SECTION – A

There are FIVE questions in this Section. Answer Q. No. 1 and any TWO from the rest.

1. Write short notes on any three of the followings: (10×3=30)
   (a) Architectural Planes and Volumes
   (b) Regular and Irregular Forms
   (c) Primary Shapes
   (d) Entrance and Stairways

2. What is the relation between form and space? How different types of elements can define space? Explain with sketches. (5+15=20)

3. How spaces are related with each other? Elaborate with sketches different types of "Spatial Organizations". (5+15=20)

4. Briefly analyze and explain the form of one of your known Buildings, focusing "Transformation of Form" of that built volume and "Organization" of its elements. Explain with sketches. (20)

SECTION – B

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

5. Write short notes on any "three" of the following (Use sketches): (10×3=30)
   (a) Dolmens & Stonehenge
   (b) Doric & Ionic Column
   (c) The Parthenon
   (d) The Colosseum

6. Describe with sketches different architectural features of the Great Pyramid of Cheops (Khufu), Giza. (20)

7. Critically discuss "Realism in reference to the paintings of Francois Millet and Gustave Courbet. (20)
8. Briefly explain with sketches, as necessary the main features of building design criteria for "Warm-Humid" climate in terms of:

(a) Settlement Planning
(b) Orientation of Building
(c) Type and Form of Buildings.

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SECTION – A

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

1. (a) What is money? What are the characteristics of a good quality money?
   (b) Explain the four functions of money.
   (c) Explain Keynes’ demand for money.

2. (a) Derive the LM curve from money market equilibrium.
   (b) What is monetary policy? Discuss the impact of expansionary and contractionary
       monetary policy on income and interest rate.

3. (a) What is budget surplus? Explain.
   (b) Give that
       \[ C = 100 + 0.75 \text{YD} \]
       \[ I = 100 \]
       \[ G = 100 \]
       \[ X = 150 \]
       \[ M = 70 \]
       \[ TR = 250 \]
       \[ T = 150 + 0.20 \text{Y} \]
       (i) Calculate equilibrium income and multiplier in this model.
       (ii) If government expenditure increases to 200, what will be the new equilibrium
            income?
       (iii) Calculate budget surplus and change in budget surplus.
       (iv) If government reduces the tax rate to 10% then what will be the new equilibrium
            income and multiplier.

4. (a) How would you derive the IS curve from the aggregate demand curve?
   (b) What determines the slope of the IS curve?
   (c) Explain the effects of the multiplier on the steepness of the IS curve.
HUM 177(URP)

SECTION-B

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

5. (a) What do you mean by inflation? Explain the causes of demand pull and cost push inflation. Show the effects of demand pull and cost push inflation on an economy? (5+15+5=25)
   (b) Describe the factors of investment demand. (10)

6. (a) Derive the aggregate supply curve when the workers have perfect foresight about future price movements. (20)
   (b) "The flatter the LM curve, the steeper the aggregate demand curve" - justify the statement. (15)

7. (a) Describe the determinants of export, import, net export and consumption expenditure. Determine the curves of export, import and net export. (25)
   (b) What is business cycle? Explain different phases of a business cycle. (10)

8. (a) What does aggregate demand curve look like? Explain the shape of long run aggregate supply curve. What are the factors that affect the changes in aggregate demand, short run aggregate supply and long run aggregate supply? (5+5+10=20)
   (b) What is unemployment? Describe the implicit contract theory of unemployment. (15)
1. (a) "Planning should be conceived not as the identification of problems and their resolution, but as a process of balancing conflicting claims on scarce 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. (15)
(b) "Every system is a sub-or super-system of another system". Explain the statement in the light of your understanding about planning approaches. (8\textfrac{1}{3})

2. (a) Name the approaches based on which Chittagong Master Plan 1959 and Dhaka Metropolitan Development Plan (DMDP) (1995-2015) was prepared. (3\textfrac{1}{3})
(b) Distinguish between the two planning approaches (named as an answer of question 2. a) under the following heading:
   (i) Farm of plan (rigid and/or flexible)
   (ii) Content /scope of plan
   (iii) Decision making process
   (iv) Institutional aspects. (20)

3. (a) "The contents of level wise plan are the sectoral plans". Explain in the light of the concept of development planning. (15\textfrac{1}{3})
(b) Survival of a community/area depends on the expansion /contraction of service sector. Briefly explain. (8)

4. (a) Name different types of local plans with two examples for each. (9)
(b) Explain the characteristics of a city as an activity system. (6\textfrac{1}{3})
(c) Briefly explain Patrick Geddes' three - stage planning process. (8)
PLAN 113

SECTION – B

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

5. (a) What is the importance of planning? (4)

(b) Briefly discuss the stages of planning process. (10½)

