BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2   BURP Examinations 2021-2022

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) Suppose you are involved in a planning project to ensure "Affordable Housing for All" in your community. Write the sequential stages of planning you will follow in this case.   **(16)**

(b) "The activities of the Bangladesh Planning Commission include the elements of development planning." — explain this statement.   **(7⅓)**

2. (a) Discuss the three fundamental ethical approaches in planning with relevant examples.   **(9)**

(b) Summarize the functions of relevant institutions in the planning process of Bangladesh with a neat diagram.   **(14⅓)**

3. (a) Briefly describe the general principles and responsibilities of a planner according to the code of ethics and professional conduct by Bangladesh Institute of Planners (BIP).   **(15)**

(b) As a planner, you are working to improve water supply conditions in rural areas of Bangladesh. Discuss the functional approach of community participation in the context of this project.   **(8⅓)**

4. (a) Write the differences between allocative and innovative planning approaches.   **(7⅓)**

(b) Briefly discuss the levels of citizen participation according to Arustein.   **(16)**

SECTION – B

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

5. (a) "Planning is a logical decision making process, which tries to balance between demand and supply." In the light of the statement, list the issues, which you find important while defining the term 'planning'. Write a brief description of each of your identified issues.   **(13⅓)**

(b) Outline the contents of a Structure Plan.   **(10)**

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6.   (a) During 1950s, the 'theory of physical determinism' was followed to improve the physical environment and accessibility. Discuss the principles that were adopted under the theory.   **(17)**

(b) Outline the differences between backward and forward linkages among the economic sectors.   **(6⅓)**

7.   (a) "The implicit assumption for national level planning is— the whole country is a single point in space." Explain the statement with relevant examples.   **(13⅓)**

(b) "Every system is a sub- or super- system of another system." Discuss the statement in light of the Systems Approach of planning.   **(10)**

8.   (a) Draw a neat sketch to show the differences between 'equity' and 'justice'.   **(7⅓)**

(b) Discuss the following two criticism of traditional planning approach with examples-   **(16)**

   (i)   Entirely physical in scope,

   (ii)   Detached from decision making process.

L-1/T-2/URP   **Date: 18/10/2023**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2   BURP Examinations 2021-2022

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**.

Assume any missing data as needed (bared on the question description)

1. (a) Define cadastral map. Write the significance of cadastral maps for an urban
    planner.   **(7)**

    (b) Describe the different types of thematic maps based on mapping techniques.   **(13)**

    (c) Explain the structure of NAVSTAR GPS.   **(15)**

2. (a) Define map scale. Name the different types of maps based on scale.   **(7)**

    (b) A photogrammetric drone captures an aerial photograph of a tall building situated
    at an average altitude of 700 ft above mean sea level with a relief displacement of 4.33
    mm. The top of the building is 31.85 mm apart from the center point of the aerial
    photograph. The drone produced an 8 by 8-inch image of an average photo scale of
    1:4000 with a lens of 15-inch focal length. Compute the height of the building from the
    ground and the mean sea level.   **(13)**

    (c) Discuss the basic steps of map composition with relevant examples and illustrations. **(15)**

3. (a) Explain the relationship between ellipsoid and datum with appropriate examples. **(7)**

    (b) Describe the major sources of error in GPS survey and explain the underlying
    principle of high-precision (2-10 cm) measurement.   **(13)**

    (c) Define projection. Classify different map projection types with appropriate
    illustrations.   **(15)**

4. (a) Describe the Universal Transverse Marcaton (UTM) with appropriate illustrations. **(10)**

    (b) Suppose a cricket stadium is proposed as part of the Purbachal New Town project.
    For development planning, a 3D model is to be created by surveying a circular area of
    1.5 mile radius with a photogrammetric drone of 13-inch focal length. The drone has a
    ground speed of about 60 mph. The photograph size is 8.5 by 8.5 inches with an
    average photo scale of 1:2000. The area's average elevation is 15 meters, and the
    survey will be conducted in cloud free day between May and June. Overlap should be
    at least 70% and side lap should be at least 30%. The two outer flight lines correspond
    to the boundary of the area. Flight lines should be placed on an existing map with a
    scale of 1:10000. Calculate the necessary data for flight planning.   **(25)**

