

15.9.13

L-4/T-1/URP

Date : 23/07/2013

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-4/T-1 BURP Examinations 2011-2012

Sub : CE 439 (Basic Environmental Engineering)

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) What is an Intake? Why it is used? Write down the factors to be considered while selecting the location of an intake. (7)
- (b) For the water supply of a small rural town with the total daily requirement of 2,25,000 liters, it is proposed to construct a distribution reservoir. The pattern of water consumption is given in the table below: (15)

Period	Demand Liters
7.00 AM to 8.00 AM	67.5
8.00 AM to 5.00 <del>AM</del> PM	78.75
5.00 <del>AM</del> PM to 6.30 <del>AM</del> PM	67.5
6.30 <del>AM</del> PM to 7.00 AM	11.25

The pumping is to be done at a constant rate for 8 hours per day (From 8.00 AM to 4.00 PM). Determine the storage capacity of the reservoir. (Draw the cumulative curve in the plain graph paper).

- (c) Describe the mechanisms of the following water treatment processes: (7+6)
- (i) water softening by chemical precipitation method and
  - (ii) reverse osmosis process.
2. (a) A 150 mm diameter tubewell is installed in an unconfined aquifer to withdraw water at a rate  $60 \text{ m}^3/\text{hr}$ . The depth of water in the tubewell while pumping is 35 m. The radius of the drawdown is 30 m and the coefficient of permeability of the aquifer is  $0.51 \text{ liter/s/m}^2$ . Calculate the drawdown for the tubewell. (10)
- (b) Write down the significance of the following water quality parameters: (8)
- (i) Arsenic and (ii) Total coliform and fecal coliform.
- (c) Discuss the applicability of infiltration galleries for groundwater collection. Draw a neat sketch of a typical dug-well cross-section. (10)
- (d) What is the importance of risk analysis for an environmental issue? Write down the fundamental steps of environmental risk analysis. (7)
3. (a) What are the problems associated with using surface water as a source of potable water? Write short note on rainwater harvesting process. (10)

Contd ..... P/2

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**Contd ... Q. No. 3**

- (b) List the methods commonly used for population estimation. The population of a town in the year 1990 and 2005 were 155 thousand and 238 thousand respectively. Estimate the future population of that town for the year 2015 and 2020 by the most widely used method of population prediction. (10)
- (c) Write down the advantages and disadvantages of gravity flow system and distribution system with direct pumping. Illustrate with figures the different types of water distribution pipe layout options. (15)
4. (a) Define different types of filtration unit used in water treatment plant. Draw flow diagram of treatment unit processes to treat water from a groundwater source. Laboratory analysis shows that the water contains considerable amount of CO<sub>2</sub> and organic substances. Arsenic and iron concentrations exceed the guideline values in ECR'97 for respective parameters. Note that alkalinity of the water is about 100 mg/L as CaCO<sub>3</sub>. Also mention why each unit is being used. (6+9)
- (b) What are the key issues for development of a sanitation program? Discuss the possible incremental improvement for rural sanitation in Bangladesh. (8)
- (c) Define the parameters of an aquifer storage function. Illustrate with figure the variation in storage function parameters with soil grain size distribution. (8)
- (d) Briefly describe Hydraulic ram. (4)

**SECTION - B**

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

- 145 ← 5. (a) What do you understand by primary and secondary pollutants? Explain with examples. On a particular day, air quality data at a monitoring station are as follows: PM<sub>2.5</sub> (24-hr) = 14.5 μg/m<sup>3</sup>; PM<sub>10</sub> (24-hr) = 195 μg/m<sup>3</sup>; SO<sub>2</sub> (24-hr) = 170 μg/m<sup>3</sup>; O<sub>3</sub> (8-hr) = 150 μg/m<sup>3</sup>. Determine AQI for each parameter and report AQI for that particular day (Table for calculating AQI provided; Given: Temperature = 25°C and P = 1 atm). (12)
- (b) Discuss the possible ways to mitigate and control noise pollution. Discuss the noise pollution scenarios in Dhaka and Chittagong. (9)
- (c) What do you understand by a "sanitary landfill"? Draw a cross-section of a typical sanitary landfill showing all major elements. (9)
- (d) What do you understand by "Photochemical smog"? What are its adverse impacts? (5)

