

Department of Geology  
University of Dhaka  
Fourth-Year B.S. Honor's Course-Final Examination 2013  
Subject: Geology  
Course: GHT 401  
Course Name: Marine Geology  
Subjective Part  
Full marks 25  
Time 2 Hours

(The figure at the right margin indicates full marks. Answer any five of the following (Nations. Draw suitable sketches and diagrams wherever necessary.)

1. a) Mention the factors which drive ocean currents. 0.5  
b) Distinguish between longshore currents and rip currents. 1.0  
c) What do you mean by ocean gyres? Mention the characteristics of subtropical gyres. 1.5  
d) What is thermohaline circulation? Briefly discuss the Global Conveyor Belt circulation. 2.0
2. a) Give the characteristics of different layers in oceanic crust. 1.0  
b) How would you differentiate between passive and active continental margins? 1.0  
c) Briefly discuss the main features of passive continental margin. 2.0  
d) Describe the differences between oceanic ridges and oceanic rises. 1.0
3. a) Tabulate the Shepard's classification of coast. 1.0  
b) How do coasts change their shape? 1.0  
c) Mention the morphological features of coast created by deposition. Explain each of them briefly. 2.0  
d) Mention the major sub-environments and main sediment types of continental shelf with a suitable diagram. 1.0
4. a) What physical properties of sea water are influenced by salinity? 0.5  
b) Explain why ocean water often looks indigo blue or yellowish green. 1.0  
c) Give a depth-zone configuration of a sea. 1.5  
d) Discuss the temperature-salinity (T-S) relationship of ocean water. 1.5 .
5. a) How and when the Bay of Bengal came into being? 1.0  
b) Discuss the morphology and sedimentation pattern of Bengal deepsea fan. 2.0  
c) Why the sea floor spreads? Explain briefly the seafloor spreading theory and the related features. 2.0
6. Write short notes on any FOUR - 1.25x4.5.0
  - a) Ekman Spiral
  - b) Hot spot
  - c) Sea mounts
  - d) Headland and bays
  - e) Coral reefs

Department of Geology  
University of Dhaka  
'Fourth -Year B.S. Honor's Course -Final Examination 2013  
Subject: Geology  
Course: GHT 402 Course Name: Environmental Geology  
Subjective Part  
Full marks 25 Time 2 Hours

*The figure at the right margin indicates full marks. Answer any five of the following questions. Draw suitable sketches and diagrams wherever necessary.*

1.
  - a) Show in a flow chart the typical unit operations and steps in the composting of the solid waste. 1.0
  - b) What are environmental factors affecting composting? 0.5
  - c) Point out the roles of moisture content for composting in subtropical region of the world. 1.5
  - d) Determine the energy content (kj/kg) of a typical sample of municipal solid waste of 100 kg with the average composition of food waste 32.5%, paper 35%, newsprint 5%, cardboard 4%, rubber 0.5%, plastic 3%, PVC 0.5%, loather 0.5%, textile 3%, yard waste 13%, and wood 3%. 2.0

Table 1. Analysis of SW (% by weight on dry basis)

Component	Carbon (C)	Hydrogen (H)	Oxygen (O)	Nitrogen (N)	Sulphur (S)	Ash (A)
Food waste	49.1	6.6	37.6	1.7	0.2	4.8
Paper	43.4	5.8	44.3	0.3	0.2	6.1
Newsprint	49.1	6.1	43.0	0.1	0.2	1.5
Cardboard	44.0	5.9	44.6	0.3	0.2	5.0
Rubber	77.8	10.4	-	-	2.0	9.8
Plastic	60.0	7.0	23.0	-	-	10.0
PVC	45.2	5.6	1.6	0.1	0.1	47.4
Leather	42.0	5.3	22.8	6.0	1.0	22.9
Textile	55.0	6.5	31.2	4.5	0.2	2.6
Yard waste	48.7	6.3	37.9	3.0	0.3	3.8
Wood	50.5	6.0	42.4	0.2	0.1	0.8

2.
  - a) What are the semi -empirical and empirical equations followed in Bangladesh? 0.5
  - b) State the difference between aerobic and anaerobic decomposition. 1.0
  - c) What do you mean by hazardous waste? Point out the possible sources of hazardous wastes in Bangladesh. 1.5
  - d) Estimate the amount of gas produced from the organic fraction of MSW under anaerobic conditions. Estimate the total theoretical amount of gas that would be produced under anaerobic conditions in a sanitary landfill per unit weight of solid waste. Given that the chemical formulae of typical waste are as follows:

Without Water: C60.0 H94.3 O37.8 N

With water: C60.0 H56.3 O69.1N, also given that the total weight of organic material in 100 lb of solid wastes is equal to 79.5 lb including moisture. 2.0

3.

