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Full marks: 72

Time: 3 Hours

- N.B:-**
- (i) Answer any **SIX** questions, taking **THREE** from each section.
 - (ii) Figures in the margin indicate full marks.
 - (iii) Use separate answer script for each section.
 - (iv) Assume reasonable value for any data missing.

SECTION-A

- Q.1(a) Draw an equilibrium profile of a river, and explain how water discharge, slope, channel width, and water velocity change as a function of distance downstream. 4.00
- (b) What geological processes control large-scale geomorphology on earth? 4.00
- (c) Differentiate between consequent streams and subsequent streams. 4.00
- Q.2(a) Write down the conditions under which the river capture occurs. 4.00
- (b) Describe the process of valley lengthening. 4.00
- (c) Define the terms: (i) Drainage density (ii) Bifurcation ratio (iii) Cutoff ratio (iv) Tortuosity. 4.00
- Q.3(a) Write short notes on: (i) Loop cut-offs (ii) Clute cut-offs. 4.00
- (b) Discuss the characteristics of braided streams. 4.00
- (c) Discuss the different ways in which rivers transport their load. 4.00
- Q.4(a) Enumerate the differences between the braided and meandering channels. 4.00
- (b) Describe the autogenic causes of river instability. 4.00
- (c) Find out the total number of stream segments and a 5th order drainage basin whose bifurcation ratio is 4. 4.00

SECTION-B

- Q.5(a) Explain the internal structure of the earth with diagram. Also write about the physical properties of rocks. 4.00
- (b) Draw neat levelled sketch of the followings: 4.00
- (i) Horst and Graben (ii) Recumbent fold.
- (c) How do you distinguish mineral from a rock? What are the major differences of dykes and sills? 4.00
- Q.6(a) What is fold? Describe the parts of fold. Attempt the classification of folds in brief. 4.00
- (b) Describe the physical properties of minerals (i) Asbestos and (ii) Hematite. 4.00
- (c) Describe various textures of igneous rocks with proper diagram. 4.00
- Q.7(a) What is earthquake? How are they caused? Briefly explain the nature of different types of waves generated during an earthquake. 4.00
- (b) Describe two land forms each created by depositional action of glacier and running water. 4.00
- (c) What is meant by Landslide? Explain its causes in detail. 4.00
- Q.8 Write the differences between (i) Graded bedding and Ripple marks (ii) Dip-slip fault and strike-slip fault (iii) Plutonic rocks and volcanic rocks (iv) Mechanical weathering and chemical weathering. 12.00

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Geology and Geomorphology

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SECTION-A

- Q.1 (a) What are the characteristics of a mature stream? 4.00
(b) Discuss the methods of transportation work of rivers. 4.00
(c) Write short notes on: (i) Alluvial rivers (ii) Bed-rock channels. 4.00
- Q.2 (a) Write down the conditions under which the river capture occurs. 4.00
(b) List the fundamental objectives of a river system over time. 4.00
(c) Define the terms: (i) Drainage density (ii) Bifurcation ratio (iii) Cut off ratio (iv) Tortuosity. 4.00
- Q.3 (a) Write short notes on: (i) Natural levee (ii) Deformed meanders. 4.00
(b) Define the followings: (i) Rejuvenation (ii) Anastomosing channel pattern (iii) Thalweg (iv) Braiding index. 4.00
(c) Enumerate the differences between the braided and meandering channels. 4.00
- Q.4 (a) Write short notes on: (i) Loop cut-offs (ii) Chute cut offs. 4.00
(b) Discuss the characteristics of braided pattern. 4.00
(c) Discuss the different ways in which rivers transport their load. 4.00

SECTION-B

- Q.5 (a) Describe the purposes of studying geology in Civil Engineering. 4.00
(b) Define minerals. Briefly explain the properties of minerals. 4.00
(c) Draw a schematic diagram of rock cycle (with one example of each type of rock) in geologic point of view. 4.00
- Q.6 Briefly discuss, mention or draw sketches on the following topics: 12.00
(i) Principal zones of earth (ii) Typical geometry of a fold (iii) Horst and Graben (iv) Richter Scale.
- Q.7 (a) Classify and discuss the various earthquake waves. 4.00
(b) How does sediment differ from sedimentary rock? What does it mean to be lithified? Explain with sketches. 4.00
(c) Explain the types of weathering in details. Add a note on weathering grade and its engineering significance. 4.00
- Q.8 (a) What is landslide? Explain about the types of landslide. 4.00
(b) What are joints and faults? Why joints are less harmful than faults from civil engineering point of view. 4.00
(c) What is Karst terrain? Write short notes on land subsidence and sinkholes. 4.00