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6. (a) What do you understand by BOD and COD? Why COD is generally greater than BOD? High incidences of diarrhea is observed in a community where pond water is used as a source of potable water. Discuss the possible water quality problems, and the water quality parameters that need to be examined. (12)
- (b) Draw neat sketches of a VIP latrine and a ROEC latrine. What are the relative advantages and disadvantages of these two types of latrines? (7)
- (c) What do you understand by aerodynamic diameter of particulate matter (PM). Why particulates of anthropogenic origin are considered more harmful compared to particulates of natural origin? Explain. (9)
- (d) What are the major components of a small bore sewerage system? What are the major technical advantages of SBS system over conventional sewerage system? (7)
7. (a) Design an alternating twin offset pit pour-flush latrine for a family of 9 members, with a design life of at least two years. The pit is to be constructed with concrete rings 1.0m in diameter and 0.3 m in depth. The average wastewater flow rate is 8 lpcd. The soil is sandy loam with long-term infiltration rate of 28 L/m<sup>2</sup>.day. Draw a neat sketch of the designed latrine. (15)
- (b) What do you understand by "eutrophication"? How eutrophication can be controlled. (8)
- (c) What are the key targets of National 3R Strategy for solid waste management? Also provide some examples of plans/programs that can be undertaken for promotion of 3R Strategy. (12)
8. (a) Design a septic tank for a family of 6 members. The average wastewater flow rate is 180 lpcd, and the tank is to be desludged every 3 years. Assume a temperature of 25°C for design. Also draw a neat sketch of the designed septic tank (Note: Table for estimating "F" value provided). (20)
- (b) Discuss the adverse health effects of carbon monoxide (CO). What do you understand by "thermal NO<sub>x</sub>" and "fuel NO<sub>x</sub>"? What are the adverse impacts of NO<sub>x</sub>? (10)
- (c) Classify pesticides. Also classify synthetic organic insecticides and provide two examples of each class. (5)
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L-4/T-1/URP

Date : 21/09/2013

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-4/T-1 BURP Examinations 2011-2012

Sub : **PLAN 451** (Environmental Planning and Management)

Full Marks: 210

Time : 3 Hours

USE SEPARATE SCRIPTS FOR EACH SECTION

The figures in the margin indicate full marks.

**SECTION - A**

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

1. (a) For establishment of a sewage treatment plant two alternative sites have been considered. Through using weighted matrix technique, find out the suitable site with least environmental impact. (08)

Here b = Relative weighting project component (total 100)

c = Impact of project on environmental component (0-10)

**Project Location A**

Environmental Component	Importance weighting	Project Action			
		Treatment plant	Pumping Station	Interceptor	Outfall
Air quality	21	10(b) 9(c)	0 -	50 6	40 7
Water quality	42	100 10	0 -	0 5	0 -
Noise	09	0 3	100 -	0 5	0 7
Ecosystem	28	10 2	20 -	40 9	30 7

**Project Location B**

Environmental Component	Importance weighting	Project Action			
		Treatment plant	Pumping Station	Interceptor	Outfall
Air quality	20	20(b) 8(c)	15 7	45 6	20 4
Water quality	40	75 3	15 -	0 7	10 -
Noise	15	30 -	60 6	5 9	5 2
Ecosystem	25	5 -	25 -	30 7	40 4

- (b) How overlay maps are used as an impact identification tool? (05)
- (c) Discuss different types of methods and models to predict environmental impact of projects. (12)
- (d) What do you know about environmental monetary valuation techniques? Discuss in short. (10)