(c) Explain the term "Stakeholder". What steps are included in the stakeholder analysis process? (3+6)

6. (a) Briefly discuss four ethical principles which you suggest to be included in the "Code of Conduct" of planners of Bangladesh. Justify your answer with relevant examples. (10)

(b) Who developed the "Advocacy Planning" concept? What are the salient features of "Advocacy Planning"? (1+5½)

(c) Discuss a hypothetical scenario "Where process planning procedure is rational to follow". Justify your answer. (7)

7. (a) Why did Charles Lindbolm criticize the Rational Comprehensive Planning model? Which planning model he proposed to reduce the complexities of Rational Comprehensive Planning model? Discuss the salient features of his planning model. (4+10)

(b) Discuss the benefits and limitations of public participation in planning process. (9½)

8. (a) "Blue Print" planning is justified where the condition of complete certainty is met - explain this statement. (5)

(b) Briefly discuss the levels of participation according to Sherry Arnstein. (11½)

(c) How is it possible to empower communities? (7)

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

1. (a) Let \( f(x) = \begin{cases} \frac{x \sin \frac{1}{x}}{x} & x \neq 0 \\ 0 & x = 0 \end{cases} \) \( (13 \text{ marks}) \)

Discuss the continuity and differentiability of \( f(x) \) at \( x = 0 \). Also sketch the graph of \( f(x) \).

(b) If \( \log y = \tan^{-1} x \) then prove that \( (1 + x^2) y_{n+2} + (2nx + 2x - 1)y_{n+1} + n(n+1)y = 0 \) \( (10 \text{ marks}) \)

2. (a) Discuss the relative maxima and minima of the function \( f(x) = x + \frac{1}{x} \), \( x \neq 0 \). \( (7 \text{ marks}) \)

(b) A window is in the form of a rectangle surmounted by a semicircle. If the total perimeter be 25 ft. Find the dimensions so that the greatest possible amount of light may be admitted. \( (9 \frac{3}{4} \text{ marks}) \)

(c) Find the \( n \text{th} \) derivative of the function \( y = e^{ax} \sin bx \). \( (7 \text{ marks}) \)

3. (a) Evaluate the following \( \lim_{n \to \infty} \left( \frac{n}{n^2 + n^2 + 1^2} + \frac{n}{n^2 + 2^2} + \cdots + \frac{n}{n^2 + (n-1)^2} \right) \). \( (13 \text{ marks}) \)

(b) Workout the integral \( \int e^{3x} \sin 4x \, dx \). \( (10 \text{ marks}) \)

4. (a) Workout the following

(i) \( \int \frac{\cos x + \sin x + 1}{2 \cos x - \sin x + 2} \, dx \) \( (7 \text{ marks}) \)

(ii) \( \int \frac{1}{(1-x)^{1/2} + x + 1} \, dx \) \( (7 \text{ marks}) \)

(b) Find the area enclosed by the parabola \( y^2 = 8x \) and the straight line \( 4x - y - 4 = 0 \). \( (9 \frac{3}{4} \text{ marks}) \)
MATH 103(URP)

SECTION – B

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

5. (a) Solve: \( \frac{dy}{dx} = \sin(x + y) + \cos(x + y) \)  

(b) Solve: \( \int \left( x^3 + y^2 \sqrt{x^2 + y^2} \right) dx = xy \sqrt{x^2 + y^2} \) dy  

(c) Is the differential equation \( y \ln y \, dx + (x - \ln y) \, dy = 0 \) exact? If not, make it exact and solve.

6. (a) Solve: \( \left(1 + x^2 \right) \frac{dy}{dx} + y = \tan^{-1} x \).  

(b) Find the general solution of the Bernoulli's equation \( \frac{dy}{dx} + P(x)y = Q(x)y^n \).  

(c) Solve: \( \frac{dy}{dx} + \frac{y}{x} \log y = \frac{y}{x^2} (\log y)^2 \).

7. Solve the following ODE's:
   
   (a) \( (D^4 + 1)y = 0 \)  

   (b) \( (D^2 + a^2)y = \csc ax \)  

   (c) \( \frac{d^2 y}{dx^2} - 2 \frac{dy}{dx} + y = xe^x \sin x \)

8. Solve the following differential equations:
   
   (a) \( x^3 \frac{d^3 y}{dx^3} + 2x \frac{dy}{dx} - 2y = x^2 \ln x + 3 \)  

   (b) \( (1 + 2x)^2 \frac{d^2 y}{dx^2} - 6(1 + 2x) \frac{dy}{dx} + 16y = 8(1 + 2x)^2 \)
SECTION A

1. (a) Travers stations can be plotted using consecutive coordinates or independent coordinates. Explain the differences between these two methods of plotting with the help of a diagram.

(b) For a closed traverse ABCDEA, the following included angles and dimensions were recorded in the field book.

