

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA  
L-2/T-1 B.Sc. Engineering Examinations: January 2020 Term

Sub: CE 203 (Engineering Geology and Geomorphology)

Full Marks: 180

Time: 2 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

**SECTION – A**

There are **FOUR** questions in this Section. Answer any **THREE**.

No.	Questions	Marks
1(a)	Explain the following terms with respect to an alluvial land formation: i) meandering River, ii) Oxbow lake, iii) cutoff	10
(b)	Write short notes on i) Rectangular, ii) Trellis types of drainage patterns with diagrams.	10
(c)	What is geomorphic process? What is geomorphic agent?	10
2(a)	Explain the following terms: i) Drainage Density and ii) Stream Frequency.	15
(b)	What is river transportation? What are the factors affecting the transportation power of a river?	15
3(a)	As an effect of urbanization in Dhaka, what sort of change do you expect in the overall condition of run off and ground water table?	15
(b)	Write short notes on Form factor and compactness coefficient. How the differences of these parameters make difference in the drainage system.	15
4(a)	Explain with diagram the variation of the various morphological parameters of a river basin as it flows in the downstream direction.	15
(b)	What is longitudinal bed profile of a stream? What information does it give? Show schematically the differences between a theoretical profile and an actual one for a natural river. Derive the equation of longitudinal bed profile of a stream.	15

**SECTION-B: CE 203**

There are **FOUR** questions in this section. Answer any **THREE**.

5. (a) Discuss in your own words the importance of Engineering Geology for Natural Hazard Mitigation in Bangladesh. (20)
- (b) What is the significance of rock-cycle? Present a sketch of the rock-cycle. (10)
6. (a) Discuss the formation of loess deposits. What do you know about its characteristics? Give some real examples. (10)
- (b) What do you know about sediment transport and deposition in river? (10)
- (c) Which deposits are unsorted? Describe the formation of such deposits. (10)
7. (a) Distinguish between the following with figures and examples where applicable: (8x3=24)
- (i) Transform plate boundary and Subduction plate boundary
- (ii) Ripple marks and Scour marks
- (iii) Sea-mounts and Mid-oceanic ridges
- (b) Present a neat diagram showing the locations of magma eruption. (6)
8. (a) Describe the formation of various minerals at different stages of magma cooling. (6)
- (b) What do you know about the grade of Gneiss? What is the significance of such grade? (6)
- (c) In your opinion, what are the three most important characteristics for identifying a fault. (6)
- (d) Explain with diagram the formation of V-shaped rock outcrop. (6)
- (e) List the sources of pressure in metamorphism. (6)

**SECTION - A**

There are **FOUR** questions in this Section. Answer any **THREE**.

	MARKS
1. (a) Write down the advantages of concrete over other engineering materials. Describe the function of Gypsum and Alumina in cement.	(12)
(b) Write short notes on: (i) Workability of concrete (ii) Bleeding of concrete	(8)
2. (a) Write down the engineering properties and uses of plastics. Briefly describe the factors that affect the physical properties of steel.	(12)
(b) Write down the properties and uses of cast iron.	(8)
3. (a) Briefly describe soil classification according to grain size. Write short notes on Compressibility and Permeability properties of soil.	(8)
(b) A soil mass has a wet unit weight of 125 lb/cft, moisture content of 15% and a specific gravity of 2.68. Calculate the following: (i) Dry unit weight (ii) Void ratio (iii) Porosity (iv) Degree of saturation	(12)
4. (a) Describe the different types of building foundation with neat sketches.	(5)
(b) Estimate the volume of earthwork excavation and brickwork for the boundary wall shown in figure 1.	(15)