**PLAN 451**

2. (a) What are the general characteristics of a common-pool resource (CPR)? How does it differ from a pure public good? (4+3=7)
- (b) What is Volatile Organic Compound (VOC)? According to Environmental Protection Agency, USA discuss the 'Criteria Pollutant'. (3+6=9)
- (c) Why non renewable resources are not assessed while calculating ecological footprint? (04)
- (d) Why 'Tragedy of Commons' concept has also been termed as 'Free Rider Problem'? (05)
- (e) Which informations are needed regarding project site and surrounding environment while establishing environmental baseline at the early stages of EIA (Environmental Impact Assessment)? (10)
3. (a) Is there any kind of similarity between the two impact evaluation methods namely Goal Achievement Matrix (GAM) and Multi-Attribute Utility Theory (MAUT)? According to you which one is more effective in case of avoiding complexity and evaluating the real impact not just reflecting the analyst's view? (12)
- (b) Discuss Delphi method as an impact evaluation technique. (07)
- (c) A Descriptive checklist for Land Development project is needed to be prepared for environmental impact identification. Following factors are identified for this particular project. Discuss the bases for estimating each of the factors. (08)

Factor
A. Local Economy
(i) Public fiscal balance
(ii) Employment
(iii) Wealth
B. Natural Environment
(i) Air Quality
- Health
- Nuisance
(ii) Water quality
(iii) Noise

- (d) Simple matrices can be used for purposes other than impact identification. The following table shows a matrix framework which can be used to summarize baseline environmental conditions. How this environmental baseline matrix can be linked to the whole EIA (Environmental Impact Assessment) process? (08)

**PLAN 451**

Identification  Environmental elements/units	Evaluation														
	Scale of Importance					Scale of present condition					Scale of management				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
	Low		High			Low		High			Low		High		
Biological: flora fauna Ecological relationships															
Physical-chemical: atmosphere water earth															
Cultural: HH (Households) communities economy communications															
Bio-cultural units: resources recreation conservation															

4. (a) Describe the models of integrating environment in the policy making process. **(09)**
- (b) Write down the procedure of issuance of ECC (Environmental Clearance Certificate) for FONSI (Finding of NO Significant Impact) projects according to Environmental Conservation Rule (ECR '97) of Bangladesh. **(05)**
- (c) What major parameters are considered for measuring chemical quality of water? **(09)**
- (d) Find out the significance of Tragedy of Commons and Prisoner's Dielemma concepts to define the accepted ways of viewing problems that an individual faces when attempting to achieve collective benefits. **(12)**

**SECTION - B**

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

5. (a) What are the two major sources of air pollution? Briefly explain each of it. **(15)**
- (b) Describe the various impacts of air pollution. **(10)**
- (c) What are the plausible measures to mitigate air pollution? **(10)**

**PLAN 451**

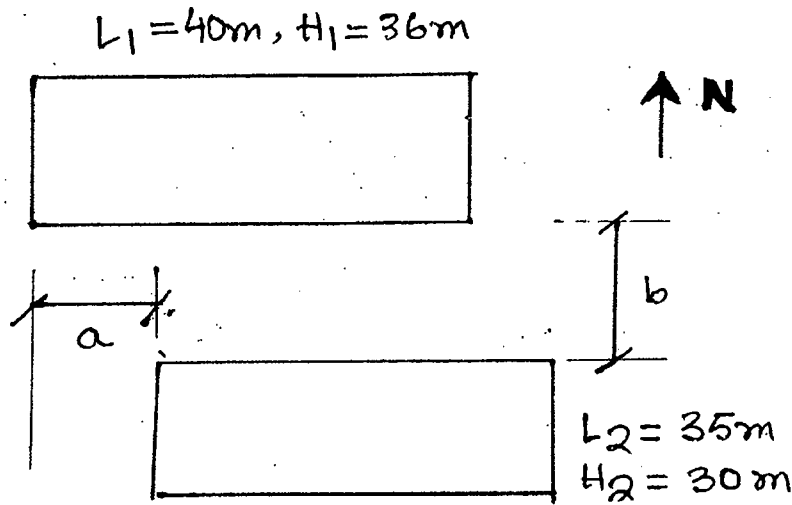
6. (a) What are the contrast between biotic and abiotic environment? (15)  
(b) Define ecosystem and planetary ecosystem. (10)  
(c) What are the three basic types of ecosystem? Give an example of each. (10)
7. (a) Describe the prevailing problems of solid waste management system in Dhaka city. (17)  
(b) Explain the plausible solutions of solid waste management problems. (18)
8. Write short notes on the followings: (5×7=35)  
(a) Environmental Management  
(b) Sustainable Development  
(c) Food Chain  
(d) Habitat and Niche  
(e) Deforestation
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 28/09/2013