- a) Describe the environmental effects and public health aspects related to solid and hazardous waste management. 1.5
- b) What are the basic principles of EIA? 1.0
- c) Point out and discuss over the landfill planning and design geo-factors. 1.0
- d) What are the impact categories followed in impact assessment in Bangladesh? How can GoB ensure implementation of Environmental laws? 1.5

4.

- a) Point out the typical environmental impacts of a coal mine operation and its possible mitigation options. 2.0
- b) Describe various types of flood and their causes. 1.0
- c) Give a brief account of flood control and mitigation approaches taken in Bangladesh. 0.5
- d) What types of hazards are responsible for vulnerabilities of the coastal land in Bangladesh? Explain the effects of any one of them. 1.5

5.

- a) Distinguish between shallow landslide and deep-seated landslide. 1.0
- b) Write down the name of various types of volcano and explain any one of them. 1.0
- c) Show the comparison of magnitude, intensity, and acceleration of Mercalli scale in a chart. 1.0
- d) What are the hazards associated with earthquakes? 1.0
- e) What types of hazard are responsible for vulnerabilities of the coastal land in Bangladesh? Explain the effects of any one of them. 1.0

6. Write short notes on the following:  $1.25 \times 4 = 5.0$

- a) Earthquake zonation in Bangladesh
- b) Community participation in solid waste management
- c) Major causes of deforestation
- d) EMP in water resource project

Department of Geology  
University of Dhaka  
Fourth-Year B.S. Honor's Course-Final Examination 2013  
Subject: Geology  
Course: GHT 403  
Course Name: Sedimentology  
Subjective Part  
Full marks 25  
Time 2 Hours

The figure at the right margin indicates full marks. Answer any five of the following questions. Draw suitable sketch, and diagrams wherever necessary.

1.
  - a) Distinguish between facies sequence and facies association. 1.0
  - b) List the architectural elements of fluvial systems as proposed by Miall (1985). 1.5
  - c) Discuss the functions of a facies model with the Bouma sequen. as an example. 2.5
  
2.
  - a) Give the classification (after Rust, 1978) of fluvial systems. 1.0
  
  - b) Describe the main factors that control braiding and meandering of fluvial systems. 1.5
  - c) Show the sub-environments of a tidal system in a diagram. Describe the vertical facies succession developed in the intertidal zone. 2.5
  
3.
  - a) On a neat diagram show the morphological elements of a deep-sea fan. 1.0
  - b) Explain the facies relationship diagram (FRD) with figure. 1.5
  - c) Describe the facies model of braided-river system. 2.5
  
4.
  - a) Show the classi.I turbidite sequence in a diagram. 1.0
  - b) Briefly describe the processes of.. development. 1.5
  - c) Briefly discuss the tectonic controls on alluvial fan sedimentation. 2.5
  
5.
  - a) define apposition fabric. What do you understand by palaeocurrent analysis? 1.0
  - b)List in a table all the four kinds of rock property used in palaeocurrent analysis including short definition and examples. 1.5
  - c) Define a sedimentary basin. Write an account on palaeocurrent indicators with reference to their classification, significance, and examples. 2.5

6.

Write short not. on any FOUR of the following: -  $1.25 \times 4 = 5.0$

- a) Neap-spring tide
- b) External and internal current indicators
- c) Diachronism
- d) Tectonic controls on sedimentation
- e) Anastomosing rivers

Department of Geology  
University of Dhaka  
Fourth -Year B.S. Honor's Course -Final Examination 2013  
Subject: Geology  
Course: GFIT 404 Course Name: Quaternary Geology  
Subjective Part  
Full marks 25 Time 2 Hours

The figure at the right margin indicates full marks. Answer any five of the following questions. Draw suitable sketches and diagrams wherever necessary.

