4</b>	i. Wh iii. W iv. W	at are the aims and objectives of the site investigations for engineering p that is the purpose of drilling? The a short note on cost-benefits ratio of different types of site investigations	projects. (5 Marks) (5 Marks) tions. (5 Marks)
Q.5	W	rite a note on the properties of intact rock and how they are determined	. (15 Marks)
Q.6	E	xplain the stress and strain in rocks.	(15 Marks)
Q.7	W	rite a note on the types of movement of landslides and type of material	involved. (15 Marks)
Q.8	3 i.	Differentiate between surface and groundwater and discuss hydrologica	d cycle. (10 Marks)
	••	White a note on different types of aquifers.	(5 Marks)

ii. Write a note on different types of aquifers.

- Q-1. Elaborate the classification and chemistry in Feldspar group.
- Q-2. Discuss the Calcic-Sodic and Sodic amphiboles and their paragenesis.
- Q-3. What are the differences betweenpyralspite and ugrandite garnets? Discuss.
- Q-4. What is EPMA and its use in mineralogy.
- Q-5.Describe the principal, data and significance of Atomic Absorption Spectrometry.
- Q-6. Write a note on carbonate group of minerals.
- Q-7.Explain the sulphide minerals, their mode of formation and paragenesis.

UNIVERSITY B.S. Applied Geology	OF THE PUNJAB	Roll No.
Subject: Environmental Geology	Paper: X / GEOL-326	Time: 3 Hrs. Marks: 75

Q.1	Define the following environmental terms:	(15)
a) b) c) d) e)	Cofiring Biomass Climate Change Impacts Gravitational water Elastic rebound theory	
Q.2	What are environmental impacts of mining, discuss a an environmental-friendly m strategy.	ining (15)
Q.3	What do you understand by the term "Thermal conversion of Biomass", give its environmental impacts.	(15)
Q.4	What is meant by clean energy resources, discuss solar energy in detail? Why it is environment friendly	(15)
Q.5	What do you understand by PEPA? Briefly discuss the it's salient features and functionin in Pakistan. (15)	
Q.6	How Green House Effect is caused? Give its scientific evidence also discuss its impact on the world's environment. (15)	
Q.7	What is air pollution? Discuss its effects on global temperatures and human health in various ways. How can it be minimized? (15)	
Q.8	Write a note on the following.	(8+7)
	<ul><li>i). Seismic Hazards</li><li>ii). Geothermal energy</li></ul>	

B.S. Applied Geology	OF THE PUNJAB	Roll No.
Subject: Remote Sensing & GIS	Paper: IV / SURV-303	Time: 3 Hrs. Marks: 75

NOTE: Attempt any FIVE questions. All questions carry equal marks. Illustrate the concept with diagrams.

Q1. How Remote sensing is significant and can be used in the field of Geology? Moreover list down the extensions of shape file.

Q2. What is electromagnetic spectrum? Write the following portions of the spectrum with detailed specifications and proper illustrations: Visible, Infrared, Radio wave, Ultraviolet

Q3. Write the characteristics of LANDSAT-7, Sentinel-II, Geo-Eye 1 satellite.

Q4. Explain Remote Sensing in detail with the help of diagrams and explain the historical background of remote sensing.

Q5. What are the types of scattering explain in detail and discuss difference between passive and Active sensing.

Q6. Define the satellite and furthermore describe the different types of satellites along with their orbital classification.

Q7. Explain raster Pyramids, spectral signature? Moreover describe the different methods that can be utilized to classify the numeric data in GIS.

Q8. Write down the applications of Digital Elevation model explicitly in the field of Geology / Hydrology



Subject: Geology & Tectonics of Pakistan

Paper: I / GEOL-318

NOTE: Attempt any FIVE questions.

Q.1. Discuss various geological evidences to argue the concept of continental drift.

Q.2. What do you mean by PALEOMAGNETISM? Discuss its role and significance in tectonism.

Q.3. Explain the geology and structure of hot spots. Explain your answer in the light of examples from the Globe.

Q.4. Discuss the morphology of subduction zone with help of suitable sketch.

