SECTION-A

1. (a) “The analysis of a site and its environs includes all natural, cultural and aesthetic factors that affect it” – Briefly describe the statement.
   (20)
   (b) How outdoor noise of a site can be attenuated?
   (10)
   (c) What do you mean by surrogate user?
   (5)

2. (a) What is microclimate? “Vegetation can control or modify wind by obstruction, diversion, guidance and filtration and thus influence the microclimate of a site” ---- Explain how?
   (15)
   (b) How do ‘view point’ and ‘visual sequence’ influence the sensed landscape of a site?
   (10)
   (c) How does impervious soil impede natural drainage system?
   (5)
   (d) How the sense of time of an area can be restored?
   (5)

3. (a) Suppose you are assigned to plan a new Academic Building in BUET campus. What direct and indirect user analysis technique would you apply? --- justify your answer.
   (15)
   (b) What are the characteristics of a successful enclosure?
   (10)
   (c) What are the components of an integrated system of watershed based storm water management approach? Discuss about any two control measures of integrated storm water management system with necessary sketches.
   (10)

4. (a) Make a comparative analysis between a traditional pipe system and a watershed based system for storm water management with necessary illustrations.
   (15)
   (b) How does the development of a site impact its natural drainage system? Discuss in context of Dhaka.
   (8)
   (c) What is albedo? What is the relevance of albedo of surface material for site planning?
   (12)

SECTION-B

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

5. (a) Discuss the importance of urban rainwater harvesting considering the context of Dhaka city.
   (15)
(b) What is a first flush system? Describe it with a neat diagram. (8)
(c) Why we need to develop a filter system in harvesting rainwater? Discuss about ‘Dewas filter’ system with a neat sketch. (3+9=12)

6. (a) How a common courtyard can play an important role for creating a good housing group? (8)
(b) The site plan of “Dhanmondi Residential Area” is developed based on a famous subdivision planning pattern. Name the pattern along with it’s advantages and disadvantages for Dhanmondi area with necessary sketches. (12)
(c) How can a planner solve the design problems of the simple gridiron pattern? Describe with necessary sketches. (10)
(d) Draw the loop street pattern of sub-division planning. (5)

7. (a) Which factors should be considered before establishing a water supply system? (6)
(b) Discuss about the design requirements of the community water supply system. (13)
(c) Draw a comparative scenario between the public and private sewerage systems. As a planner, which sewerage system you are going to recommend for an area where the soil condition is poor and why? Discuss with necessary sketches. (10+1+5=16)

8. Write short notes on: (5x7=35)
(a) Site characteristics of sub division planning
(b) Four important design principles of site planning
(c) Concept of house grouping
(d) Cluster pattern
(e) Maintenance of the catchment area of rainwater harvesting system.
SECTION - A

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

1. (a) Define 'Urban Planning'. 
   (5)

(b) How different urban land uses should be organized? Illustrate your answer based on the principles of urban land use planning. 
   (17)

(c) The following figures offers the typical spatial relationship of different land uses of urban area of Bangladesh. Evaluate it from urban land use planning perspective. 
   (13)

* Institutional land use is comprised of administrative, defense and security, educational institutions, research institutions, health care, religious and restricted areas.

![Diagram of Typical Spatial Relationship among Different Land Uses of Urban Area of Bangladesh]

2. (a) Describe the principles of designing a town centre. 
   (25)

(b) Briefly illustrate the means to control industrial location. 
   (10)

3. (a) How did the concept of neighbourhood emerge in urban planning? 
   (10)

(b) Describe the basic characteristics of a neighbourhood unit. 
   (20)

(c) Explain the concept of 'Environmental Area'. 
   (5)

Contd ........... P/2
PLAN 211

4. (a) Define 'Floor Area Ratio' (FAR). Evaluate the role of FAR as a density control tool with special reference to Dhaka City. (5+15=20) (b) Explain the possible adverse impacts of low density development. (10) (c) List the factors on which functional efficiency of a town is primarily dependent. (5)