1.

- a) What are the important characteristics of the Quaternary period and possible causes for its instability? 1.5
- b) How does the Quaternary Period differ from the Tertiary Period? 1.0
- c) Describe the classical model of Quaternary climatic fluctuations after Penck and Bruckner and its present day reliability. 2.5

2.

- a) Point out the school of thoughts on sea -level fluctuation. 1.5
- b) Write down the evidence of the Holocene marine transgression along the eastern coast of the Bay of Bengal. 2.0
- c) Briefly describe the Milankovitch Astronomical Forcing theory for the Quaternary climatic change. 1.5

3.

- a) What do you understand by lithostratigraphy, chronostratigraphy, and magnetostratigraphy? 1.0
- b) Point out the origin and evolution of the Pleistocene Madhupur Tract. 1.5
- c) Compare and correlate the Quaternary deposits exposed in the Bengal Basin in Bangladesh and in its Indian counterparts. 2.5

4.

- a) What is neotectonics? 0.5
- b) What is a neotectonic map? State the different criteria for neotectonic studies. 1.5
- c) Give an overview of neotectonic activity in the Bengal Basin. 3.0

5.

- a) What are the differences in morphology between the Pleistocene and Holocene surfaces ? 1.0
- b) Describe the morphology, stream pattern, and structural movements of the Barind Tract. 2.0
- c) Give an account on the sediment characteristics, morphology, and structural activity of the Lalmai hills. 2.0

6. Write short notes on the following:  $1.25 \times 4 = 5.0$

- a) Concept of sea -level band
- b) Haluaghat Gravel bed
- c) Tiberian limit
- d) Stadial and interstadial

Department of Geology

University of Dhaka

Fourth -Year B.S. Honor's Course -Final Examination 2013

Subject: Geology

Course: GHT 405. Course Name: Principles of Hydrogeology

Subjective Part

Full marks 25 Time 2 Hours

The figure at the right margin indicates full marks. Answer any five of the following questions. Draw suitable sketches and diagrams wherever necessary

1.

- a) Which physical properties of rocks do control occurrence of groundwater? Differentiate between primary and secondary porosity. 4
- b) List the various laboratory and field methods for measuring hydraulic conductivity. 1
- c) Briefly discuss various geological formations forming aquifers. 3

2.

- a) What is meant by groundwater exploration? Mention the various stages of exploration. 1
- b) Distinguish between percussion and rotary drilling methods. 1
- c) List the common logs used in groundwater exploration. Briefly discuss log interpretation techniques. 3

3.

- a) Why do we conduct pumping tests? Name the various types of pumping tests. 1
- b) List the various methods for measuring discharge during pumping test. 1
- c) Briefly discuss the test procedure for long term constant discharge pumping test. 3

4.

- a) What is non-equilibrium well equation? Who did develop it? 1
- b) Enumerate the assumptions made in the derivation of the equation. 2
- c) Explain how Jacob modified the non-equilibrium well equation. 2

5.

- a) Derive an equation for steady-state flow of a pumped unconfined aquifer. Show how this equation can be re-arranged to express it in terms of corrected drawdown. 2
- b) Mention the assumption for the above equation. 1
- c) Explain the differences between the processes by which water is released from storage when groundwater is abstracted from a confined aquifer and an unconfined aquifer. 2

6.

- a) A well in an unconfined aquifer is pumped over a long period at a rate of  $0.05 \text{ m}^3/\text{s}$  until approximate steady-state conditions are achieved. Two observation wells at distances of 25m and 50m from the abstraction well give observed drawdowns below the initial water table level of 15.3m and 9.5m respectively. If the saturated thickness of the aquifer prior to pumping is 80m determine the hydraulic conductivity of the aquifer material. 2
- b) Calculate the steady-state drawdown at the pumping well which fully penetrates a confined aquifer if the pumping well is 65 m from a river which is in full hydraulic connection with the aquifer. The following useful data are used in calculating: (i) Diameter of pumping well - 0.2 m, (ii) Pumping rate  $4000 \text{ m}^3/\text{day}$ . and (iii) Transmissivity  $470 \text{ m}^2/\text{day}$ . 2
- c) What would be the drawdown in a piezometer 100m from the well and 25m from the river? 1

