

**University of Asia Pacific**  
**Department of Civil Engineering**  
**Final Examination Spring 2012**  
**Program: B. Sc. Engineering (Civil)**

Course # : CE-203  
 Full Marks: 120 (60 + 60= 120)

Course Title: Engineering Geology & Geomorphology  
 Time: 3 hours

**Section A**

**There are four (4) questions in this section. Answer any three (3)**

20 x 3 = 60

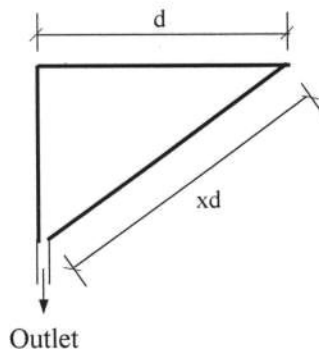
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|----|--|------------|
| 1. | (a) Describe, in short, different geomorphic processes that change the landform of the earth.                  | 14         |
|    | (b) Draw a schematic diagram of rock cycle (with one example of each type of rock) in geologic point of view.  | 6          |
| 2. | (a) Classify and describe major minerals. Distinguish between Ferromagnesian and Non-Ferromagnesian Silicates. | 10         |
|    | (b) Define folds, fault, joint and rock cleavage.  | 4          |
|    | (c) Classify (mention names only) and draw sketches of different types of faults.                              | 6          |
| 3. | (a) Classify and discuss briefly (with neat sketches) various types of folds based on geometry.                | 8          |
|    | (b) Discuss on liquefaction phenomenon (with basic mechanism) due to earthquake.                               | 6          |
|    | (c) Classify and discuss, in short (no sketch is required), various earthquake waves.                          | 6          |
| 4. | Briefly discuss, mention or draw sketches, as asked for, on <b>any four</b> of the following topics:-          | 5 x 4 = 20 |
|    | (i) Principal zones of earth   |            |
|    | (ii) Typical geometry of a fold (with neat sketch)   |            |
|    | (iii) Neat sketches of Horst and Graben  |            |
|    | (iv) Major earthquake parameters (geometric)   |            |
|    | (v) Modified Mercalli intensity scale of earthquakes (VIII to XII)   |            |

**Section B**

**There are four (4) questions in this section. Answer any three (3)**

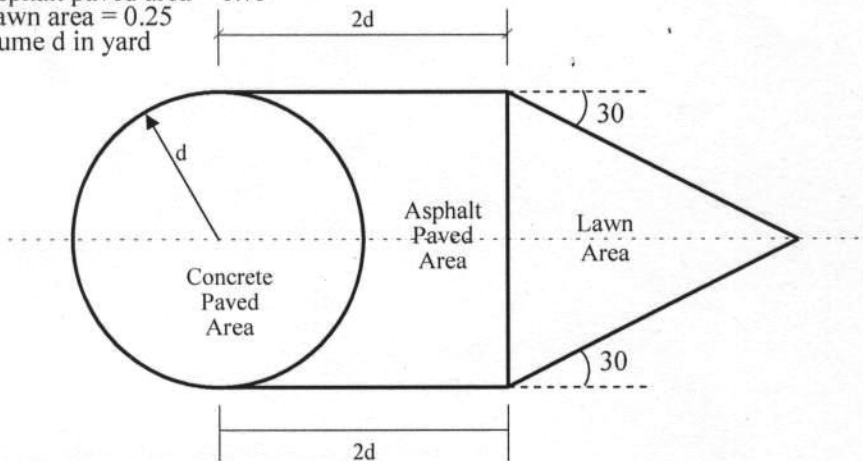
20 x 3 = 60

- |    |  |   |
|----|--|---|
| 1. | (a) Discuss, in brief, the factors affecting runoff.   | 6 |
|    | (b) For the following basin, x is a constant factor. For what value of x, the flow rate (Q) will be the maximum for the basin? Find the FF and CC of the basin for maximum runoff. | 7 |