Q.5. Write a note on the geology of Salt Range and Trans Indus Ranges.

Q.6. Differentiate metamorphism of Lesser and Higher Himalayas.

Q.7. Elaborate the stratigraphy and structure of Sulaiman Fold & Thrust Belt.

Q.8. Discuss the geology and genesis of Chagi volcanic-plutonic arc.

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B.S. Applied	Geology / Third Prof. Annual 2021	Roll No.
Subject: Sedimentology	Paper: II / GEOL-319	Time: 3 Hrs. Marks: 75

- Q.1 What are fluids and what are their different types? Explain the various methods of particle movements in different fluid regimes?
- Q.2 What are Evaporites? Describe the Evaporating Dish mechanism in detail? Also describe the economic importance of evaporites for mineral and hydrocarbon industry?
- Q.3 Explain the different models for the formation of Dolomite?
- Q.4 What are the different suitable environments for the formation of Limestone? Explain the folk's classification of limestone in detail?
- Q.5 What are sandstones? Explain the mechanism of their genesis and the different environments for their formation? Also give their standard classification?



## UNIVERSITY OF THE PUNJAB

B.S. Applied Geology / Third Prof. Annual 2021

Subject: Economic Geology

Paper: III / GEOL-320

Roll No. .... Time: 3 Hrs. Marks: 75

Q.1.	Attempt any Six Short Questions from the following;	6×6=36
I. II. IV. V. VI. VII.	How do we identify minerals? Define a metal and explain its properties. Explain the different geological process which can concentrate minerals into de Write short note on silica sand deposit. Briefly explain minerals associated with sedimentary and metamorphic rocks. Write an essay on the precious and semi-precious stones of Pakistan. Briefly describe barite • Define the following; A) Ore B) Gangue C) Syngenetic D) Exogenetic E) Metallogeny F) Superger	posits. ne
Þ	Attempt any THREE QUESTIONS from the following;	3×13=39
Q.2.	Discuss the magmatic differentiation with respect to ore crystallization.	
Q.3.	Write a detailed note on the use of chromite and its deposits in Pakistan.	

- Q.4. What are the different industrial uses of copper and its deposits in this region?
- Q.5. Write a note on Ceramic Minerals, their uses and deposits in our country.

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B.S. Applied Geolog	<b>OF THE PUNJAB</b>	Roll No
Subject: Micropaleontology	Paper: V / GEOL-321	Time: 3 Hrs. Marks: 75

Q1: Describe the paleobathymetery of larger Foraminifera in detail.				
Q2: Describe different types of chamber arrangements in coiled foraminifera with diagrams.	the help of 15			
Q3: Differentiate with the help of diagrams.	15			
a, Dentalina and Ellipsonodosaria b, Lenticulina and Bolivina				
Q4: Give salient features of Globotruncana ventricosa in detail.				
Q5: Differentiate between Operculina salsa and Operculina subsalsa.				
Q6: Describe the genus Lockhartia and its species and give its stratigraphic signif	icance. 15			
Q7: Write a detailed note on Conodonts.	15			
Q8: Write short notes on the followings.	5,5,5			
a, Nummulites b, Miscellanea c, Assilina				

NOTE: Attempt any FIVE Questions

- 1. Discuss secular variations in geomagnetism. What are its types? How could be avoided from these variations during Magnetic field data acquisition?
- 2. Discuss the applications of electrical methods, and derive an equation for Apparent Resistivity of an isotropic medium using dipole-dipole electrode configuration.
- 3. During the episode of an earthquake what different types of wave originated from the focus point? Give details with their importance and characteristics.
- 4. Define earthquake magnitude and briefly discuss different types of magnitude.
- A) Differentiate between seismic refraction and seismic reflection methods.
   B) Find wavelength of a seismic wave, if velocity is 2500 meter/second and time period is 10 millisecond.
- 6. What is Gravity method? Give details of its applications.
- 7. Discuss latitude based variations in gravitational acceleration and correction-strategy to remove these variations while processing gravity field data.
- 8. Write short notes on any three of the following:
  - A) Diurnal variations in Earth's magnetic field
  - B) Earthquake intensity
  - C) Magnetic field of Earth from space.
  - D) Gravity meter

# UNIVERSITY OF THE PUNJAB B.S. Applied Geology / Third Prof. Annual 2021 Subject: Geochemistry Paper: VII / GEOL-323

NOTE: Attempt any FOUR questions. All questions carry equal marks.