Department of Geology  
University of Dhaka  
Fourth -Year B.S. Honor's Course -Final Examination 2013  
Subject: Geology  
Course: GHT 407 Course Name: Principles of Petroleum Geology  
Subjective Part  
Time 2, Hours Full marks 25

*The figure at the right margin indicates full marks. Answer any five of the following questions. Answers should accompany suitable sketches and/or diagrams wherever necessary.*

1.
  - a) Distinguish between paraffinic oil and aromatic oil in terms of composition and organic matter source. 2.0
  - b) "The Niger Delta is rich in both oil and gas whereas the Bengal Delta is rich only in gas." Explain the above from a geological viewpoint. 1.5
  - c) Note the difference between natural gas produced within diagenesis zone and that produced during catagenesis zone. 1.5
2.
  - a) What is gas window? Draw a diagram to show its position with respect to oil window. 1.5
  - b) What does happen in the metagenesis zone? 1.5
  - c) Give a classification of organic matter as proposed by Tissot and Welts, and note the oil and gas generating potential of each class. 2.0
3.
  - a) Draw a diagram to show the following elements of a trap:  
(i) closure, (ii) amplitude, (iii) spill point, (iv) edge water, and (v) gas -water contact. 1.5
  - b) What are (i) a diapir and (ii) a growth fault? Show the various petroleum traps formed by these two structures. 1.5
  - c) How are development of stratigraphic traps related to the depositional sedimentary environments? 2.0
4.
  - a) Differentiate between primary and secondary migrations with neat diagrams. 1.0
  - b) Explain with the help of suitable diagrams the physicochemical aspects of primary migration in terms of (i) temperature and pressure, (ii) compaction, and (iii) role of fluids. 2.0
  - c) Write a critical account on modes of primary migration of petroleum hydrocarbons under various hypotheses. 2.0
5.
  - a) What do you understand by overpressure? Mention the factors that are responsible for generation of overpressure in the subsurface. 2.0
  - b) Compare sandstone with limestone in terms of reservoir rocks. 1.5
  - c) Comment on how the traditional concepts of petroleum reservoir rocks have changed in the recent time in the light of unconventional oil and gas finds. 1.5

6. Write short notes on the following: 1.0 x 5 = 5.0

- a) Combination trap
- b) Sapropelic organic matter
- c) Vitrinite
- d) Secondary migration of petroleum
- e) Heavy oil

Department of Geology  
University of Dhaka  
Fourth -Year B.S. Honor's Course -Final Examination 2013  
Subject: Geology  
Course: GHT 408 Course Name: Applied Petroleum Geology  
Subjective Part  
Full marks 25 Time 2 Hours

*The figure at the right margin indicates full marks. Answer any five of the following questions. Answers should accompany suitable sketches and/or diagrams wherever necessary.*

1.

- a) Why do micaceous sand and placer sand give high gamma -ray reading? 1.5
- b) What is the effect of gas zone on neutron log? Why does such effect take place? 2.0
- c) How would you detect overpressure using sonic log? 1.5

2.

- a) "Sands texture influences the resistivity of the formation passively." Explain. . 1.5
- b) Draw a diagram to show the components of drill stem and point out the main work of each component. 1.5
- c) Comment on the petroleum prospect of the Stable Shelf area of the Bengal Basin. 2.0

3.

- a) What are the examinations a drill -site geologist would perform on the drill cuttings? 1.5
- b) What are the geophysical methods for direct detection of hydrocarbon? 1.5
- c) Rate the different zones of the Chittagong fold belt for their gas prospect. 2.0

4.

- a) How would you detect the presence of hydrocarbon in a combined trace of neutron and density logs? 1.0

- b) Name the zones of invasion around a bore hole and give their respective resistivity notation. 1.0
- c) Draw a simple diagram to show the interrelationship of (i) texture, (ii) formation resistivity factor (F), and (iii) formation resistivity (R). 1.0
- d) During drilling through a coal -bearing sand -shale sequence how would you detect the coal layers in both the (i) sonic log and (ii) density log. 1.0
- e) Rearrange the following lithologies according to gamma -ray radiation level — the highest at (I) and the lowest at (V):  
coal; organic shale; limestone; argillaceous sandstone; and siltstone 1.0
- 5.
- a) Mention why blowouts are more likely during trips. 1.5
- b) What are the indications of fluid flows from rock formation into the borehole? 2.0
- c) What would happen if formation fluid enters the borehole? How would you tackle the situation as a drilling worker? 1.5
- 6.
- a) Describe the properties of individual seismic pulse in deciphering sequence boundaries. How can the clay and the carbonate lithologies be detected from seismic traces? 2.5
- b) Define flat spot, bright spot, and dim spot. 1.5
- c) Point out the causes of velocity distortions. 1.0