**SECTION - A**

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

1. (a) Provide a brief description of key development in land policy and administration of Bangladesh in British Colonial and Pakistan Periods. (20)
- (b) Calculate "a" and "b" according to BNBC's statement of minimum separation required for building within the same plot. Where "L" denotes length of the building and "H" denotes height of the building. (8)



- (c) Name the types of transactions of land when mutation is required. (7)
2. (a) What are the general criteria for private residential project approval? (15)
- (b) Define FAR. If ground area of any plot is 2000 sq.m., ratio of length to width is 5:4, set back from each of the side of plot boundary is 3 m and the building is 8 storeyed, calculate FAR for that building. (10)
- (c) Describe the power of the Fire Service and Civil Defence Authority in case of any fire incident according to the "Fire Prevention and Fire Fighting Law 2003." (5)
- (d) Define "Height of Building" according to the Building Construction Rules 2008. (5)
3. (a) According to the "Open Spaces and Wetland <sup>Conservation</sup> Construction Act 2000", can anyone change the use of the lands used for playground, open spaces, garden or wetland? If yes, describe the procedure. (10)
- (b) Differentiate between land handover processes through "Heba" and "Will". (8)
- (c) What types of constructions are not permitted on a mandatory open space? (7)
- (d) What are the public health issues a pourashava takes care of according to the "Pourashava Ordinance 1977"? Use only one sentence to describe each of these issues. (10)



**PLAN 403**

4. (a) Discuss about the Section 3 of the Building Construction Act 1952, which states "Restrictions on improper use of a Building". (6)
- (b) Define the following terms (any five) (3×5=15)
- (i) Travel Distance (according to BNBC),
  - (ii) Combustible Material (according to BNBC),
  - (iii) Warehouse (according to Fire Prevention and Fire Fighting Law),
  - (iv) Layout Plan (according to Private Residential Land Development Rules 2004),
  - (v) Cadastre (according to land laws of Bangladesh),
  - (vi) Occupier (according to Pourashava Ordinance, 1977).
- (c) Describe the basis of determining house rent according to the "House Rent Control Act 1991". (6)
- (d) What are the rules which might be formulated by the government for managing and regulating the use of park under "Bengal Public Parks Act 1904"? (8)

**SECTION - B**

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

5. (a) Discuss about the foundation acts of modern town planning legislation under UK planning laws. (20)
- (b) What do you know about Development Plan System according to the Town and Country Planning Act 1971 (UK)? (15)
6. (a) Why the study of legal aspects in planning is important? (7)
- (b) Why the study of the legal system of planning in UK deserve special emphasis? (5)
- (c) Distinguish among the activities which are termed as 'development', 'not development' and 'may be development but do not require planning permission' according to UK Town and Country Planning Acts. (13)
- (d) Discuss any two of the regulations and acts under special forms of Development Control. (10)
7. (a) What is the basic difference between the concepts of 'Acquisition' and 'Requisition'? State the historical development of the Land Acquisition and Requisition Laws of Bangladesh. (4+12=16)
- (b) Define Compensation and Betterment fee with reference to different town planning Acts (UK). (10)
- (c) What are the main aspects of DMDP Structure Plan? Discuss optimization of existing urban land resources as one of the spatial development strategy of DMDP Structure plan. (9)
8. (a) Briefly discuss about the factors responsible for limiting the success of present land acquisition system in Bangladesh. (13)
- (b) Which landmark act of UK Planning System introduced the two-tier hierarchy plan? Provide a description of these two tier systems. (10)
- (c) Discuss Stop Notice, Purchase Notice and Blight Notice according to Town and Country Planning Act, UK, 1971. (12)
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L-4/T-1/URP

Date : 05/10/2013

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-4/T-1 BURP Examinations 2011-2012

Sub : **PLAN 401** (Project Evaluation and Management)

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) Distinguish between:

(i) Ordinary annuity and annuity due,

(3)

(ii) Stated and Effective interest rate.