SECTION – B

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

5. (a) Briefly discuss the issues which are required to be considered while planning for a historic conservation project in old Dhaka. (18) (b) Restoration is one of the most difficult types of preservation tool. Explain with one example. (8) (c) Illustrate the sector theory with a neat diagram. (9)

6. (a) Briefly discuss the three sets of land use values. (12) (b) The concept of sustainable development is based on three principles – discuss these principles. (13) (c) In a global scale, do you think it is logical to support the living standards of the rich considering its environmental cost? Explain with relevant example. (10)

7. (a) Discuss the locational requirements for employment areas. (10) (b) Briefly explain Huff's Gravity Model. (10) (c) What are the major problems and issues associated with contemporary commercial development in Dhaka? (15)

8. (a) Why is it necessary to conserve open space? (7) (b) In the case of developing countries, industrialization lags far behind the rate of urbanization – briefly explain the statement. (13) (c) Write a short summary on urbanization trend in Bangladesh since 1981. (15)
L-2/T-1/BURP

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-2/T-1 BURP Examinations 2011-2012

Sub: PLAN 291 (Statistics for Planners - I)

Full Marks : 210 Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION - A

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

1. (a) Describe the different levels of measurement with examples. (10)
(b) Explain the difference between a discrete and a continuous variable with examples. (5)
(c) Income of employees in an industrial concern are given below. The total income of the 10 employees in the class 2500 and over is Tk. 40,000. Compute the mean income. Every employee belonging to the top 25% of the earners is required to pay 5% of his income to workers' relief fund. Estimate the contribution to this fund. (20)

<table>
<thead>
<tr>
<th>Income (Tk)</th>
<th>Employees</th>
<th>Income (Tk)</th>
<th>Employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 500</td>
<td>90</td>
<td>1500-2000</td>
<td>80</td>
</tr>
<tr>
<td>500-1000</td>
<td>150</td>
<td>2000-2500</td>
<td>70</td>
</tr>
<tr>
<td>1000-1500</td>
<td>100</td>
<td>2500 and over</td>
<td>10</td>
</tr>
</tbody>
</table>

2. (a) A man gets three annual increases in salary. At the starting of the first year his salary was Tk. 1,20,000. At the end of the first year he gets an increase of 4%, at the end of second year an increase of 6% on his salary as it was at the end of the first year, an increase of 9% on his salary as it was at the end of the second year. What is the average percentage increase? (9)
(b) Suppose a female bank employee earns Tk. 29,000/= per month and believes that her salary is relatively low as a result of sex discrimination in our country. To substantiate her belief, she collects information on the salaries of her male counterparts in the banking business. She finds that their salaries have a mean of Tk. 34,000 and a standard deviation of Tk. 2,000. On the other hand a female bank employee with same competence in India gets Rs. 30,000 and the male counterparts in the banking business in India have a mean salary of Rs. 38,000 and a standard deviation of Rs. 3,000. Does this information support her claim of sex discrimination in the banking business of our country? (8)
(c) World Bank has conducted a survey on daily wages paid to workers of two garments industries to find out the variability of wages. The data on daily wages paid to workers of two industries A and B are as follows: (18)

<table>
<thead>
<tr>
<th>Daily Wages (Tk)</th>
<th>20-30</th>
<th>30-40</th>
<th>40-50</th>
<th>50-60</th>
<th>60-70</th>
<th>70-80</th>
<th>80-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry A</td>
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<td>45</td>
<td>60</td>
<td>30</td>
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<td>8</td>
</tr>
<tr>
<td>Industry B</td>
<td>25</td>
<td>40</td>
<td>65</td>
<td>35</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
</tbody>
</table>

Contd ......... P/2
(i) In which Industry is there greater uniformity in the distribution of wages?
(ii) Compute monthly wage bill of both industry (month = 25 days)

3. (a) For an income distribution of a group of men, 20 percent of men have income below Tk. 3500, 35 percent below Tk. 7500, 60 percent below Tk. 17,500 and 80 percent below, Tk. 25,000, the first and third quartile are Tk. 5,500 and Tk. 20,000. Put the above information in cumulative frequency distribution, draw an Ogive and find the median.

