L-1/T-2/BURP **Date : 16/01/2017**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Sc. Engineering Examinations 2015-2016

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

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) In case of hilly regions, what type of levelling procedure will you adopt? Describe the method with necessary illustration. **(4+6=10)**

   (b) What is contour? How can you plot contour lines using Kennedy's method? **(3+7=10)**

   (c) What are cumulative error and compensating error? The distance between two substations was found to be 5305 ft when measured by an Engineer's chain and 7946 links by Gunter's chain. Both the chains were incorrect. What correction is needed in the Engineer's chain if the Gunter's chain is 0.4 link long? **(5+10=10)**

2. (a) Describe with illustrations Lehmann's rules for overcoming the three-point problem. **(10)**

   (b) The following table gives the lengths and bearings of the lines of a traverse ABCDE. Calculate the length and bearing of EA. **(15)**

Line	Length (m)	Bearing
AB	204	87°30′
BC	226	20°20′
CD	187	280°0′
DE	192	210°3′
EA	?	?

   (c) Define the following: **(5×2=10)**

   (i) Datum (ii) Mean Sea level (ii) Station point (iv) Height of instrument (v) Permanent benchmark.

3. (a) The following staff readings were observed successively with a level, the instrument having been moved after third, sixth and eighth readings: 2.228, 1.606, 0.988, 2.090, 2.864, 1.262, 0.602, 1.982, 1.044, 2.684 meters. Enter the above readings in a page of a level book and calculate the Reduced Level (R.L) of points if the first reading was taken with a staff held on a bench mark of 432.384 m. Give necessary checks. **(20)**

   (b) How can you chain along sloping ground? **(15)**

4. (a) Discuss about the general stages of surveying. **(15)**

   (b) What are the general considerations for selecting stations during chain survey? **(10)**

   (c) The bearing (fore bearing) for line AB, BC, CD, DE, EA are 60°30′ 122°0′, 46°0′, 205°30′ and 300°0′. Calculate the interior angles. **(10)**

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PLAN 161

SECTION – B

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

All abbreviations and terms have their usual meaning.

5. (a) Define map. Why as an Urban and Regional Planner you need to learn about map? **(4+6=10)**

(b) You are working in a project to update the maps for Dhaka City Corporation (North). You are preparing a map showing elevation of the wetland.

(i) Name the type of the map. **(2)**

(ii) What objectives would you consider from mapping and design perspective in preparing layout of the map? **(8)**

(iii) You have found that a scale of 1 cm = 20 km would best fit the layout of the map (mentioned in 5b) in A4 (8.27″ × 11.69″) paper. What type of scale is this from presentation perspective? What are the other kinds of scale? **(4+4=8)**

(c) What are the uses of 'general purpose map'? Name the different kinds of cadastral map that are in use in Bangladesh. **(2+5=7)**

6. (a) "Defining co-ordinates for earth surface is complicated by three factors" – do you agree? Justify your answer. **(10)**

(b) Explain with necessary figures why a GPS receiver needs at least four satellites to lock for determining its position. **(8)**

(c) What is aerial photograph? Describe the typology of aerial photograph. **(2+6)**

(d) Bangladesh Transverse Mercator (BTM) is a cylindrical projection system. What are the characteristics you would expect from it? Name the ellipsoid used in BTM. If its semi minor axis is 6,337,267 m and semi major axis is 6,356,098 m, what would be its co-efficient of flattening? **(5+2+2=9)**

7. You are working in a firm which produce map using GPS and aerial photograph.

(a) You are assigned to conduct an RTK survey.

(i) What are the equipments you need to conduct the survey? **(4)**

(ii) How could you conduct the survey? **(8)**

(iii) You have found that one of the roaming receivers has following values – HDOP 5, VDOP 5 TDOP 4. Would you accept the data for positional accuracy as well as geographic accuracy? Or order new survey? Justify your answer. **(2+3=5)**

(b) Your firm won a contract for preparing map for Dinajpur. The map would be used for preparing detailed area plan for Dinajpur. Your client expect you to use conduct aerial survey and use the aerial photograph for preparing the map. Client set the following conditions- **(18)**

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PLAN 161

Contd ... Q. No. 7(b)

(i) Contact print size would be 23 cm by 23 cm.

(ii) Scale of the print is 1 : 20,000.

(iii) Minimum forward lap 60%.

(iv) Minimum side lap 30%.

The layout length of the study area in north-south is 20 km and east-west is 24 km and average elevation is 37 m. You have a map of the area in 1 : 100,000 and focal length of the camera mounted in the plane is 175 mm. Prepare a flight plan for the crews of the plane.

8. (a) Write short notes on (Any five) – **(5×5=25)**

(i) T-O map.

(ii) Pseudo Area Cartogram.

(iii) Shape compactness index

(iv) Choropleth map.

(v) Map orientation.

(vi) Control and Space segment of GLONASS.