Department of Geology  
University of Dhaka  
Fourth -Year B.S. Honor's Course -Final Examination 2013  
Subject: Geology  
Course: GHT 409 Course Name: Seismology  
Subjective Part  
Time 2 Hours Full marks 25

*The figure at the right margin indicates full marks. Answer any five of the following questions. Answers should accompany suitable sketches and/or diagrams wherever necessary.*

- 1.
- a) Explain the elastic rebound theory of earthquakes on a fault. 1.5
- b) Discuss the seismic cycle. 1.5
- c) Define focal mechanism and discuss the fault geometry used in earthquake study. 2.0
- 2.
- a) What do you mean by historical and instrumental earthquakes? 1.5

- b) How are historical earthquakes studied? 2.0  
c) Described the method of locating earthquakes from waveform data. 1.5
3.  
a) What is seismicity? 1.0  
b) What are interplate and intraplate earthquakes and their causes? 1.5  
c) Describe the global distribution of earthquakes associated with different types of plate, settings. 2.5
4.  
a) How do you read a seismogram? 1.0  
b) Sketch a cross-section of the Earth showing the travel paths of P and S waves and their shadow zones. 2.0  
c) Explain the procedure of finding the epicentre of an earthquake. 2.0
5.  
a) What are (i) tectonics, (ii) neotectonics, and (iii) active tectonics? 1.5  
b) What is an active fault? How would you recognize active faults? 1.5  
c) Describe the geodynamics of Bangladesh and its surroundings associated with major earthquakes. 2.0
6.  
a) Differentiate between the primary and secondary seismic hazards. 1.0  
b) What is liquefaction? Why does it occur? 2.0  
c) Write down the characteristics of tsunami. Describe its severity with an example. 2.0

Department of Geology  
University of Dhaka  
Fourth-Year B.S.11onours Course -Final Examination 2013  
Subject: Geology  
Course: GHT 410 Course Name: Exploration Geophysics  
Subjective Part  
Time 2 Hours Full marks 25

*The figure at the right margin indicates full marks. Answer any /lee of the following questions. Answers should accompany suitable sketches and/or diagrams wherever necessary.*

1.  
a) What do you mean by Fourier Transformation? Mention the advantages of using Fourier

Transformation in data processing. 1.5

- b) What is correlation? Explain the cross correlation operation by taking two digital data sets. 2.0
- c) Illustrate and explain the difference between band pass and band reject frequency filters. 1.5

2.

- a) Mention the importance of seismic velocity. 1.0
- b) Discuss the various causes of velocity distortion. 2.5
- c) How is stacking velocity determined? 1.5

3.

- a) Distinguish between structural and stratigraphic interpretations of seismic data. 1.5
- b) Illustrate the seismic evidences of a reef structure. Mention its economic significance. 2.0
- c) Discuss the amplitude anomalies related to hydrocarbon occurrence. 1.5

4.

- a) Mention the necessity of geophysical wireline logging. 1.5
- b) Explain the functioning of a mechanical caliper tool. 2.0
- c) Write about the factors that are necessary to provoke SP current around a bore hole. 1.5

5.

- a) "SP log is a qualitative indicator of formation water." Explain. 1.0
- b) Draw a schematic diagram to show 'tone of invasion around a bore hole, equivalent representation of fluid mixing, and equivalent resistivity profile. 2.5
- c) List the various resistivity tools and schematically show the type of resistivity measured by various tools. 1.5

6.