(b) The mean travel time of the following distribution of travel time to work of a firm’s employees is 44.21 minutes and the standard deviation (s) 11.18 minutes.

<table>
<thead>
<tr>
<th>Travel time (in minutes)</th>
<th>Frequency</th>
</tr>
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<tbody>
<tr>
<td>up to 30</td>
<td>20</td>
</tr>
<tr>
<td>up to 40</td>
<td>73</td>
</tr>
<tr>
<td>up to 50</td>
<td>80</td>
</tr>
<tr>
<td>up to 60</td>
<td>44</td>
</tr>
<tr>
<td>up to 70</td>
<td>22</td>
</tr>
<tr>
<td>up to 80</td>
<td>2</td>
</tr>
</tbody>
</table>

The firm's owner has decided to arrange bus service for the employees if $\bar{X} \pm 2s$ is more than 70%. Will the owner arrange bus service for the employees?

(c) Distinguish between mean and median with examples.

4. (a) The following data shows the annual tax paid of Government officers.

<table>
<thead>
<tr>
<th>Annual Tax paid (Tk. Thousand)</th>
<th>No. of officials</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10</td>
<td>18</td>
</tr>
<tr>
<td>10-15</td>
<td>30</td>
</tr>
<tr>
<td>15-20</td>
<td>46</td>
</tr>
<tr>
<td>20-25</td>
<td>28</td>
</tr>
<tr>
<td>25-30</td>
<td>20</td>
</tr>
<tr>
<td>30-35</td>
<td>12</td>
</tr>
<tr>
<td>35-40</td>
<td>6</td>
</tr>
</tbody>
</table>

(i) Calculate the first four moments about the mean for the above distribution.
(ii) If the moment co-efficient of skewness for the perfectly symmetrical curve is zero, comment on the measures of skewness of above distribution.
(iii) Classify the above distribution from the viewpoint of peakedness.

(b) Prove that the total area of the rectangles in a histogram is equal to the total area bounded by the corresponding frequency polygon and the x-axis.
5. (a) In a large city, 15,000 workers lost their jobs last year. Of them, 8,300 lost their jobs because their companies closed down or moved, 3,100 lost their jobs due to insufficient work, and the remainder lost their jobs because their positions were abolished. If one of these 15,000 workers is selected at random, find the probability that this worker lost his or her job.

(i) because the company closed down or moved
(ii) due to insufficient work.
(iii) because the position was abolished.

Do these probabilities add up to 1.0? Justify your answer with appropriate reasoning.

(b) Suppose you want to find the (approximate) probability that a randomly selected family from Dhaka earns more than Tk. 180,000 a year. How would you find this probability? What procedure would you use? Explain briefly.

(c) The probability that a farmer is in debt is 0.80. What is the probability that three randomly selected farmers are all in debt? Assume independence of events.

6. (a) A recent study revealed that 65 percent of the drivers in Dhaka city do not have valid driving licenses. A sample of 10 drivers are selected in Dhaka. What is the probability that exactly 6 drivers do not have valid driving licenses?

(b) Mr. X, who frequently invests in the stock market, carefully studies any potential investment. He is currently examining the possibility of investing in a power company. Through studying past performance, Mr. X has broken the potential results of the investment into five possible outcomes with accompanying probabilities. The outcomes are annual rates of return on a single share of stock that currently costs Tk. 150. Find the expected value of the return for investing in a single share of the power company.

<table>
<thead>
<tr>
<th>Return on investment (Taka)</th>
<th>0.00</th>
<th>10.00</th>
<th>15.00</th>
<th>25.00</th>
<th>50.00</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>0.20</td>
<td>0.25</td>
<td>0.30</td>
<td>0.15</td>
<td>0.10</td>
</tr>
</tbody>
</table>

If Mr. X purchases stock whenever the expected rate of return exceeds 10 percent, will he purchase the stock, according to these data?