(3)

(b) For a Waste Management Program, two mutually exclusive projects (A and B) are formulated. The expected cash flows (at the end of each year) for the two alternative projects are provided in the following table.

	Project A (Tk. in 000's)	Project B (Tk. in 000's)
Initial Investment	83	95
<b>Cash flows</b>		
Year 1	52	26
Year 2	44	20
Year 3	15	35
Year 4	10	45

Assuming a discount rate of 11.5% and a cost of capital of 10%, determine the value of the followings:

(i) Modified Net Present Value

(9)

(ii) Benefit-Cost Ratio

(7)

(iii) Internal Rate of Return

(10)

Which of the above three measures do you think would provide a better comparison between the two projects? Give reasons for your opinion.

(3)

2. (a) A project consists of the following activities:

Activity	Preceding Activity	Duration (weeks)
A	---	2
B	---	2
C	A	7
D	B	5
E	D	6
F	C, E	3
G	D	6
H	G	2

**PLAN 401**

**Contd ... Q. No. 2(a)**

The project is completed when both F and H are completed.

- (i) Draw a network diagram for the project. (8)
  - (ii) Determine the critical path of the network diagram. (8)
  - (iii) Compute free float and independent float for each activity. (8)
  - (b) What is Net Present Value (NPV) of a project? Describe its properties that make it a very useful measure in project evaluation. (2+9=11)
3. (a) According to an agreement with a finance company, Aspire Limited should repay its loan of Tk. 5 million in 9 years. If the stated interest rate is 12.3% and compounding is done quarterly, what would be the annuity due for Aspire Limited? (7)
- (b) Prepare the loan amortization schedule for Aspire Limited considering that the installments are paid at the end of each year. (20)
- (c) There are generally two approaches for analyzing social costs and benefits. What are these approaches? State the similarities and dissimilarities between them. (2+6=8)
4. (a) Differentiate among the three time estimates assigned for each activity while developing a project schedule. (6)
- (b) State the rules that need to be followed when constructing a project network diagram. (4)
- (c) (i) Discuss about the different sources of risk for a project. (10)
- (ii) Apex Corporation is considering to start a new project. To determine the associated risks, the company is conducting a break-even analysis based on the previous data of similar projects. Calculate the financial break-even point of the income of the proposed project using the following data: (15)
- Initial investment: Tk. 26 million
  - Variable cost: Tk. 15 million
  - Income: Tk. 23 million
  - Fixed cost: Tk. 1.5 million
  - Depreciation: Tk. 2.5 million
  - Tax: 25%
  - Project life: 8 years
  - Interest rate: 12%

**SECTION – B**

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

5. (a) Abu and Babu have been taken refuge in an uninhabited island after a ship wreck. They found that available fruits in the island are only mango and blackberry. Explain by drawing appropriate diagram how they would reach optimal allocation of mango and blackberry. (20)
- (b) "Objective tree is the mirror image of problem tree" – explain by example. (15)

**PLAN 401**

6. (a) You are in a team to evaluate performance of Kuril flyover project. What are the criteria you would set to perform the task? (10)
- (b) Define risk management. As a risk management manager what procedure you would take for risk management in a project? (2+10)
- (c) "Though often monitoring, reviewing and evaluating are used synonymously; but they are different". – do you agree? Justify your answer. (13)
7. You have been appointed as a project manager in a land readjustment project by RAJUK.
- (a) As project manager what are the basic and integrative project management function you have to perform? (16)
- (b) You have to write the concept note for the project. What should be included in this concept note? (10)
- (c) You need to provide a terms of reference to the contractor who would perform the land development work of the project. What you think it should contain? (9)
8. (a) Write short notes on (Any three) (3×5=15)
- (i) Goals and objectives,
  - (ii) Project life cycle,
  - (iii) Types of audit,
  - (iv) Process of open tendering,
  - (v) Log frame matrix.
- (b) Define project. Explain by example the differences between project and regular work. (2+8)
- (c) Explain with example the different non-numeric models of project selection. (10)
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