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SECTION – B

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

5.   (a) You have been given a task to conduct engineering surveys to assist in planning a new 15-kilometer road link. Using sketches, discuss the steps you would take for your tasks.   **(25)**

(b) What are the differences between plane surveying and geodetic surveying?   **(10)**

6.   (a) The length and breadth of a plot of land were measured by an Engineer's chain that was found to be 100.25 ft long at the end of the survey. The area of the plot was 28.70 inch^2 in the drawing sheet. It was drawn to a scale 1 inch = 150 ft. Calculate the true area of the plot in acres.   **(20)**

(b) Explain how you will draw a perpendicular from a point on the chain line in the field when you do not have an optical square.   **(15)**

7.   (a) Using sketches, explain how you will use a field book.   **(25)**

(b) The whole circle bearings of four lines were found to be 35°, 174°, 186°, and 305°. Calculate the reduced bearings of these lines.   **(10)**

8.   (a) Explain how you would fix the closing error of a closed traverse using the graphical technique.   **(20)**

(b) Describe the traversing method of the plane table survey.   **(15)**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2   BURP Examinations 2021-2022

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. 4** and any **TWO** from the rest.

1. "Order without diversity can result in monotony or boredom; diversity without order can produce chaos"— Evaluate this statement with respect to different ordering principles.   **(20)**

2. How does articulation of "L-shaped configuration of planes" aid us with diversified sense of enclosure? Explain with necessary sketches.   **(20)**

3. Identify the type of approach and entrance to the Academic Building of Department of Architecture.   **(12+8=20)**
    Rationalize the path-space relationship of it's top floor plan with necessary sketches.

4. Answer any TWO of the followings: **(2×15=30)**
    (a) Process of form articulation
    (b) Form and space
    (c) Determinants of organization type
    Use sketches where necessary.

SECTION – B

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

5. Write short notes on any TWO of the followings: **(15×2=30)**
    (a) Roof design guidelines in warm humid climatic zone.
    (b) Roman Aqueduct
    (c) Stonehenge

6. "In each historical development in Architecture, there is one basic principle underlying its conception"— explain the statement with reference to relevant examples.   **(20)**

7. Briefly discuss the Greek city planning layout and the major influences behind it. Use sketches/diagrams where necessary.   **(20)**

8. "For an impressionist to paint from nature is not to paint the subject but to realize the sensation"— Paul Cezzane.   **(12+8=20)**
    Explain the statement with reference to the main features of impressionism and state how the perception has changed over the years.

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA
L-1/T-2 BURP Examinations 2021-2022

Sub: **MATH 103** (Calculus and Differential Equations)

Full Marks: 140   Time: 3 Hours

The figures in the margin indicate full marks

Symbols used have their usual meaning

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

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

1. (a) Discuss the continuity and differentiability of the function: **(8)**

$$f(x) = \begin{cases} 5x - 4, & 0 < x \le 1 \\ 4x^2 - 3, & 1 < x \le 2 \\ 3x + 4, & x > 2 \end{cases}$$ at the points $x = 2$. Also, sketch the graph of the function.