(c) Suppose Ministry of Communication, Bangladesh is going to conduct a survey of 5,000 people from the population of the Dhaka city regarding their opinions on a number of issues related to the first elevated expressway in the capital. The researchers who are administering the survey have reasons to believe that the opinions expressed on the various questions would be highly dependent on income. Which method of sampling do you think more appropriate in this context? Why?
7. A construction zone on a highway has a posted speed limit of 40 miles/hr. The speeds of vehicles passing through this construction zone are normally distributed with a mean of 45 miles/hr and a standard deviation of 4 miles/hr. Find the percentage of vehicles passing through this construction zone that are
(a) maintaining speed below the posted limit. (11\frac{1}{2})
(b) exceeding the posted speed limit. (11\frac{1}{2})
(c) traveling at speeds between 55 and 60 miles/hr. (11\frac{1}{2})

8. In a random sample of 50 homeowners selected from a large suburban area, 19 said that they had serious problems with excessive noise from their neighbors.
(a) Make a 99% confidence interval for the percentage of all homeowners in this suburban area who have such problems. (20)
(b) Suppose the confidence interval obtained in part (a) is too wide. How can the width of this interval be reduced? Discuss all possible alternatives. Which option is the best? (15)
### Appendix Table 1
Areas under the Standard Normal Probability Distribution between the Mean and Positive Values of $z$.

<table>
<thead>
<tr>
<th>$z$</th>
<th>0.00</th>
<th>0.01</th>
<th>0.02</th>
<th>0.03</th>
<th>0.04</th>
<th>0.05</th>
<th>0.06</th>
<th>0.07</th>
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<th>0.09</th>
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</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.0000</td>
<td>0.0040</td>
<td>0.0080</td>
<td>0.0120</td>
<td>0.0160</td>
<td>0.0199</td>
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<td>0.0593</td>
<td>0.0602</td>
<td>0.0611</td>
<td>0.0620</td>
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<td>0.1091</td>
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<td>0.1114</td>
<td>0.1126</td>
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<td>0.30</td>
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<td>0.1689</td>
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<td>0.1713</td>
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<tr>
<td>0.40</td>
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<td>0.2109</td>
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<td>0.50</td>
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<td>0.60</td>
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<td>0.2919</td>
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<td>0.80</td>
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</table>

### Appendix Table 2
Areas in Both Tails Combined for Student's $t$ Distribution

<table>
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<tr>
<th>Degrees of Freedom</th>
<th>0.10</th>
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<th>0.02</th>
<th>0.01</th>
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<td>1</td>
<td>6.314</td>
<td>12.706</td>
<td>31.821</td>
<td>63.657</td>
</tr>
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<td>2</td>
<td>2.920</td>
<td>4.303</td>
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<tr>
<td>3</td>
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<tr>
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SECTION A

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

1. (a) Define a brick. Write down the factors affecting the quality of bricks. (5 ½)
   (b) Briefly describe the classification of bricks by P.W.D. in our country. (8)
   (c) Describe the field tests of bricks and the responses of good quality bricks to these tests. (6)
   (d) What is a frog mark? State the functions of a frog mark. (4)

2. (a) Write down the characteristics of good timber. (5 ½)
   (b) Describe the main types of natural defects that commonly occur in timber. State the objectives of seasoning of timber. (9)
   (c) Write short notes on the following:
      (i) Ply-wood. (9)
      (ii) Advantages and disadvantages of natural seasoning of timber.
      (iii) Re-constructed wood.

3. (a) Define soil. Describe soil classification based on grain size. (6 ½)
   (b) Write short notes on the following:
      (i) Bearing capacity of soil; (9)
      (ii) Permeability of soil;
      (iii) Compressibility of soil;
   (c) A soil mass has a wet unit weight of 120 lb/cft, moisture content of 16% and a specific gravity of 2.68. Calculate the following:
      (i) Dry unit weight (ii) Void ratio (iii) porosity (iv) Degree of saturation (8)

4. (a) Write down the uses of cast iron. Describe the effects of carbon (C) and Manganese (Mg) upon the physical properties of steel. (7)
   (b) Differentiate between "thermoplastics" and "thermosetting plastics". List the uses of plastics. (7 ½)

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(c) Write short notes on the following: (9)
   (i) Tin;
   (ii) Zinc;
   (iii) Uses of slag.

