UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Meneralogy and Petrology
Subject: Geochemistry
PAPER: GEOL-437 G1

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Q.1. Discuss classification of elements in detail.

Q.2. Explain geochemical classification diagrams

Q.3. Describe geochemistry of intrusive rocks.

Q.4. How geochemical characteristics of igneous rocks are used as petrogenetic indicators?

Q.5. Discuss various factors which cause diversification of igneous rocks.

Q.6. Discuss geochemical characteristics of various magma series.

Q. 7 What is geothermometry? Discuss its role in the Petrogenesis of rocks.

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Paleontology and Stratigraphy
Subject: Advanced Stratigraphy
PAPER: GEOL-437 G2

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Q-1: What do you know about
i, Law of Super Position
ii, Present is the key to the past 7,8

Q-2: Discuss the Cambrian sequence of Hazara in detail. 15

Q-3: Describe the environments of deposition of Tobra Formation. 15

Q-4: What do you know about Cambrian-Permiab Boundary in Salt Range. Explain with the help of a stratigraphic column. 15

Q-5: Describe the K-T Boundary in Pakistan. 15

Q-6: Describe the facies of Warchha Sandstone and its economic importance. 15

Q-7: Compare the Paleocene-Eocene succession of Salt Range with Hazara and Kohat. 15

Q-8: Write short notes on 5,5,5
i, Salt Range Formatio
ii, Types of Unconformity
iii, Patala Formation

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Engineering Geology
Subject: Rock Mechanics
PAPER: GEOL-437 G4

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Question No.	Questions	Marks
Q.1	Discuss in detail the following characteristics of rocks; • Density • Porosity • Permeability • Thermal Conductivity • Saturation	25
Q.2	What is a strength criteria of rocks, discuss Mohr-Coulomb Criteria for rocks.	25
Q.3	Define and explain the importance of following parameters of discontinuities in rock characterization; • Orientation • Infilling • Persistence • Spacing • Roughness	25
Q.4	Write down the necessary conditions of the followings with illustrations; • Sliding and Toppling • Wedge Failure	25
Q.5	How elastic parameters of the rocks are determined in Laboratory? Elaborate.	25

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Petroleum Geology
Subject: Petroleum Geology
PAPER: GEOL-437 G5

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

Q.1 - Briefly explain any six questions from the followings; 6×5=30

I. What conditions must be fulfilled for a commercial oil accumulation to occur?
II. Write down four postulates of petroleum migration theory
III. Explain the petroleum from Noah to organization of petroleum exploring countries.
IV. Explain the composition and occurrence of Gas Hydrates.
V. What geological and chemical facts must be explained by a theory of petroleum genesis?
VI. Define and explain the porosity and capillary pressure.
VII. Write down the three major phases in the evolution of organic matter.
VIII. Seal and cap rocks.
IX. Hydrodynamic Trap

Attempt any THREE questions from following; 15 ×3= 45

Q.2 Write an easy on stratigraphic Trap.

Q.3 Summarize the relationship of porosity, permeability and texture.

Q.4 Write a detail note on Crude oil and its chemistry along with its classification.

Q.5 How the formation of Kerogen occurs also tells about its chemistry and maturation.

Q.6 I) What are the different oil and gas production methods?

II) Explain the petroleum system in your own words

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Geophysics
Subject: Seismic Method and Seismic Stratigraphy
PAPER: GEOL-437 G6

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

NOTE: Questions number ONE is compulsory. Attempt any THREE questions from the remaing.

1(a) Define any six of the following terms. (2x6)
Fermat's Principle, Reflection coefficient, critical distance, Dispersive waves, Transgressive surface, Pre-critical region, Gardner's Law, Tube wave, Horizontal resolution, SH wave.

1(b) Give the short answer of any six questions. (2x6)

I. What is Bandwidth?
II. What are limitation of seismic refraction?
III. What is static correction?
IV. What are surface multiples?
V. Define seismic facies.
VI. How layers' velocities are determined from seismic refraction survey?
VII. What is meant by impulse response?
VIII. Define Fold taper.
IX. Write two factors that may produce mis-tie?
X. What is velocity pull-down? How it is produced? How it can be removed?