(vii) Centers of aerial photograph.

(b) Describe the spatial properties of projection system. **(10)**

L-1/T-2/URP **Date : 22/01/2017**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Urp Examinations 2015-2016

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 – A

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

1. (a) Find the limits of $\lim_{x\to 0} \frac{1+2^{1/x}}{3+2^{1/x}}$. **(7)**

   (b) A function f(x) is defined as follows:

$$f(x) = x\sin\left(\frac{1}{x}\right), \quad x \neq 0$$
$$= 0, \quad x = 0$$

   Examine the continuity and differentiability of $f(x)$ at $x = 0$. **(9)**

   (c) A function $f(x)$ is defined as

$$f(x) = 0, \quad 0 \le x < \frac{1}{2}$$
$$= 1, \quad x = \frac{1}{2}$$
$$= 2, \quad \frac{1}{2} < x \le 1$$

   Show that $f(x)$ is discontinuous at $x = \frac{1}{2}$. **(7 ⅓)**

2. (a) If $y^{1/m} + y^{-1/m} = 2x$, prove that $(x^2-1)y_{n+2} + (2n+1)xy_{n+1} + (n^2-m^2)y_n = 0$ **(12)**

   (b) Find the maximum or the minimum values of y when $y^7 = (x-3)^4$. **(11 ⅓)**

3. Carryout the following:

   (a) $\int \frac{\cos x + 4\sin x}{3\cos x + 2\sin x}dx,$ **(8)**

   (b) $\int \frac{dx}{(1+x^2)\sqrt{(\tan^{-1}x)^2 + \tan^{-1}x - 2}}$ **(8)**

   (c) $\int e^x \frac{1+\sin x}{1+\cos x}dx$ **(7 ⅓)**

4. (a) Evaluate the following:

   (i) $\lim_{n\to\infty}\left[\frac{1^2}{n^3+1^3} + \frac{2^2}{n^3+2^3} + \frac{3^2}{n^3+3^3} + \cdots + \frac{n^2}{n^3+n^3}\right]$ **(7)**

   (ii) $\int_0^{\pi/2} \frac{dx}{5+3\cos x}$ **(8)**

   (b) Find the area enclosed by the curve $x^{2/3} + y^{2/3} = a^{2/3}$. **(8 ⅓)**

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MATH 103(URP)

SECTION – B

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

5. (a) Find the differential equation of the family of curves, $y = e^x(A\cos x + B\sin x)$, where A and B are arbitrary constants. **(7)**

   (b) Solve the differential equation $2x^2\frac{dy}{dx} = 3xy + y^2$ subject to the initial condition $y(1) = -2$. **(8⅓)**

   (c) Solve: $x^2y' + x(x+2)y = e^x$ **(8)**

6. (a) Solve: $(y^3 - y^2\sin x - x)dx + (3xy^2 + 2y\cos x)dy = 0$ **(7)**

   (b) Solve: $\frac{dy}{dx} + \frac{1}{x}\sin 2y = x^3\cos^2 y$. **(8⅓)**

   (c) The population of a certain country is known to increase at a rate proportional to the number of people presently living in the country. If after three years the population has doubled, and after four years, the population is 10,000. Estimate the number of people initially living in the country and the population after ten years. **(8)**

7. Solve the following differential equations:

   (a) $\frac{d^5y}{dx^5} - \frac{dy}{dx} = 0$. **(7)**

   (b) $y'' - 4y' = e^{2x}$, $y(0) = 1, y'(0) = -4$. **(8⅓)**

   (c) $\frac{d^2y}{dx^2} - 4\frac{dy}{dx} + 3y = x^5 + x^2$. **(8)**

8. Solve the following:

   (a) $x^4\frac{d^3y}{dx^3} + 2x^3\frac{d^2y}{dx^2} - x^2\frac{dy}{dx} + xy = 0$. **(11)**

   (b) $x^3\frac{d^3y}{dx^3} + x\frac{dy}{dx} - y = x\ln x$. **(12⅓)**

L-1/T-2/ARCH **Date : 22/01/2017**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Arch. Examinations 2015-2016

Sub : **ARCH 165** (Building and Finish Material)

Full Marks : 140 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 Q. No. 1 and any **TWO** from the rest.

1. (a) What are the desirable conditions for Brick Clay? **(5)**

   (b) Explain how the harmful constitutions affect Brick Clay. **(10)**

   (c) How Plasticity and Binding quality is imparted in quality Brick Clay? **(5)**

2. Elaborate the Properties of building Stone for structural works. **(25)**

3. (a) Define Portland Cement and its constituent parts. **(10)**

   (b) Explain the functions of Cement ingredients. **(15)**

4. Write 'Notes' on the following (Any Two). **(25)**

   (a) Constituents of Brick Clay (b) Granite (c) Properties of Concrete.

SECTION – B

There are **FOUR** questions in this Section. Answer Q. No. 5 and any **TWO** from the rest.