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SECTION-A

- Q1 (a) Define geomorphology and provide three example applications as to how it influences human interaction through living on earth's surface. 4.00
- (b) Discuss the variation of various morphological parameters of a river basin as it flows in the downstream direction. Explain these variations in the context of Bangladesh. 4.00
- (c) List the five factors that control landscape characteristics and evolution over time, provide an example of each. 4.00
- Q2 (a) Write down the conditions when river capture occurs. 4.00
- (b) Describe stream ordering suggested by Horton. 4.00
- (c) Describe the process of valley lengthening. 4.00
- Q3 (a) Write short notes on: (i) Alluvial Channel and (ii) Bedrock Channel. 4.00
- (b) Define the followings: (i) Rejuvenation (ii) Anastomosing channel pattern (iii) Sinuosity and (iv) Braiding index. 4.00
- (c) Enumerate the differences between the braided and meandering channels. 4.00
- Q4 (a) What is alluvial fan? Write down the geographical importance of alluvial fans. 4.00
- (b) Describe the following types of multiple channels with neat sketches (i) Braided channel and (ii) Distributary channel. 4.00
- (c) Discuss the different ways in which river transport their load. 4.00

SECTION-B

- Q5 (a) Define mineral. Name at least four rock forming minerals and their important engineering properties. 4.00
- (b) Elaborate the various physical properties which help in identification of minerals. 4.00
- (c) Describe the three layers of the Earth as determined by compositional properties. 4.00
- Q6 (a) Explain briefly the essential factors to study Geology in civil engineering. 4.00
- (b) Define weathering. Discuss the various factors which influence weathering. 4.00
- (c) Compare and contrast the factors that cause the three main types of metamorphism. 4.00
- Q7 (a) What are the principal types of seismic waves? Also describe which are faster or slower, and how seismic waves can be used to locate a specific earthquake epicenter. 4.00
- (b) Write in detail about landslides and their causative effects. Explain about the types of landslide. 4.00
- (c) Write short notes on: (i) Horst and Graben (ii) Sinkhole and subsidence. 4.00
- Q8 (a) Explain the mechanisms for folding and faulting. How can we measure movement along faults? 4.00
- (b) Describe the different types of geological faults observed on the earth's surface. 4.00
- (c) Write short notes on: (i) Ridge and Basin (ii) Richter's scale and Mercalli scale (iii) Slip and separation (iv) Bowen's Reaction Series. 4.00



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Geology and Geomorphology

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SECTION-A

- Q. 1(a) Define the following terms: (i) Consequent stream, (ii) Obsequent stream, and (iii) Aggrading stream. 5.00
- (b) Write down the ideal favourable conditions for the formation growth of delta. 5.00
- (c) Distinguish between competence and capacity of a river. 2.00
- Q. 2(a) Explain the followings: (i) Drainage density, (ii) Anastomosing channel, (iii) Cutoff ratio, and (iv) Sinuosity. 6.00
- (b) Enumerate the difference between the braided and meandering channels. 3.00
- (c) Write down the kind of autogenic instability of a river. 3.00
- Q. 3(a) Write down the characteristics of a mature stream. 5.00
- (b) What do you mean by artificial cutoffs? Mention the recommendations made by Pickles for design and execution of artificial cutoffs. 5.00
- (c) Define braiding index. 2.00
- Q. 4(a) Discuss the different methods of transportation work of rivers. 4.00
- (b) Distinguish between alluvial fan and alluvial cone. 4.00
- (c) Write down the geographical importance of alluvial fan. 4.00

SECTION-B

- Q. 5(a) What do you mean by Mineralogy? What are the common rock forming minerals? 4.00
- (b) What steps and tests would you undertake to completely describe and identify the unknown minerals? 4.00
- (c) Write short notes on: (i) Hardness, (ii) Translucent, (iii) Streak, and (iv) Cleavage. 4.00
- Q. 6(a) What is rock cycle? Explain fully with neat diagrammatic sketch. 4.00
- (b) Differentiate between foliated and non-foliated metamorphic rock. 3.00
- (c) Describe landslides and land subsidence. Also mention the difference between them. 5.00
- Q. 7(a) What do you mean by structural geology? Write down the different parts of fold with sketching. 5.00
- (b) What do you mean by Domes and Basin? 3.00
- (c) Explain the requirements of a stone should fulfill so that it can be suitably used as (i) concrete aggregate, and (ii) railway ballast. 4.00
- Q. 8(a) Write short notes on: (i) Tremor, (ii) Hypocenter, (iii) Epicenter, and (iv) Seismogram. 4.00
- (b) How does Richter Scale measure the earthquake size and earthquake epicenter? Explain. 5.00
- (c) What factors should be considered for design of a building structure in seismic area? 3.00