2(a) What is seismic resolution. What are the effects of different parameters on seismic resolution. How it can affect the seismic interpretation? (9)

2(b) What are seismic sources? Which characters of seismic sources are required? Write different types of seismic sources. (8)

3(a) What are different types of P-wave seismic velocities? Write their relation and utilities in seismic processing and interpretation. (9)

3(b) What is seismic to well tie? Which factors/parameters must be considered for seismic to well tie? (8)

4(a) Explain in detail the different factors that affect the seismic velocity? (9)

4(b) What is check shot survey and sonic logging? Compare their pros and cons. (8)

5(a) Write the seismic facies and their geological interpretation. (8)

5(b) Deduce the mathematical relationship between refractor depth and cross over distance for planner horizontal and planner dipping interface. (9)

6(a) Deduce the travel time equation for the refracted wave for the planner horizontal interface? (9)

6(b) Which processing step(s) can increase the bandwidth of the seismic data? (8)

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Meneralogy and Petrology
Subject: Igneous Petrology
PAPER: GEOL-438 G1

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

NOTE: Attempt any THREE questions. All questions carry equal marks. Be brief and to the point and draw the sketch where needed.

Q. 1. Differentiate between "enriched" and "depleted" Mantle. Which suite of volcanic rocks occurs in Hawaiian island?

Q. 2. Briefly discuss the following:

a. Mantle Plumes
b. Fractional Crystallization
c. Alumina Saturation Index
d. Mid Oceanic Ridge Basalts
e. Komatite Rock Suite

Q. 3. Discuss the classification of igneous into rock suites also elaborate the chemistry, fractionation and tectonic setting of various rock suites.

Q. 4. Discuss the Alphabetical classification of the Granitoids and its importance in understanding the petrogenesis of Granitoid rocks.

5. Discuss the IUGS Classification of Gabbroic Rocks

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Paleontology and Stratigraphy
Subject: Micropaleontology
PAPER: GEOL-438 G2

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Q-1: a, Describe the marine environments in detail. 7,8
b, Describe the different types of apertures in foraminifera.

Q-2: Describe the two Guide/Index Fossils of Upper Cretaceous other than *Globotruncana* in detail. 15

Q-3: Differentiate between *Globotruncana fornicate* and *Globotruncana carinata.* 15

Q-4: Differentiate between the followings 5,5,5
i, *Dentalina and Nodosaria*
ii, *Lenticulina and cibicides*
iii, *Bolivina and Spiropletamina*

Q-5: Describe the salient features of genus "*Assilina*" and give its types. 15

Q-6: Explain the difference between *Nummulites mamillates* and Nummulites *atacicus.* 15

Q-7: Describe the Genus "*Alveolina*" and its stratigraphic significance. 15

Q-8: Write short notes on the followings: 5,5,5

i, *Ranikothalia*

ii, *Lenticulina*

iii, *Textularia*

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Petroleum Geology
Subject: Sequence Stratigraphy
PAPER: GEOL-438 G5

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

Attempt any four questions. First question is compulsory.

Q1 **write short note on any five of the following. (3+3+3+3+3)**

1) Sequence Boundary (SB-1)
2) Reseistivity Log.
3) Shelf Break System
4) Maximum Flooding Surface
5) High Stand Systems Tracts
6) Lithostratigraphy
7) Chronostratigraphy
8) Internal Reflection Patterns

Q2.(a) What are the sequence stratigraphic cycles? Discuss long-term and short-term stratigraphic cycles? (10)

(b) Describe and explain terms:

i) Accommodation space ii) Sediments supply (10)

Q3.(a) Define sequence and discuss sequence models and approaches? (08)

(c) Write note on

i) Aggradation ii) Progradation ii) Retrogradation? (12)

Q4. Describe and discuss application of sequence stratigrphic based on wireline log data framework? (20)

Q5. Define and explain the term system tracts? Discuss the development of various types of system tracts both along shelf break and ramp margin ? (20)

Q6. What are the Parasequences ? Discuss development, formation and thickness? of Parasequences? Describe also Parasequence sets and their types (20)

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Engineering Geology
Subject: Soil Mechanics
PAPER: GEOL-438 G4

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Q.1 What do you know about soil mechanics and how in industry it is applied? (15 Marks)

Q.2 What type of distinctive property exhibited by coarse and fine grained soil? Broadly classify the soil into four main groups depending on its grain sizes? (15 Marks)

Q.3 What do you know about void spaces in soil and how can we represent soil mass in phase system? Write any five useful relationships between various quantities in soil phase system. (15 Marks)

Q.4 Write a note on soil grain particle size accumulation curve, modes, mixtures and gap-grading. (15 Marks)

Q.5 Discuss the following in detail.

i. The depth soil should be investigated for engineering projects. (7.5 Marks)

ii. Record of soil survey with an example of any cross-section showing exploratory holes and plotted log data on it. (7.5 Marks)

