

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Urp. Examinations 2016-2017

Sub : **PLAN 161** (Surveying and Cartography)

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) Write down the definition of map projection and explain with diagrams the conical, cylindrical and planner projections. (20)
- (b) Give a short description on Universal Transverse Mercator (UTM) grid and coordinate system. (15)
2. (a) Define with diagrams the different types of scale. (15)
- (b) State with example the various types of maps. (20)
3. (a) Explain with diagrams how the qualitative and quantitative information is represented on a map. (10)
- (b) Discuss the methods of measuring area and shape of a polygon. (15)
- (c) Illustrate the differences between photographic and electronic scanning techniques used in photo mapping. (10)
4. Write short notes on the followings: (5×7=35)
 - (a) Photomaps
 - (b) GPS
 - (c) Ellipsoid and geoids
 - (d) Basic elements of map composition
 - (d) Slope and gradient

SECTION – B

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

Abbreviations and Terms have their usual meanings,

Assume any reasonable value for missing data. Formula sheet is attached.

5. (a) Describe the characteristics of Electronic Distance Meter (EDM). Describe the principle behind measuring distance by EDM. (2+2)
- (b) 'Benchmarks are reference for measuring elevation during survey of a site' – How many types of benchmarks are used by surveyors? Describe. (2+6)

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Contd ... Q. No. 5

(c) You are leading a team of surveyors who is conducting 'chain survey.

(i) What would be your instructions for the surveyors for selection of station and determination of survey line? (3+4)

(ii) On the survey line, there is a hillock which makes two stations invisible from one another. But there is no obstruction for chaining. Suggest the way for ranging. (6)

(iii) Survey team recorded the following Table-1 for a line AB which consist of three segments (AA1, A1B1 and B1B). The tape you used was standardized at 24°C and found to be 30 m. But your team found the length 30.02 m. The tape was held horizontally at constant tension of 10.5 kg. The tape has cross sectional area of 0.05 cm² and weight of 0.036 kg/m.

Table 1: Data Recorded in Chain Survey:

Section	Distance (in m)	Temperature (in °C)
AA1	27.5	18.0
A1B1	28.75	19.5
B1B	26.4	20.0

Consider Co-efficient of thermal expansion 0.0000115 m/°C.

Calculate the length of AB. (10)

6. (a) Describe the advantages of using Total Station over traditional survey equipments like theodolite, dumpy level in engineering survey. (5)

(b) You are conducting a plane table survey. During reconnaissance you found that some of the objects of interest are inaccessible. Describe the method (with appropriate diagram) you would use for quickly plotting the area by plain table. (10)

(c) The following bearings (Table-2) were observed in a closed traverse. Calculate the included angle. Apply necessary correction. (6)

Table-2: Forward and Backward Bearing of Traverse line

Line	Forward Bearing	Backward Bearing
AB	203°0'0"	23°0'0"
BC	137°0'0"	313°37'0"
CD	89°41'0"	289°4'0"
DE	24°25'0"	204°25'0"
EF	314°20'0"	134°20'0"
FA	256°56'0"	76°56'0"

(d) Describe the characteristics of contour line. Explain with appropriate diagram how you could draw contour line by grid method. (10+4)

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7. (a) Explain the method of closed traversing in the field using theodolite. What are the criteria you should follow before starting traverse survey? (5+6)
- (b) Describe the sources of error in plane table survey. (6)
- (c) Name three types of survey that could be conducted using GPS. (4)
- (d) You are collecting data for determining contour lines in an area using dumpy level? In your haste you forgot to take your level book. So, in the field you wrote the following in a note book (Table-3)

Table-3: Notes on Staff Readings:

Station	Object of Interest	Staff Reading (in ft)
Station-01	A	5.5
	B	7.2
	C	5.3
	D	5.6
	E	6.1
	F	6.9
Station-02	F	9.8
	G	9.8
	H	5.9
	I	6.2
	J	6.3
	K	6.9

- (i) Fill up your level book using the note. (6)
- (ii) If A is the benchmark with R.L value 0.0 ft (i.e. at sea level) then how many objects of interest are below sea level using height of instrument method? (8)
8. (a) There are several methods for plotting closed traverse using theodolite. Name them. Explain with appropriate diagram how to plot traverse using parallel meridians. (5+6)
- (b) From field survey following (Table-4) has been logged for a closed traverse. Determine the consecutive co-ordinates of the station using Bowditch rule. (10)

Table 4: Length and Bearing of Traverse line

Arm of Traverse	Arm length	WCB
AB	127.5	262°0'0"
BC	162.3	292°15'36"
CD	153.6	209°26'25"
DE	193.4	103°2'33"
EA	212.4	50°36'22"

*After angular correction

- (c) "There are two kinds of engineering survey – plane survey and geo-detic survey" – describe the differences between them. (6)

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Contd ... Q. No. 8

(d) What are the purposes of reconnaissance survey? (5)

(e) The following readings have been observed in a traverse survey. Determine the reduced bearing. (3)

Line	Forward Bearing
AB	203°10'
BC	133°37'
CD	85°16'