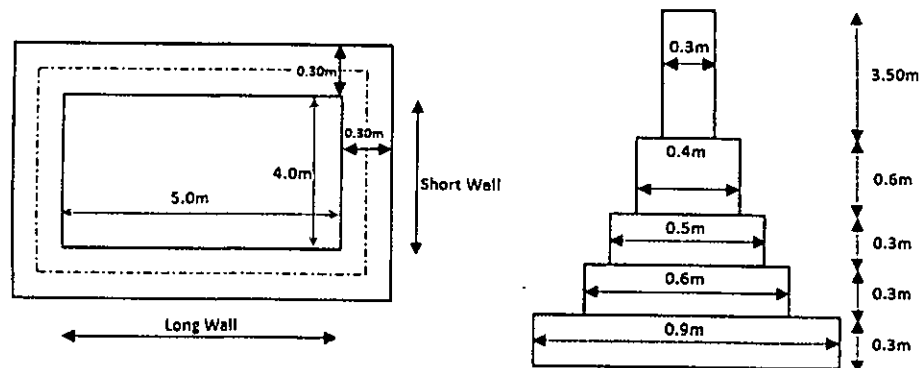


Figure 1 for question 4(b)

**SECTION B: CE 209 FOR URP**

There are **FOUR** questions in this section. Answer any **THREE** questions.

NO.	QUESTIONS	MARKS																																									
5.	<p>(a) Write down the characteristics and qualities of good building stones?</p> <p align="center">Also write down the uses of stones.</p> <p>(b) Provide a brief description of brick classification according to P.W.D. in Bangladesh.</p>	(12)  (8)																																									
6.	<p>(a) Write down the characteristics of good bricks. What is a frog mark? State the functions of a frog mark.</p> <p>(b) Briefly describe the harmful ingredients in brick earth.</p>	(12)  (8)																																									
7.	<p>(a) Discuss in brief the different types of sands according to source and mention their uses.</p> <p>(b) The following table shows the results of sieve analysis of two aggregates. Determine the fineness modulus (FM) of each sample. Also, determine the combined FM when mixed in a ratio of Sample 1: Sample 2 = 1:1.5.</p>	(5)  (15)																																									
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">Sieve size</th> <th colspan="2">Weight of Material Retained (gm)</th> </tr> <tr> <th>Aggregate 1</th> <th>Aggregate 2</th> </tr> </thead> <tbody> <tr><td>1¼ inch</td><td>0</td><td>0</td></tr> <tr><td>3/8 inch</td><td>0</td><td>14</td></tr> <tr><td>#4</td><td>6</td><td>27</td></tr> <tr><td>#8</td><td>18.5</td><td>45</td></tr> <tr><td>#16</td><td>78.6</td><td>88</td></tr> <tr><td>#20</td><td>142</td><td>115</td></tr> <tr><td>#30</td><td>103.5</td><td>81</td></tr> <tr><td>#40</td><td>45</td><td>35</td></tr> <tr><td>#50</td><td>40</td><td>30</td></tr> <tr><td>#100</td><td>50</td><td>45</td></tr> <tr><td>#200</td><td>13.4</td><td>18</td></tr> <tr><td>Pan</td><td>3</td><td>2</td></tr> </tbody> </table>	Sieve size	Weight of Material Retained (gm)		Aggregate 1	Aggregate 2	1¼ inch	0	0	3/8 inch	0	14	#4	6	27	#8	18.5	45	#16	78.6	88	#20	142	115	#30	103.5	81	#40	45	35	#50	40	30	#100	50	45	#200	13.4	18	Pan	3	2	
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8.	<p>(a) Identify the following terms relating to the growth and structural characteristics of timber with a neat sketch. (i) Pith, (ii) Bark, (iii) Medullary Ray and, (iv) Annual Ring.</p> <p>(b) State the objectives of seasoning of timber. List the different types of natural and artificial defects in timber.</p>	(8)  (12)																																									

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA  
L-2/T-1 B.Sc. Engineering Examinations: January 2020 Term

Sub: CE 265 (Structure-I: Mechanics)

Full Marks: 120

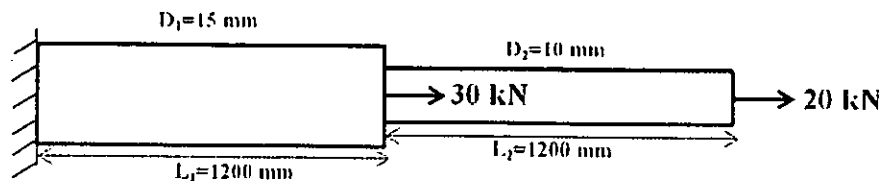
Time: 2 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

**SECTION – A**

There are **FOUR** questions in this Section. Answer any **THREE**.