Q.6 How pressure and stress is distributed from particle to particle in soil? (15 Marks)

Q.7 Concisely explain consolidation and settlement. What do you know about shearing strength related to friction and cohesion? (15 Marks)

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Paleontology and Stratigraphy
Subject: Invertebrate Paleontology
PAPER: GEOL-439 G2

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

Instructions: **Attempt any FIVE questions. All questions carry equal marks. Draw figures where necessary.**

Q-1. Write a note on Precambrian Trace Fossils. Explain Paleontology of the PRECAMBRIAN / CAMBRIAN Boundary. **(15)**

Q-2. Discuss in detail the morphology and classification of Tabulate Corals. **(15)**

Q-3. Explain detailed morphology of the order Graptoloidea. **(15)**

Q-4. Classify marine Bryozoans. Also differentiate their morphological features. **(15)**

Q-5. Describe morphology of Trilobites and discuss their modes of life. **(15)**

Q-6. Explain morphological features of the class Blastoidea. **(15)**

Q-7. Classify phylum Brachiopoda; also explain their morphology. **(15)**

Q-8. **(a)** What are Ammonoids? Explain the evolutionary history of Ammonoid suture. (8)
(b) Describe Ammonite hard-part morphology in detail. (7)

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Engineering Geology
Subject: Seismotectonics
PAPER: GEOL-439 G4

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Q. 1(a). Discuss body and surface waves with respect to their amplitude and frequency and how surface wave are more destructive. (8)

Q. 1(b). Discuss how we can calculate the epicenter of an earthquake? (7)

Q. 2(a). Discuss how we can differentiate between natural earthquakes and blasts? (7)

Q. 2(b). Discuss different types of earthquake magnitude scales and their empirical relationships in detail (8)

Q. 3. Write a note on Probabilistic seismic hazard analysis and how probabilistic seismic hazard technique is more accurate than deterministic method. (15)

Q. 4(a). Differentiate between earthquake magnitude and intensity also discuss the different divisions Mericalli intensity scale. (8)

Q. 4(b). Define and explain different factor which are helpful to estimate building codes. (7)

Q. 5(a). Discuss the relationship between earthquake depth distribution and plate boundaries (8)

Q. 5(b). Write a note on Main boundary thrust also discuss the major earthquakes associated with this thrust (7)

Q. 5(a). Define and explain foreshocks, aftershocks and Earthquake swarms. (5)

Q. 5(b). What is fault plan solution what are the key points of fault plane solution? (10)

Q. 6. Discuss the major seismically active zones of Pakistan. (15)

Q. 7. Discuss the importance of seismotectonic study for mega engineering structures. (15)

Q. 8. Define and explain Hooks Law and elaborate Longitudinal strain, transverse strain and position ratio (15)

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Petroleum Geology
Subject: Petroleum Engineering & Geophysical Methods
PAPER: GEOL-439 G5

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Q. 1. Describe logging, discuss the electric logging and give the uses of Gamma Log.

Q. 2. Describe the followings:

a) How drilling fluid properties effect penetration rate

b) Cementing job

Q. 3. Write note on

a) Fresh water Muds

b) Rotary bits

c) Formation cutting

Q. 5. Write down a significant note on role of drilling fluid (mud) in well drilling process.

Q. 6. Discuss the blowout and its causes.

Q. 7. What is a rig? Discuss its components.

Q. 8. What is mud logging? Explain in details.

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Mineralogy and Petrology
Subject: Sedimentary Petrology
PAPER: GEOL-440 G1

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

Q. 1 Briefly explain any SIX questions from the followings; 6×5=30

I. What is the importance of sedimentary structure?
II. How tectonic setting affects sediment accumulation?
III. What are the factors that control the depositional process and resulting sediments characteristics?
IV. How we study of sedimentary rocks in field and Lab?
V. What is difference between Bouma's model and Hsu's model?
VI. What is effect of climate and relief on weathering?
VII. What is difference between mature and immature sandstone?
VIII. What are sedimentary basin and its types?

Attempt any THREE questions from following; 15 ×3=45

Q.2: Explain Dunham and Folk Classification of limestone.

Q.3 Summarize the relationship of porosity, permeability and texture.

Q.4 Explain digenesis in detail.

Q.5 Explain sedimentary structures with the help of diagram.

Q.6 Explain Siliciclastic rocks and its types.

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Engineering Geology
Subject: Engineering Geology
PAPER: GEOL-440 G4

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

NOTE: Attempt any FIVE questions. Each questions carries Fifteen marks.