List of Formula needed to solve the problems

All the symbols of their usual meanings

Correction for Distance $L = \frac{L_e}{L_c} \times \text{measured incorrect length}$

Correction for Sag $L' = \frac{(Mg)^2 L^3}{24 T^2} \cos^2 \beta$

Correction for Temperature $C_T = a(t_f - t_s) \times L$

Latitude = Length of the side \times cosine of the bearing

Departure = Length of the side \times sine of the bearing

First rule of correction for plotting

Correction for Latitude = $\frac{1}{2} \times \text{Total error in latitudes} \times \frac{\text{Latitude of the side}}{\text{Sum of Latitudes}}$

Correction for Departure = $\frac{1}{2} \times \text{Total error in departures} \times \frac{\text{Departure of that side}}{\text{Sum of Departures}}$

Second rule of correction for plotting

Correction for Latitude = $\text{Total error in latitudes} \times \frac{\text{Length of the side}}{\text{Perimeter of the traverse}}$

Correction for Departure = $\text{Total error in departures} \times \frac{\text{Length of the side}}{\text{Perimeter of the traverse}}$

Third rule of correction for plotting

Correction for Latitude = $\text{Total error in latitudes} \times \frac{\text{Latitude of the side}}{\text{Arithmetic sum of all latitudes}}$

Correction for Departure = $\text{Total error in departures} \times \frac{\text{Departure of the side}}{\text{Arithmetic sum of all departures}}$

Correction for Earth Curvature $h_c = \frac{2}{3} l^2$

Correction for Refraction $h_r = \frac{2}{21} l^2$

L-1/T-2 B. Sc. Engineering Examinations 2016-2017

Sub : **MATH 103** (Mathematics II)

Full Marks : 140

Time : 3 Hours

The figures in the margin indicate full marks.

Symbols have their usual meaning.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION - AThere are **FOUR** questions in this Section. Answer any **THREE**.

1. (a) A function
- $f(x)$
- defined as follows:

(11 $\frac{1}{3}$)

$$f(x) = \begin{cases} 2x-1; & 0 < x \leq 1 \\ x^2 - x + 1; & x > 1 \end{cases}$$

Discuss the continuity and differentiability of $f(x)$ at $x = 1$.

- (b) Evaluate the following:

(6+6)

(i) $\lim_{x \rightarrow 0} (\cos x)^{1/x^2}$

(ii) $\lim_{x \rightarrow 0} \frac{\tan^{-1} x}{x}$

2. (a) If
- $y = e^{a \sin^{-1} x}$
- then show that
- $(1 - x^2)y_{n+2} - (2n+1)xy_{n+1} - (n^2 + a^2)y_n = 0$
- . Also find
- $(y_n)_0$
- .

(11)

- (b) Show that of all rectangles of given area, the square has the smallest perimeter.

(12 $\frac{1}{3}$)

3. Carryout the following:

(a) $\int (2x+1)\sqrt{x^2 - x + 1} dx$ (8)

(b) $\int \frac{x+3}{\sqrt{4x^2 - 4x + 3}} dx$ (8)

(c) $\int \frac{4x-3}{9x^2 + 4} dx$ (7 $\frac{1}{3}$)

$$= 2 =$$

MATH 103/BURP

4. (a) Evaluate the following:

$$(i) \lim_{n \rightarrow \infty} \left[\frac{n^2}{(n^2 + 1^2)^{3/2}} + \frac{n^2}{(n^2 + 2^2)^{3/2}} + \dots + \frac{n^2}{\{n^2 + (n+1)^2\}^{3/2}} \right] \quad (7)$$

$$(ii) \int_3^5 \frac{dx}{x^2 \sqrt{x^2 - 9}} \quad (8)$$

(b) Find the total area enclosed by the curve $x^4 + y^4 = 2a^2xy$. (8 1/3)

SECTION - B

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

5. (a) Find the differential equation of all straight lines passing through the origin. (7)

(b) Solve the differential equation $(y^2 + xy^3)dx + (5y^2 - xy + y^2 \sin x)dy = 0$. (8 1/3)

(c) Solve the differential equation $(1+x)y' + y = \ln x$ subject to the initial condition $y(1) = 10$. (8)

6. (a) Solve: $\frac{dy}{dx} = \tan^2(x+y)$. (7)

(b) Solve: $t^2 \frac{dy}{dt} + y^2 = ty$. (8 1/3)

(c) The population of a town grows at a rate proportional to the population present at time t . If the initial population of 500 increases by 15% in 10 years, what will be the population in 30 years? How fast is the population growing at $t = 30$ years? (8)

7. Solve the following differential equations:

$$(a) \frac{d^4 y}{dx^4} + \frac{d^3 y}{dx^3} + \frac{d^2 y}{dx^2} = 0. \quad (7)$$

$$(b) y'' + 3y = 48x^2 e^{2x} \quad (8)$$

$$(c) \frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + 5y = e^x \cos 2x. \quad (8 1/3)$$

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8. (a) Solve: $x^4 \frac{d^4 y}{dx^4} + 6x^3 \frac{d^3 y}{dx^3} + 9x^2 \frac{d^2 y}{dx^2} + 3x \frac{dy}{dx} + y = 0.$ (11)