(b) Evaluate: $\underset{x \to 0}{Lim} \left(x \ln \sin x \right)$.   **(8⅓)**

(c) Find the n-th derivative of $y = \sin^5 x \cos^4 x$.   **(7)**

2. (a) State Leibnitz's theorem. If $y = x \cos(\ln x)$, then find the expression of y_{n+2}.   **(7)**

(b) Identify stationary points, critical points, relative extrema, and inflection points of

the function $f(x) = 3x^5 - 5x^3$.   **(8⅓)**

(c) Find the radius and height of the right circular cylinder of largest volume that can

be inscribed in a right circular cone with radius 6 inches and height 10 inches.   **(8)**

3. (a) Evaluate the integral: **(8)**

$$\int \frac{\sin 2x}{\left(a^2 \sin^2 x + b^2 \cos^2 x \right)^3} \, dx \, .$$

(b) Evaluate the integral by making substitution that converts the integrand to a

rational function: **(8⅓)**

$$\int \frac{5 + \ln x^2}{x (1 + \ln x)^2} \, dx \, .$$

(c) Evaluate the integral: **(7)**

$$\int \frac{x^2}{\sqrt{x^2 - 2x + 2}} \, dx \, .$$

4. (a) Evaluate: **(8)**

$$\underset{n \to \infty}{Lim} \left[\left(\frac{1}{na} \right) + \left(\frac{1}{na+1} \right) + \left(\frac{1}{na+2} \right) + \cdots\cdots + \left(\frac{1}{nb} \right) \right].$$

(b) Show that: **(8⅓)**

$$\int_{0}^{\frac{\pi}{4}} \ln(1 + \tan x) \, dx = \frac{\pi}{8} \ln 2 \, .$$

(c) Sketch the graph and find the area of the region bounded the curve   **(7)**

$$\left(\frac{x}{4} \right)^{\frac{2}{3}} + \left(\frac{y}{3} \right)^{\frac{2}{3}} = 1 \, .$$

MATH 103/URP

SECTION – B

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

5. (a) Form the differential equation corresponding to the family of curves $y = c(x-c)^2$, where c is an arbitrary constant. $(10\frac{1}{3})$

(b) Find a curve passing through the point (0, 3) and the orthogonal trajectories is $y = ce^{-2x} + 3x$. (7)

(c) Solve $(x^2 + 2xy - y^2)dx + (y^2 + 2xy - x^2)dy = 0$. (6)

6. (a) Solve $x^2 \frac{dy}{dx} - 2xy = 3y^4$, subject to the initial condition $y(1) = \frac{1}{2}$. (7)

(b) According to Newton's law of cooling, the rate at which a substance cools in moving air are proportional to the difference between the temperature of the substance and that of the air. If the temperature of the air is 300 K and the substance cools from 370 K to 340 K in 15 minutes, find when the temperature will be 310 K. $(10\frac{1}{3})$

(c) Solve the initial value problem $(D^2 - 6D + 25)y = 0$ subject to $y(0) = -3$, $y'(0) = -1$. (6)

7. Carryout the followings:
(a) Solve $(D^4 - 1)y = x^2 e^x$. (12)

(b) Solve $(D^4 + 2D^2 + 1)y = x^2 \cos^2 x$. $(11\frac{1}{3})$

8. (a) Solve $(x^2 D^2 + xD + 1)y = \sin(\ln x^2)$. (11)

(b) Solve the following differential equation $(D^2 - 1)y = e^x$ by the method of variation of parameter. $(12\frac{1}{3})$

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-1/T-2   BURP Examinations 2021-2022

Sub: **HUM 177** (Macroeconomics)

Full Marks: 140   Time: 3 Hours

The figures in the margin indicate full marks

Symbols indicate their usual meaning.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

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

1. (a) According to Friedman's permanent-income hypothesis (PIH), if the marginal Propensity to consume (MPC) out of permanent income equals 0.8 and current income equals \$550000 (of which \$50000 is transitory income), then what should be the amount of consumption?   **(20)**

   (b) Demographers predict that the fraction of the population that is elderly will increase over the next twenty years. What does the life-cycle model predict for the influence of this demographic change on the national saving rate?   **(15)**

2. Mumta Hena consumes only apples. In year 1, red apples cost Tk. 10 each, green apples cost Tk. 20 each, and Mumta Hena buys 100 red apples. In year 2, red apples cost Tk. 20, green apples cost Tk. 10, and Abby buys 100 green apples.