SECTION – B

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

5. (a) Why rapid hardening, quick setting and low heat cements are required? How can you impart these properties to a cement? (8 1/3)
   (b) Describe the function of Gypsum and Alumina in a cement. (5)
   (c) What is the effect of fineness on rate of hydration, water content and workability of a cement? (5)
   (d) Define 'False Setting'. List some causes of false setting. (5)

6. (a) Differentiate between setting and hardening processes of a cement. (5)
   (b) Describe classification of sand according to its size. Draw a graph to show bulking of sands at different moisture contents. (7 1/3)
   (c) Define 'Fineness Modulus'. Calculate the Fineness Modulus of the following aggregate sample. (2+9=11)

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Mass Retained</th>
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<tbody>
<tr>
<td>1&quot;</td>
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<tr>
<td>3/4&quot;</td>
<td>26.4</td>
</tr>
<tr>
<td>1/2&quot;</td>
<td>45.6</td>
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<tr>
<td>Pan</td>
<td>12.8</td>
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</table>

Contd ........... P/3
7. (a) Explain the term "Quarrying". What are the precautions to be adopted in quarrying? (7)
   (b) How does strength, absorption and toughness properties of a building stone affect its structural uses. (6 1/3)
   (c) What are the principal factors affecting the strength of concrete? Draw the diagrams showing the effect of w/c ratio, maximum sizes of aggregate and age on compressive strength of concrete. (4+6=10)

8. (a) Define 'workability' of concrete. What are the factors affecting workability of concrete? How workability is measured? Briefly describe the test for measuring workability. (2+3+3 1/3=8 1/3)
   (b) Briefly describe the following:
      (i) Segregation
      (ii) Bleeding
      (iii) Curing
   (c) Design a concrete mix by the minimum voids method from the following data:
      Voids in coarse aggregate (CA) = 40%
      Voids in fine aggregate (FA) = 30%
      Size of coarse aggregate = 3/4" – 1"
      Size of fine aggregate = 3/16" – 1/4"
      Allow an excess of 10% for cement and 7% for fine aggregate. Use ordinary Portland cement (OPC). (9)
USE SEPARATE SCRIPTS FOR EACH SECTION.

SECTION - A
There are FOUR questions in this Section. Answer any THREE.

1. (a) What do you know about natural environment and man-made environment? (10)
   (b) Briefly describe the relationship between physical environment and social development. (15)
   (c) Discuss the potential consequences of global warming. (10)

2. (a) What do you mean by crude birth-rate and crude death-rate? (8)
   (b) Show how the technological developments have changed our social and family life. (12)
   (c) Explain the various stages of demographic transition theory. (15)

3. (a) What do you understand by urbanization, urbanism, over-urbanization and under urbanization? (12)
   (b) Discuss with examples the classification of cities. (8)
   (c) What problems do megacities have and how can the problems be tackled? (15)

4. Write short notes on any Three of the following: (35)
   (b) Changing functions of the family.
   (b) The various types of industries in Bangladesh.
   (c) Social consequences of Industrial Revolution
   (d) Causes of conformity.

SECTION - B
There are FOUR questions in this Section. Answer any THREE.

5. (a) What do you understand by social values? Critically discuss the normative Functions of culture. (15)
   (b) Explain the conflict view of culture of a society. (10)
   (c) Discuss primary socialization and anticipatory socialization. (10)

6. (a) Discuss functional theoretical perspective of sociology. (10)
   (b) What is research methodology? Explain the steps of social research. (15)
   (c) 'Sociology is a categorical discipline, not a normative discipline' --- Explain. (10)
7. (a) What is social stratification? Discuss different systems of social stratification.
    (b) Explain the Marxist view of social stratification.
    (c) What do you understand by stratum mobility?

8. Write short notes on any three of the following:
    (a) Globalization
    (b) Social Planning
    (c) Industrial revolution
    (d) Juvenile delinquency.