No.	Questions	Marks
1(a)	A steel rod with two circular sections of different diameter ( $D_1$ and $D_2$ ) is subjected to different loads as shown in Figure 1. Calculate the deformation of the rod considering value of $E= 200 \times 10^3$ Mpa.	12
(b)	For the mass system in Figure 2, calculate the value of force, P, required to resist the downward motion of Mass Y weighing 2500 N. Given, weight of Mass X is 1800 N.	8
2(a)	Explain, in brief, the concept of a stress tensor with a schematic illustration	8
(b)	Determine the centroid of the composite section shown in Figure 3	12
3(a)	For the composite three-dimensional object in Figure 4, determine the position of the center of gravity.	12
(b)	Differentiate between true stress and engineering stress along with any suitable schematic illustration(s).	8
4(a)	The arrangement, shown in Figure 5, consists of a mass M supported by two circular steel rods (XY and YZ) with diameters of 10 mm and 15 mm, respectively. Considering a value of 750 MPa for the rods and factor of safety of 2.5, determine the maximum value of M that can be supported by the arrangement.	15
(b)	Draw the stress-strain curve for mild steel. Also, identify and label the key parameters in the stress-strain curve.	5



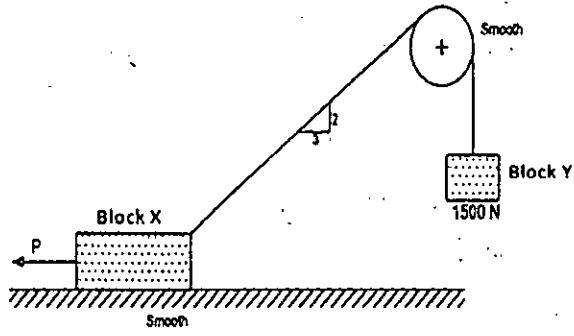


Figure 2

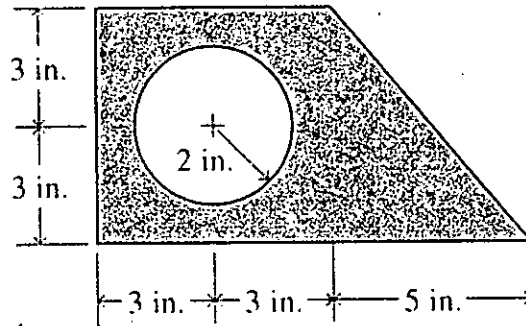


Figure 3

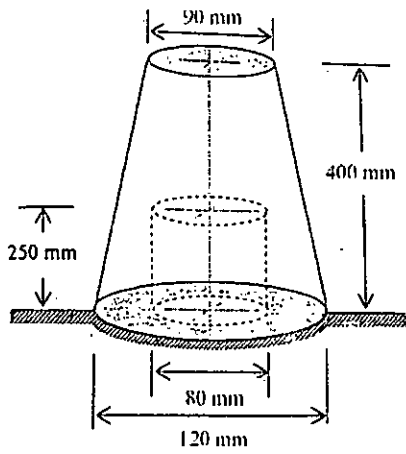


Figure-4

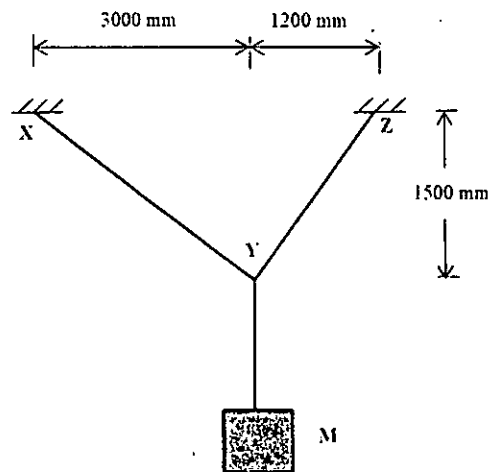


Figure 5

**SECTION-B: CE 265**

There are **FOUR** questions in this section. Answer any **THREE** questions.