   (a) Compute a consumer price index for apples for each year. Assume that year 1 is the base year in which the consumer basket is fixed. How does your index change from year 1 to year 2?   **(20)**

   (b) Compute Mumta Hena's nominal spending on apples in each year. How does it change from year 1 to year 2? Using year 1 as the base year, compute Mumta Hena's real spending on apples in each year. How does it change from year 1 to year 2?   **(15)**

3. The economy of Bangladesh can be characterized by the following set of equations:

   $Y_{full} = 2400$ (full employment output)

   $(M^d/P) = 1470 + 0.4Y - 10000 (r + \pi)$ $(\pi = 0.03)$ (Real money demand)

   $(M_s/P) = 2000$ (Real money supply)

   $C = 388 + 0.6 (1 - t) Y - 50000r$ $t = 0.4$ (Consumption)

   $I = 600 - 12000r$ (Investment)

   $NX = 300 - 0.2Y + 0.1Y^* + 10000(r - r^*)$ (Net exports)

   $Y^* = 12000$ (Foreign real output)

   $G = 900$ (Government spending)

   $R^* = 0.02$ (Foreign real interest rate)

= 2 =

HUM 177/URP
Contd.... for Q. No. 3

Using the above information answer the following questions graphically and mathematically:

(a) Find the IS equation, the LM equation, the short-run equilibrium values of interest rate and output. **(20)**

(b) Is the economy above or below its full employment output? **(15)**

4.   Given, the aggregate demand function of Bangladesh economy is

        Y = 500,000 – 2P; and the long run aggregate supply curve is Y = 200,000

        where, Y = output or real Gross Domestic Product (GDP)

(a) Find the long run equilibrium output and the price level of Bangladesh economy show graphically. **(20)**

(b) Draw the short run aggregate supply curve considering the short run and long run equilibrium price is the same. **(15)**

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

5.   (a) Briefly explain the difference between nominal and real Gross Domestic Product (GDP). Is nominal GDP always higher than real GDP? **(20)**

(b) Explain any one of the methods (Expenditure method, Income method and Value addition method) of measuring GDP. **(15)**

6.   (a) Derive the following expression for the overall price level using the sticky price model. **(20)**

$$P = EP + \frac{(1-s)a}{s}(Y - \bar{Y})$$

where, a > 0

    s = fraction of firms with sticky prices

    P = actual price level

    EP = Expected price level

    Y = Aggregate output; $\bar{Y}$ = natural rate of output

(b) Derive the aggregate supply (AS) equation by solving for Y using the equation in 6(a). **(15)**

$$Y = \bar{Y} + a(P - EP) \quad \text{where } a = \frac{s}{(1-s)a} > 0$$

7. (a) Given the equation of the quantity theory of money in Bangladesh economy,   **(20)**

    $M \times V = P \times Y$

    Where, M = the money supply

    V = the velocity of money

    P = the price level

    Y = real output, or Gross Domestic Production (GDP)

    Using the above equation answer the following questions:

    Derive the aggregate demand equation for Bangladesh economy.

    (b) How is the money market equilibrium determined (both mathematically and graphically)?   **(15)**

8. Consider the economy of Bangladesh.

    The consumption function is given by

    $C = 6000 + 0.6 (Y - T)$.

    The investment function is

    $I = 14000 - 80r$.

    Government purchases and taxes are both 2000.

    The money demand function is

    $(M/P)^d = Y - 4000r$.

    The money supply M is 60,000 and the price level P is 6.

    [Hint: For this economy, first determine the equilibrium interest rate (r) and level of income (Y) using the knowledge of goods market equilibrium and money market equilibrium equations.)

    (a) Suppose government decides increases the government purchases (expansionary fiscal policy) from 2000 to 2800. What are the new equilibrium interest rate and level of income?   **(20)**

    (b) Suppose Bangladesh Bank increases the money supply from 60,000 to 90,000 to execute an expansionary monetary policy. What are the new equilibrium interest rate and level of income?   **(15)**