(b) Solve the differential equation $x^2 \frac{d^2 y}{dx^2} - 2x \frac{dy}{dx} + 2y = x^4 e^x$ by variation of parameters. (12 1/3)

L-1/T-2/BURP

Date : 28/02/2018

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. URP. Examinations 2016-2017

Sub : ARCH 145 (Elements of Architecture)

Full Marks : 140

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) "Architecture is generally conceived, realized and built in response to an existing set of conditions" – explain the architectural system or process according to D. K. Ching. **(13 $\frac{1}{3}$)**
(b) Briefly explain the characteristics of primary elements of architecture. **(10)**

2. (a) Space is an inherently formless vapor. As space begins to be captured, enclosed, molded and organized by the elements of mass, architecture comes into being. Explain how the horizontal elements can generate and define a volume of space with appropriate example. **(15 $\frac{1}{3}$)**
(b) How the degree of spatial and visual continuity can be controlled between an elevated space and its surroundings – explain with sketches. **(8)**

3. What are the key factors of selecting any spatial organization? Elaborate with sketches of different spatial organizations. **(7+16 $\frac{1}{3}$ = 23 $\frac{1}{3}$)**

4. Briefly discuss the followings (use sketches). **(23 $\frac{1}{3}$)**
(a) Unity in variety, (b) Path-Space Relationship, (c) Transformation.

SECTION – B

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

5. Write short notes (use sketches if necessary) on following: **(23 $\frac{1}{3}$)**
(a) Evolution of dwellings in prehistoric period.
(b) Evolution of Egyptian Tomb Architecture.

6. What are the major influencing factors that help to shape up architecture in a context? Briefly discuss the influencing factors of Greek architecture. **(7+16 $\frac{1}{3}$ = 23 $\frac{1}{3}$)**

ARCH 145

7. (a) How do you define the “Question of Taste” in art? – Briefly explain. (8)
- (b) Elaborately discuss “Post-Impressionism” with appropriate example. (15 ⅓)
8. (a) Illustrate the thermal balance process of human body. (6)
- (b) Briefly explain the basic consideration that influence the comfort of outdoor spaces in war-humid climate. (13 ⅓)
- (c) State the key components of building design guidelines in general for any climate context. (4)
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L-1/T-2 B. Urp. Examinations 2016-2017

Sub : **PLAN 113** (Fundamentals of Planning)

Full Marks : 140

Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – AThere are **FOUR** questions in this section. Answer any **THREE**.

1. Assume that the following goal has been set for a transportation planning study in Dhaka Regional Development Plan (RDP) area: The transport system should provide inclusive mobility of the population of Dhaka city. Define one objective to achieve the stated goal. For achieving the objective, briefly discuss the basic stages of planning involved, potential strategies as the outcome of the decision making process and likely constraints against the implantation of the strategies. (5+8+5+5 1/3 =23 1/3)

2. (a) "Failing to plan is planning to fail." Explain with special reference to the significance of planning in the context of rapid urban growth of Dhaka city. (15 1/3)

(b) Briefly discuss the stakes of sustainability involved in marked led planning efforts considering the sustainable development of Dhaka city. (8 1/3)

3. (a) Discuss the efficacy of Draft Dhaka Structure Plan (2016-2035) in terms of its purpose being reflected through various sectoral strategies outlined in the plan. (13 1/3)

(b) Write short notes on 'National Economic Council (NEC)' and 'Executive Committee of National Economic Council (ECNEC)'. (5+5=10)

4. (a) Briefly explain the limitations involved in using indications to define the concept of 'Development'. How did the concept of 'Development' change over the time? (10)

(b) A serious livability concern for the people living in the Dhaka South and North City Corporation is unavailability of potable water. The Ward Councilors, at one of the recent meetings, reportedly out cried about the grave situation for which studies suggest that ground water table depletion is responsible to have a situation like this. If you are given the opportunity to work on this issue, which planning concept you think is best suited to tackle the issue? Briefly explain why you would prefer this concept over the other ones. (3 1/3 +10=13 1/3)

PLAN 113

SECTION – B

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

5. (a) A rational program needs to be developed to conduct a planning job- briefly discuss the contents of the program. **(18)**
- (b) What is the importance of monitoring and evaluation in planning process? **(5 1/3)**
6. (a) As a planner, you want to convince your higher officials to include community participation in planning process. In case of a “slum improvement project” explain the role of stakeholders and benefit of community participation to those officials. **(17 1/3)**
- (b) Briefly discuss three fundamental ethical approaches in planning. **(6)**
7. (a) You are approved as a planner and team leader to plan and design Rohingya refugee Camps. Which planning approach would you adopt? Explain with arguments. **(17)**
- (b) Briefly discuss the barriers to a good plan. **(6 1/3)**
8. (a) Write short notes on the following: **(6×2=12)**
- (i) Stakeholders in planning process.
- (ii) Advocacy planning
- (b) Distinguish the characteristics of “Functional Planning” and “Normative Planning”. **(11 1/3)**
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