5(a)	A uniform wheel of 600 mm diameter, weighing 5 kN rests against a rigid rectangular block of 150 mm height as shown in Figure 6. Find the least pull, through the centre of the wheel, required just to turn the wheel over the corner A of the block. Also find the reaction on the block. Take all the surfaces to be smooth.	10
(b)	Two smooth cylinders of 200 mm radius rest in a box (See Figure 7). Determine the contact forces at A, B, C and D. Each cylinder weighs 250 N.	10

6	Determine the weight $W$ and the reaction at B if the link AB is in equilibrium. There is no friction at the pulley (See Figure 8).	20
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7(a)	Write down the characteristics of a Couple and give two practical examples.	10
7(b)	State and prove the parallelogram law of forces.	10
8	A cable of uniform thickness hangs between two points 120 m apart, with one end 3 m above the other. The cable loaded with a uniformly distributed load of 5 kN/m and the sag of the cable, measured from the higher end, is 5 m. Find the horizontal thrust and maximum tension in the cable.	20

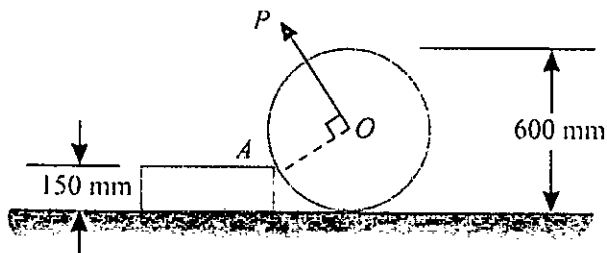


Figure 6

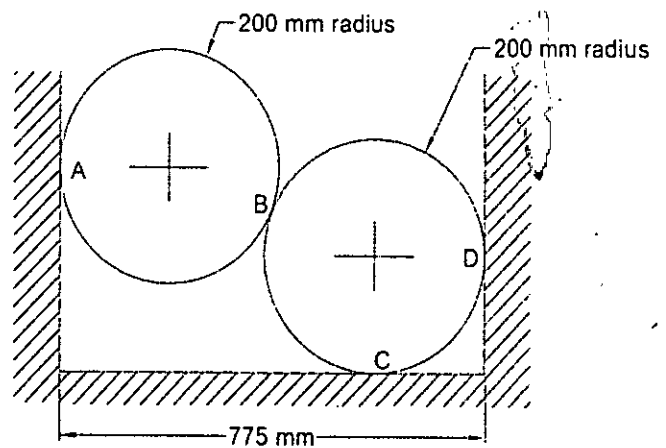


Figure 7

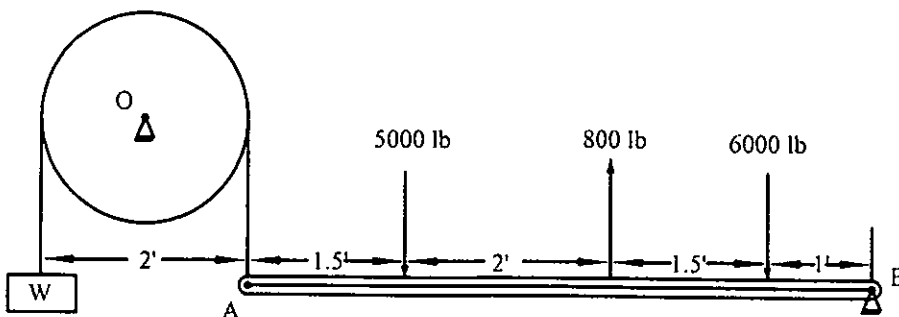


Figure 8