- a) How is bulk density of a subsurface formation measured by density log? 1.5
- b) Write about the quantitative use of density log in the evaluation of porosity. 2.0
- c) Explain the working principle of neutron porosity log. 1.5

Department of Geology  
University of Dhaka  
Fourth -Year B.S. Honours Course -Final Examination 2013  
Subject: Geology  
Course: GHT 411 course Name: Remote Sensing  
Subjective Part  
Time 2 Hours Full marks 25

*The figure at the right margin indicates full marks. Answer any five of the following questions. Illustrate your answers with suitable sketches and/or diagrams wherever necessary.*

1.
  - a) Is microwave remote sensing an active remote sensing? What are the advantages of active remote sensing over passive remote sensing? 1.0
  - b) List the four characteristics of image data. 2.0
  - c) Distinguish between Polar and Geostationary orbits. 1.0
  - d) What is wavelength band? Why are different wavelength bands needed? 1.0
  
2.
  - a) What are the different types of resolution used in Remote Sensing? 2.0
  - b) Briefly describe various types of atmospheric scattering. 1.0
  - c) Name two broad categories of aerial photography with brief description. What is the relationship between scale factor, focal length, and height in aerial photography? 1.0
  - d) What are general sensitivity and spectral sensitivity? 1.0
  
3.
  - a) Briefly describe main types of multispectral scanner . 2.0
  - b) Define Histogram and what do you mean by GCP. 1.0
  - c) What does CCD stand for and what is it used for? 1.0
  - d) Define sensor and platform. What are the various types of platforms? 1.0
  
4.
  - a) What do you mean by image transformation? 1.0
  - b) Write down the ways for image enhancement and briefly explain any one of them. 1.5
  - c) Briefly describe the elements of visual interpretation of remote sensing image. 1.5
  - d) Distinguish between supervised and unsupervised classification. 1.0
  
5.
  - a) What do you mean by ISODATA? Write down the advantages and disadvantage of ISODATA algorithm. 1.5
  - b) What is RADAR? What are the advantages of RADAR remote sensing of the environment? 1.5
  - c) Distinguish between azimuth resolution and range resolution. 1.0
  - d) What geometric distortion does exist in almost all RADAR imagery? Explain any one of them briefly. 1.0

6. Write short notes on any FOUR of the following 1.25 x 4 — 5.0
- Principal component analysis
  - Landsat 8 OLI and TIRS Sensor
  - Georeferencing and Geocoding
  - Atmospheric corrections
  - Spectral reflectance of soil, water, and vegetation

Department of Geology  
University of Dhaka  
Fourth -Year B.S. Honor's Course -Final Examination 2013  
Subject: Geology  
Course: GHT 412 Course Name: Introductory GIS  
Subjective Part  
Time 2 Hours Full marks 25

*The figure at the right margin indicates full marks. Answer any five of the following questions. Illustrate your answers with suitable sketches and/or diagrams wherever necessary.*

Question No. 1

- What can GIS do for you? 1.0
- List some commonly used map projections. 1.0
- Define spatial and non-spatial data with examples. 1.0
- Describe different feature models of GIS? 1.0
- What is Geocoding? Describe the methods of geocoding. 1.0

Question No. 2

- What is the relation between GIS and Cartography? 1.0
- How can a flat map be used to describe locations on the earth's surface? 1.0
- Why it is necessary to construct a map projection? 1.0
- How people, data; software and hardware are connect to GIS? 1.0
- Write a short note on the 'Sources of information for GIS'. 1.0

Question No. 3

- Write the properties of simple cylindrical Projection? What is the use and limitation of this projection? 2.0
- Draw a cylindrical equal area projection on the scale of 1:200,000,000 for the area extending from 10°S parallel to 50°S parallel and from 20°W meridian to 100°E meridian and spacing the parallels at an interval of 10° and meridian at 200. 3.0

Question No. 4

- a) What is the importance of topology in GIS? 1.0
- b) Draw a diagram showing the topology workflow. 1.0
- c) Describe some commonly used topology rules in GIS. 1.0
- d) Describe the basic data model used in GIS and what are the advantages and limitations of those data model? 2.0

Question No. 5

- a) What is a Thematic Map? Write down the applications of Thematic Map in GIS. 1.5
- b) What are the various forms of Thematic Map? Explain any one of them. 2.0
- c) Briefly explain how you can use GIS to study relationships between bedrock geology and subtle topography. 1.5