Full marks: 70

Time: 3 Hours

- N.B:-
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SECTION-A

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|-----|---|------|
| Q.1 | (a) Discuss the different phases of drainage network development with neat sketches. | 4.00 |
| | (b) Describe the reasons for which streams are important. | 3.67 |
| | (c) Write short notes on:
(i) Dendritic drainage pattern (ii) Flashy rivers. | 4.00 |
| Q.2 | (a) Write down the conditions under which the river capture occurs. | 4.00 |
| | (b) Discuss with sketches the orders of stream channels suggested by Horton. | 4.67 |
| | (c) Define the terms:
(i) Bifurcation ratio (ii) Drainage density and (iii) Stream frequency. | 3.00 |
| Q.3 | (a) Write short notes on (i) Natural cutoffs (ii) Cutoff ratio. | 4.00 |
| | (b) What do you mean by artificial cutoffs? Mention the recommendations made by Pickles for design and execution of artificial cutoffs. | 4.67 |
| | (c) Draw a typical cross-section of a river with flood plain. | 3.00 |
| Q.4 | (a) Distinguish between braided and distributary channels with neat sketches.? | 4.00 |
| | (b) Discuss the different ways in which rivers transport their load. | 4.00 |
| | (c) Explain the terms 'bed generative discharge' introduced by Schaffernak. | 3.67 |

SECTION-B

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|-----|---|------|
| Q.5 | (a) What do you mean by Geology? Discuss in brief the different branches of geology. | 4.67 |
| | (b) Define weathering. Discuss the various factors which influence weathering. | 3.00 |
| | (c) Define metamorphism. Briefly describe the different types of metamorphism. | 4.00 |
| Q.6 | (a) What do you mean by earthquake? Define epicentre, focus and anticeentre of earthquake. | 2.00 |
| | (b) Describe the working procedure of horizontal pendulum for measuring earthquake. | 5.67 |
| | (c) Define seismic coefficient. What is its importance for design a structure? | 4.00 |
| Q.7 | (a) What do you mean by rock cycle? Explain with net diagram and sketching. | 4.00 |
| | (b) Define sedimentary rock. Discuss the process of formation of sedimentary rock. | 4.00 |
| | (c) What are the differences between landslides and land subsidence? | 3.67 |
| Q.8 | (a) Describe how the unknown hardness of a mineral can be found out. | 2.67 |
| | (b) Explain dip and strike with neat sketches. | 3.00 |
| | (c) Explain the requirements of a stone should fulfill so that it can be suitably used as:
(i) Concrete aggregate (ii) Railway ballast (iii) Rip-rap material. | 6.00 |

CE 207
Geology and Geomorphology

Full marks: 70

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SECTION-A

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|---------|--|------|
| Q.1 (a) | Explain the followings: (i) Drainage density (ii) Anastomosing channel (iii) Cutoff ratio. | 4.00 |
| (b) | Write down the causes for the development of braided pattern of a river. | 3.67 |
| (c) | Enumerate the differences between the braided and meandering channels. | 4.00 |
| Q.2 (a) | Explain the term 'bed generative discharge' introduced by Schaffernak. | 4.00 |
| (b) | Briefly discuss the effects of degradation downstream of a dam or elsewhere in a river. | 5.00 |
| (c) | Differentiate between competence and capacity of a river. | 2.67 |
| Q.3 (a) | What do you mean by river capture? Write down the conditions on which river capture occurs? | 4.67 |
| (b) | Describe the process of valley lengthening. | 3.00 |
| (c) | Distinguish between the following: (i) Sinuosity and Tortuosity (ii) Pools and Riffles | 4.00 |
| Q.4 (a) | Differentiate between (i) Sedimentary yield and Sediment load (ii) Drainage density and Stream frequency. | 5.00 |
| (b) | Write down the procedure which should be considered for the design and execution of artificial cutoff effectively. | 4.00 |
| (c) | Describe with neat sketch the effect of sediment size on channel section. | 2.67 |

SECTION-B

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|---------|--|------|
| Q.5 (a) | Define weathering. Discuss the various factors which influence weathering. | 4.50 |
| (b) | Explain how you can determine the unknown hardness of a mineral. | 2.67 |
| (c) | What factors should be considered for design of a building structure in seismic area. | 4.50 |
| Q.6 (a) | Define metamorphism. Briefly describe the different types of metamorphism. | 3.00 |
| (b) | Describe the process of formation of sedimentary rock. | 3.00 |
| (c) | Describe with neat sketches the different parts of a fold. | 2.67 |
| (d) | Define the following terms with neat sketch: i) Step fault ii) Syncline fold iii) Graben | 3.00 |
| Q.7 (a) | What is 'rock cycle'? Explain fully with neat diagrammatic sketch. | 4.00 |
| (b) | What are landslides? Briefly describe different types of landslides. | 4.00 |
| (c) | Write down the causes of land subsidence. | 3.67 |
| Q.8 (a) | Sketch the seismic zoning map of Bangladesh and mention the basic co-efficient for different zones. | 3.00 |
| (b) | Define (i) Earthquake (ii) Seismology (iii) Seismogram and (iv) Seismograph. | 3.67 |
| (c) | Discuss the characteristics of different types of earthquake waves that are produced during an earthquake. | 5.00 |