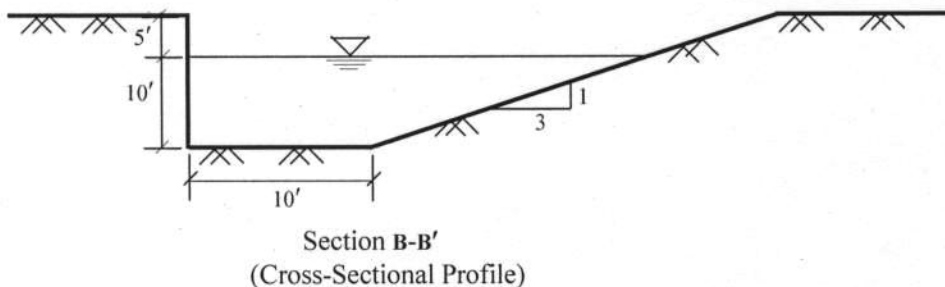
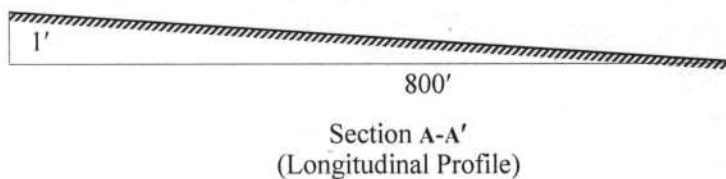
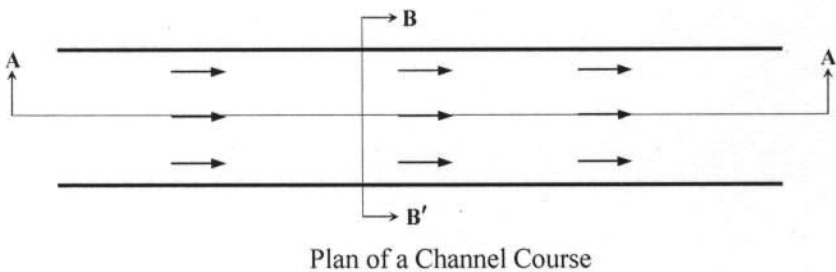


- (c) Calculate Peak runoff (Q) for the following facility under the following conditions:
- Rainfall Intensity for the whole area = 2.25 in/hr
  - Co-efficient of runoff for-----
  - Concrete paved area = 0.85
  - Asphalt paved area = 0.75
  - Lawn area = 0.25
  - Assume d in yard

7

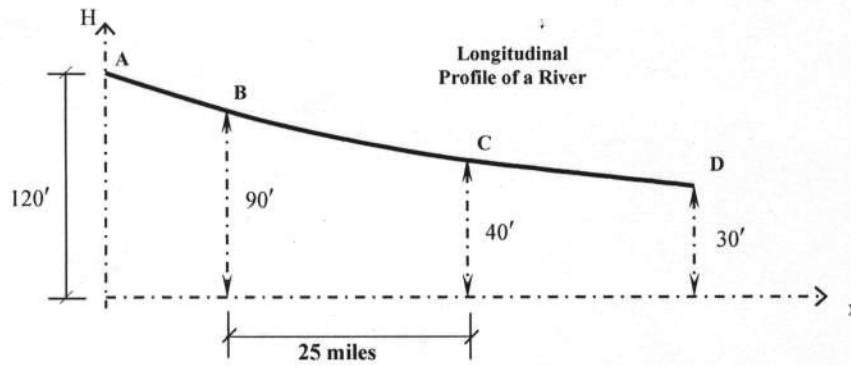


2. (a) What are the major causes of river erosion? 1.5
- (b) Prove that  $H = ae^{-bx}$ ; where symbols carry their usual meanings. 4
- (c) Prove that  $d \propto v^2$ ; where symbols carry their usual meanings. 7.5
- (d) The longitudinal and cross-sectional profiles of a channel are shown. Calculate the unit tractive force along the channel bottom. 7



3. (a) Define river transportation, load, capacity and competence. Categorize (mention names only) load of a river. 4
- (b) Mention the major factors affecting the longitudinal profile of a river. 2

- (c) From the figure shown below, calculate the horizontal distance between locations A and D along the longitudinal profile of a river. 7



- (d) The number and stream ranks of a catchment area of 1,125 square miles are calculated and the results of the survey are summarized in the table below. 7

Stream Rank	No. of Streams	Average Length (mile)
1	22	1.3
2	7	2.2
3	3	6.9
4	1	18.2

Calculate the following parameters from the above survey data:

- (i) Average Bifurcation Ratio (ABR)
- (ii) Average Length Ratio (ALR)
- (iii) Drainage Density (DD)
- (iv) Stream Frequency

4. (a) Classify and discuss, in brief, different types of drainage patterns. 10
- (b) What is a river valley? Sketch a typical cross-section of a river/stream valley. Classify (mention names only) valley according to the stage, genesis and controlling structures. 4
- (c) Discuss, in brief, different ways valleys are deepened. 6