Q.1 Discuss various methods of tunnel support in different rock types.

Q.2 Define the term concrete mix design. Discuss its components in detail.

Q.3 How sampling is executed by reverse rotary drilling method? Give its significance in geotechnical investigations.

Q.4 Suggest, how can you identify the slope failure type.

Q.5 Give procedure to access the suitability of coarse aggregate by using physical tests.

Q.6 Discuss various problems associated with dams, suggest their remediation.

Q.7 What is the Significance of Electrical Resistivity (ER) survey in ground water management investigations?

Q.8 Write a note on

a) Leaky aquifers

b) Darcy's law

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Petroleum Geology
Subject: Reservoir Geology
PAPER: GEOL-440 G5

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

Attempt Any THREE Questions:

1. a). Porosity, Permeability and Bulk Density depend on some fundamental properties of rocks. Discuss (20)
   b). Is there any difference between facies selective and fabric selective characteristics? (5)

2. a). Tertiary properties of rocks are measured indirectly by Geophysical tools. Discuss. (20)
   b). What is meant by transition zone in a reservoir? (5)

3. a). Write an essay on petrophysical properties of clastic reservoirs. (20)
   b). What methods might be used to predict the size and shape of slope-toe reservoirs? (5)

4. Describe Depositional rock characteristics of: (25)
   i) Tidal flat environment
   ii) Beach dune environment
   iii) Basinal environment

5. Describe petrophysical properties of Khewra Sandstone. (20
   b). What type of fracture would you except to find on the crest of an anticline? What will be their effect on porosity? (5)

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Mineralogy and Petrology
Subject: Advanced Mineralogy
PAPER: GEOL-441 G1

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

1. Describe the chemistry and paragenesis of mica group.

2. What are chain silicates? Discuss the variation in pyroxene structure.

3. Describe the optical and physical properties of calcite with its paragenesis.

4. Give a detailed account on structure of alkali feldspar.

5. Write down the general formula of calcic amphibole. Name its minerals and discuss their distinguishing features.

6. Describe the diagnostic features of the garnet group species.

7. What are sulphides. Discuss any one of sulphide in detail.

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Paleontology and Stratigraphy
Subject: Palynology and Paleobotany
PAPER: GEOL-441 G2

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

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

Q1. Explain the importance and applications of Palynology in Oil Industry?

Q2.What are spores? What are their different types? What are their functions and applications in the study of sedimentary rocks?

Q.3 What are Acritarchs? Explain their classification and importance in geology?

Q.4 What are Dinoflagellates? Give their comprehensive classification and the importance in geology?

Q5. Describe the standard techniques of collection and preparation of samples in palynology?

Q.6. Differentiate between Pollens and spores? Give a comprehensive account of the composition and wall structure of the pollen and spores?

Q.7. Give a comprehensive account of about the suprageneric classification of Trilete Spores?

Q.8. Write a comprehensive note on the morphological description of Pollen and Spores? Explain with diagrams the different terms used in the description of Pollen and Spores?

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Geophysics
Subject: Electrical Methods and Bore-Hole Geophysics **TIME ALLOWED: 3 hrs.**
PAPER: GEOL-441 G6 **MAX. MARKS: 75**

NOTE: Question No. 1 is compulsory. Attempt any THREE questions from the remaining.

1 (a) **Define any SIX terms** **2*6**

Dim spots, Transition zone, Net to gross ratio, Flushed Zone, Mud cake, Cementation factor, Photo-electric absorption effect, Bed resolution, Formation Characterization

1 (b) **Give the short answers of any SIX questions.** **2*6**

i. Write the factors which helps to provoke the radioactivity in the rocks?
ii. How the SP curve is affected by shaliness in the formations?
iii. Differentiate between simple and spectral gamma ray logs?
iv. Write down the principles of measurement of GR Log?
v. Which log is useful for fluid detection in reservoir and why?
vi. Write the factors necessary to generate the self-potential (SP) during borehole logging?
vii. Which logs are used for synthetic seismogram generation?
viii. Does high SP deflection means more permeable bed?
ix. Differentiate between the Compton scattering and photoelectric absorption effect?
x. How oil and gas formation volume factors are affected by the changes in formation temperature and pressure?