Question No. 6

- a) What are the ways of the RS and GIS combination to enhance the performance of each other? 1.0
- b) Briefly explain the various contributions of the RS to GIS. 1.5
- c) Write down the name of theories of the RS and GIS integration and explain briefly any one of them. 1.5
- d) Mention the various components of RS and GIS integration for urban analysis. 1.0

Department of Geology  
University of Dhaka  
Fourth -Year B.S. Honor's Course -Final Examination 2013  
Subject: Geology  
Course: GHT 413 Course Name: Engineering Geology  
Subjective Part  
Time 2 Hours Full marks 25

*The figure at the right margin indicates full marks. Answer any five of the following questions. Illustrate your answers with suitable sketches aid/or diagrams wherever necessary.*

Question No. 1.

- a) Illustrate the phase diagrams of soil in terms of weight or mass and volume. 1.5
- b) Define Water Content, Void Ratio, Porosity, Degree of Saturation, Unit Weight (wet and dry) of soil using necessary equations. 2.0
- c) What are the Atterberg limits? Define Plastic Limit, Liquid Limit, and Plasticity Index. 1.5

Question No. 2.

- a) Describe the Tunnel structure in hard ground and soft ground. 1.0
- b) What are the function and significance of sub -grade properties of Highway? 1.5
- c) Explain what are the Properties Associated with Sub -grade Soil? 1.0
- d) Brief the Classification & Identification of soil as sub -grade material 1.5

Question No: 3.

- a) What do you mean by foundation? What are the types of foundations? 1.5
- b) Write down Terzaghi's Bearing Capacity Formulas. 1.5
- c) Explain the ground water table effects on the calculation of bearing capacity 2.0

Question No. 4.

- a) Differentiate between Dam and Barrage. 1.5
- b) What are the geological considerations are taken into account in selecting the site of a dam. 1.5
- c) Write down a comparison between earth and masonry dams 2.0

Question No. 5.

- a) Explain what include in Soil investigation? 2.0
- o What is bearing capacity of rock and sand soil? 1.5
- c) Explain the SFT Correction Factors? 1.5

Question No. 6.

Write short notes on any FOUR of the followings: 1.25 x4 5.0

- a) Unified Soil Classification System
- b) Procedure of SPI
- c) Discontinuity of rockmass
- d) "Simple Means" Test for intact rock strength determination
- e) RQD

Department of Geology  
University of Dhaka  
Fourth -Year B.S. Honours Course -Final Examination 2013  
Subject: Geology  
Course: GHT 414 Course Name: Mining Geology  
Subjective Part  
Time 2 Hours Full marks 25

*The figure at the right margin indicates full marks. Answer any five of the following questions. Answers should accompany suitable sketches and/or diagrams wherever necessary.*

1.
  - a) What is Shaft? What types of shaft are used in Underground mining? 2.0
  - b) Why artificial ground freezing is required for shaft construction? 1.0
  - c) WO the help of a suitable sketch describe the shaft -lining construction. 2.0
  
2.
  - a) What is Open -pit mining? What are the necessary steps required for Open -pit mining? 1.5
  - b) Describe the ventilation method of Open -pit and Underground mining. 1.5
  - c) Describe the freezing mass technology. 2.0
  
3.
  - a) What are the harmful mine gases? Briefly describe their characteristics and permissible limits in Underground mining. 2.5
  - b) Name important mining explosives used for blasting. 0.5
  - c) Describe the advantages and the disadvantages of Surface and Subsurface mining. 2.0
  
4.
  - a) Name the types of Underground mining and give a short account on each. 2.0
  - b) Describe the important factors and issues which have lobe considered for sustainable mining operation. 2.0
  - c) Write a short account on mine life -cycle. 1.0
  
5.
  - a) Describe briefly the blasting cycle with sketch. 1.0
  - b) Differentiate between the Blast Timing and Design Configuration with sketch. 1.0
  - c) Write a short note on blasting processes. 1.0
  - d) Describe in detail the major factors that influence blasting efficiency. 2.0
  
6.
  - a) Briefly describe the subsurface ventilation systems. 1.5
  - b) Explain the major purposes of Mine Ventilation. 1.0
  - c) Write a brief note on ore and its economic importance. 1.0
  - d) What are main and local fans in mining operation? Write an explanatory note with sketch. 1.5

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