- 1. Discuss the compositional model of Mantle.
- 2. What are the meteorites? Discuss
- 3. Elaborate the geochemical classification of elements.
- 4. Explain geochemical cycle.
- 5. Discuss the geochemical controls in the composition of igneous rocks.
- 6. Write a note on AAS.
- Discuss various physio-chemical factors affecting the chemistry of chemical sedimentary rocks.

<b>UNIVERSITY OF THE PUNJAB</b>			Roll No
B.S. Applied	Geology / Third	Prof. Annual 2021	· · · · · · · · · · · · · · · · · · ·
Subject: Engineering Geolo	gy & Hydrogeology	Paper: VIII / GEOL-324	Time: 3 Hrs. Marks: 75

- Q.1 Write a note on the identification/classification properties and mechanical properties of intact rock and how they are determined? (15 Marks)
- Q.2 Write the types of deformation that can result in geological material by the action of forces. (15 Marks)
- Q.3 Write a note on the following properties of the soil. (15 Marks)
  - i. Particle size distribution.
  - ii. Consistency of clay soils
  - iii. Soil water content
  - iv. Soil specific gravity
  - v. Soil density
- Q.4 Discuss shear strength of soil and different laboratory tests used to estimate shear strength in soils. (15 Marks)

Q.5	i. ii.	Write a note on the groundwater recharge and discharge. Write a note on the groundwater fluctuation causes.	(5 Marks) (10 Marks)
Q.6	Wri	te a detail note on construction materials?	(15 Marks)
Q.7	Discuss different geological formations as an aquifer.		(15 Marks)

Q.8 What are the causative and triggering factors of landslides? Discuss consequences and prevention of landslides. (15 Marks)



Subject: Advance Mineralogy and Applied Lab Techniques Paper: IX / GEOL-325

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

- Q.1:- What is the basic principle of X-ray computed tomography? What is its application in geology?
- Q.2:- What is basic structure of ring silicates, what are their uses and occurrences?
- Q.3:- What are di-silicates? write a note on their occurrence and economic importance.
- Q.4:- Describe mineral structure of framework silicates; what their uses and where there are found?
- Q.5:- Describe chain silicates, their economic importance and occurrence.
- Q.6:- Describe principle and the components of scanning electron microscope and how it is used for geology?
- Q.7:- What is basic silicate structure? How elements are arrange in different silicate mineral groups? Illustrate with example and figures.

COD)	UN <u>B.S. Ap</u>	VERSITY plied Geology	OF THE PUNJAB / Third Prof. Annual 202	1 Roll No	
Subject	t: Environmen	tal Geology	Paper: X / GEOL-326	Time: 3 Hrs. Marks	5: 75
	NOTE: J	Attempt any Fl	VE Questions. All question	s carry equal marks.	
Q.1	Define the fe	ollowing environm	mental terms:	(15)	
a) b) c) d) e)	Soil Terrain Geo-morpho Habitant mo Geothermal Lahar	Biodiversity metry dification energy			
Q.2	What are me	asurement techni	ques for estimation flood potent	tial? Briefly discuss. (15)	
Q.3	Define the d	ynamics of coasta	al environment, how it is pollute	d by anthropogenic agents? (15)	
Q.4	How coal mi sustainable e	ning impacts on a nvironment.	atmosphere? Compare various n	nining practices for (15)	
Q.5	What do you Environment	understand by tal Protection Age	the term "Sustainable Environmency (EPA).	ment", briefly discuss the role (15)	of
Q.6	How can ass its impacts?	ess the contribution	on of "Global warming" in clin	nate change, how can we mitiga (15)	te
Q.7	Discuss the s	ignificance of "C	clean Energy Resources", how s	olar energy is produced? (15)	
Q.8	Write a note	on the following.		(8+7)	
	i). ii).	Sustainable land Biogas Energy	management (SLM)		