5. Explain with sketches Five different types of clay floor and wall tiles commonly used in building finish work in Bangladesh. **(20)**

6. (a) Define Vehicle and Pigment of paint. **(5)**

   (b) Name different types of paint according to their use and characteristics. **(5)**

   (c) Explain how Hiding power and particles shape in pigment affect the characteristics of paint? **(15)**

7. Explain with sketches the Fourcault and Float process of glass manufacturing. **(10+15)**

8. Write short notes on the following (Any Five) **(5×5=25)**

   (a) Heat absorbing and glare reducing glass. (b) Glass fibre. (c) Degree of vitrification.

   (d) Glass Block. (e) Artificial patent stone (f) Rust preventive paint

   (g) Terrazzo floor finish.

L-1/T-2/BURP **Date : 26/01/2017**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Urp. Examinations 2015-2016

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 – A

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

1. (a) "Planning is a process of balancing conflicting claims and scare resources, of deciding who is to benefit and who is to bear the cost of planning decisions and of achieving compromises between conflicting interests." Explain with examples. **(15)**

   (b) Projection of future situation is an important stage of planning process. Why? **(8⅓)**

2. (a) Both 'spatial' and 'aspatial' planning interact with each other in the development planning process. Discuss the statement with relevant examples. **(13⅓)**

   (b) Write short notes on the following – **(5×2=10)**

   (i) Sustainable Development Goals (SDGs).

   (ii) Planning Commission.

3. (a) Briefly explain the five criticisms of the planning approach, based on which the Dacca Master Plan, 1959 was prepared. **(15⅓)**

   (b) One of the main objectives of spatial planning is to ensure resource conservation. Explain with examples. **(8)**

4. (a) Briefly discuss the salient features of the 'Strategic Planning Approach.' **(15⅓)**

   (b) "Every system is a sub- or super-system of another system". Explain the statement from a planning perspective. **(8)**

SECTION – B

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

5. (a) How would you define planning? **(5)**

   (b) "Planning is a primary management function" – explain this statement with the help of a diagram. **(8.33)**

   (c) What do you mean by efficiency and flexibility of plans? **(10)**

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PLAN 113

6. (a) Discuss the major characteristics of planning objectives. **(12.33)**

   (b) "The importance and usefulness of planning can be understood with reference to a number of benefits." What are these benefits? Discuss. **(11)**

7. (a) What do you mean by public participation in the planning process? What are the techniques of public participation in planning? **(12.33)**

   (b) What do you mean by advocacy planning? Do you think that advocacy planning can stimulate city planning? If so, how? **(11)**

8. Write short notes on any three of the following:

   (a) Blue print planning, **(7.78)**

   (b) Process planning, **(7.78)**

   (c) Participatory planning, **(7.78)**

   (d) Strategic and tactical planning. **(7.78)**

L-1/T-2/URP **Date : 31/01/2017**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2 B. Arch. Examinations 2015-2016

Sub : **ARCH 145** (Elements of Architecture)

Full Marks : 140 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 Q. No. 1 and any **TWO** from the rest.

1. Write short notes on any "three" of the following (Use sketches): **(3×10=30)**

   (a) Primary Elements of Architecture

   (b) Characteristics of Primary Shapes

   (c) Differentiate between shape and form

   (d) Transformation of form

2. (a) Define "Unity of Opposites". **(4)**

   (b) What are the strategies of relating the built form to the adjacent space around it? **(6)**

   (c) "Vertical form have greater presence in our visual field than horizontal planes and therefore more instrumental in defining a discrete volume of space" – explain with appropriate illustration. **(10)**

3. (a) Define "Path-Space Relationship". **(4)**

   (b) Elaborate with sketches the spatial organization, spatial relationship and ordering principles of National Assembly Building Complex, Dhaka. **(16)**

4. Briefly discuss the followings (Use sketches) **(4×5=20)**

   (a) Unity in varity

   (b) Hierarchy

   (c) Transformation

   (d) Axis

SECTION – B

There are **FOUR** questions in this Section. Answer Q. No. 8 and any **TWO** from the rest.

5. Write short notes on any two of the following (Use sketches): **(2×10=20)**

   (a) Cultural evolution in Stone age.

   (b) Conceptual background of Buddhist Architecture.

   (c) Salient feature of Egyptian Architecture

Contd P/2

ARCH 145

6. Give a comparative analysis between Greek and Roman period in terms of history, culture and settlement planning. **(20)**

7. (a) What we look for in art – briefly explain. **(8)**

   (b) Differentiate between "Realism' and 'Romanticism" with appropriate example. **(12)**

8. (a) Briefly explain Climate Responsive Design and its methodology. **(8)**

   (b) What are the key building design criteria for any climatic content? Briefly explain with sketches the main feature of settlement planning and building design criteria for Hot Humid climate. **(4+18=22)**