2(a) Explain the different kind of logs used in porosity calculation and also explain their equations used to calculate total and effective porosity? **9**

2(b) Describe the applications of density log? **8**

3(a) Explain the principle of Resistivity log? Discuss its applications in detail? **9**

3(b) A well is drilled through a hydrocarbon-bearing formation which is at its irreducible water saturation and it has a porosity of 22%. Rock core data indicates that (a= 0.81, m=2, and n=2). The mud used for drilling is water-base, with a salt concentration (NaCl) of 50,000 ppm. The connate water has a salt concentration (NaCl) of 20,000 ppm. The shallow and deep resistivity logs readings are 12 ohm-m and 50 ohm-m respectively. The formation temperature is 145 deg F. What is the hydrocarbon saturation of the formation? **8**

4(a) What do you means by invasion and depth of invasion? Write a note on invasion profiles? **9**

4(b) Compute the shale volume in the reservoir interval of the Lower Goru Sand by using the following data: GR_{log} = 52.34 API, GR_{max} = 122.23 API and GR_{min} = 28.94 API? (Use one method from three known equation) **8**

5 (a) Describe the qualitative and quantitative application of gamma ray log? **9**

5 (b) Write a note on Neutron Log and explain its principles of measurements? How to calculate formation porosity? **8**

6 What is the principle of measurement of total gamma ray (GR) log and discus the principle of working of GR tool? Write down the qualitative and quantitative applications of total gamma ray log? **17**

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Applied Geophysics
Subject: Geophysical Data Processing
PAPER: GEOL-442 G6

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

Note: Attempt any Five questions

Q. 1(a) Discuss the phenomena of seismic wave attenuation (7)

Q: 1(b) Differentiate between body waves and surface waves with reference to their Amplitude and frequency. (8)

Q. 2(a). Elaborate different types of reflection coefficient on the basis of their Impedance contrast also highlight their classes (10)

Q. 2(b). Define and explain intercept, gradient and Poisson's reflectivity response. (5)

Q. 3(a). Discuss the land and marine energy sources in detail (8)

Q. 3(b). Define horizontal and lateral resolutions also discuss the phenomena of tuning effect (7)

Q. 4 (a). Define and explain in detail Gassman's fluid substitution modeling and how it will be helpful to improve accuracy of the reservoir. (15)

Q. 5(a). Describe the process to create a synthetic seismogram also discuss its importance for seismic reservoir characterization (9)

Q. 5(b). Write a note on instrumental noise and sampling rate. (6)

Q. 6(a). Write a comprehensive note on seismic filters (8)

Q. 6(b). Discuss the importance of accurate survey positioning in seismic data processing and interpretation (7)

Q. 7(a). Define and explain seismic reflection and refraction method and elaborate which method is more suitable for deep reservoir exploration. (8)

Q. 7(b). Define and explain attenuation and intrinsic attenuation. Discuss the role of attenuation in to explore low gas saturated reservoirs. (7)

Q. 8(a). Discuss processing sequence for Dip- Move out correction. (9)

Q. 8(b). Discuss the role of static correction in seismic data processing (6)

UNIVERSITY OF THE PUNJAB

Fourth Prof: 2nd A-2017 & A-2018
Examination:- B.S. Applied Geology

Roll No. .....

Specialization: Applied Geophysics
Subject: Gravity and Magnetic Methods
PAPER: GEOL-443 G6

TIME ALLOWED: 3 hrs.
MAX. MARKS: 75

Note: Question 1 is compulsory. Attempt any three questions from the remaining.

Q-1: **Answer briefly any EIGHT (8) of the following questions** 24

i. Define geomagnetic pole
ii. What is magnetic declination?
iii. What are isoclines and dip equator?
iv. Define magnetic Inclination.
v. Define magnetosphere.
vi. Define magnetic pole
vii What is gal?
viii. What is Isostasy?
ix. Compute free air correction if station elevation is 1000 meter and base station elevation is 990 meter.
x. What is geoid?
xi. Fundamental theory behind gravity survey
xii Differentiate b/w regional gravity anomaly and residual gravity anomaly.
xiii. What two parameters must be given to describe the Earth's magnetic field?

Q-2: Derive formulae of gravity anomaly caused by a vertical cylinder. **17**

Q-3: Discuss the effect of a nearby topographic feature on the gravity field observation while performing gravity method and what is the strategy to correct the field data (terrain correction). **17**

Q-4: Briefly discuss the necessary corrections that must be applied on magnetic field observations in data processing phase? **17**

Q-5: What are the components of magnetic field of Earth? Discuss in details. **17**

Q-6: Write notes on any three of the following. **17**

i. Instrumental drift.
ii. Earth's magnetic field when observed from space.
iii. Applications of magnetic method.
iv. Importance of gravity method.