<table>
<thead>
<tr>
<th>Station</th>
<th>Included Angles</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-</td>
</tr>
<tr>
<td>B</td>
<td>162°20'</td>
</tr>
<tr>
<td>C</td>
<td>127°06'</td>
</tr>
<tr>
<td>D</td>
<td>80°42'</td>
</tr>
<tr>
<td>E</td>
<td>98°30'</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Side</th>
<th>Length (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AB</td>
<td>15.0</td>
</tr>
<tr>
<td>BC</td>
<td>25.0</td>
</tr>
<tr>
<td>CD</td>
<td>32.0</td>
</tr>
<tr>
<td>DE</td>
<td>36.0</td>
</tr>
<tr>
<td>EA</td>
<td>42.0</td>
</tr>
</tbody>
</table>

(i) If the bearing of the side AB is 49°30', determine the consecutive of the traverse.

(ii) specify, with reasons, whether is any need to balance the traverse. Your answer should include the existence of any closing error.

2. (a) One of the chain lengths in a chain survey is obstructed by a building with a height of 50 feet. Describe a method by which chaining can be continued in this particular case.

(b) In a chain survey, the distance AB is 15 m shorter when measured by an Engineer's chain. The first measurement was taken with a Gunter's chain which provided a value of 3650 m for the distance AB. Find the actual length of AB and the Engineer's chain if the Gunter's chain was 2 cm short.

(c) With the help of necessary sketches illustrate Lehmann's rules for locating the approximate position of station on plane table.

3. (a) In a levelling operation, two staff readings at points C and D are taken from two instrument stations A and B. Using the given values of staff readings, and the distance between the instrument and the staffs find the correct staff readings at C and D.

<table>
<thead>
<tr>
<th>Instrument Stations</th>
<th>Staff Reading (ft.)</th>
<th>Horizontal Distance (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>C 6.58</td>
<td>D 5.44</td>
</tr>
<tr>
<td>B</td>
<td>C 6.15</td>
<td>D 5.14</td>
</tr>
</tbody>
</table>

Contd ........... P/2
(b) If the points C and D in the above question are located each on one bank of a river (opposite to each other), what is the true difference in elevation between C and D? (5)

(c) Staff readings in a levelling operation can be faulty if the surveyor is not careful in minimizing the possible occurrence of errors. Briefly describe the sources of these errors and how they can be minimized. (15)

(d) Discuss about the advantages of plane table surveying. (5)

4. (a) What is the purpose of stations in a chain and traverse survey? Discuss about the different types of stations and tie lines. (2 + 8 = 10)

(b) What are the considerations that need to be taken while placing stations for chain and traverse survey? (10)

(c) For updating a 10 year old site map, it is required to locate a new station on the map with the help of three previously plotted points. Explain in detail how the task can be accomplished using the mechanical method. (15)

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

5. (a) "Cartography is the science and practice of representing the features of the earth". Explain. (5)

(b) "Cartography covers every aspect of mapping from collecting data to interpreting it". Do you agree? Justify your answer. (4)

(c) "GIS and Cartography are though related, they are not same. Explain with example." (6)

(d) You have been assigned to prepare road network map for ward No. 1. under Dhaka City Corporation (north). (2)

(i) What class of map is this? (8)

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

(iii) You found that a scale of 1 cm = 20 km would best fit the layout of the above mentioned map in all size (8.27" × 11.69") paper. What type of scale is this from presentation perspective? What are the other types of scale form presentation perspective? If you have to present the layout in A3 size (11.69" × 16.54") paper what change in scale would you bring to fit the layout in new paper size? Compare the two scales (scales in A4 paper size and A3 size paper) from user perspective. (2 + 4 + 2 = 10)
6. (a) Explain- 
   (i) There may be three norths in a map 
   (ii) Azimuth and bearing 
   (6x2=12) 
(b) "Urban planners/geographers have a range of visual resources to represent spatial features on map". Explain the types of these visual resources with examples. (18) 
(c) A square grid with a spacing of 500 meters between the grid lines has been superimposed on a contour map. For a point, it has been found that 'X slope' is 4m/km and 'Y-slope' is 3 m/km. Determine the gradient. (5) 

7. (a) "A GPS receiver needs at least four satellites to determine its position". Do you agree? Justify your answer. (12) 
(b) Explain the factors that make defining co-ordinates of earth surface complicated. (9) 
(c) Write short notes on (Any two) 
   (i) Rhumb line and Great circle 
   (ii) Standard Shape index and Shape Compactness index 
   (iii) Types of area cartogram. (7x2=14) 

8. (a) Is there any relationship among geoid height, ellipsoid height and orthometric height? Justify your answer. (1+5=6) 
(b) You are assigned to conduct an RTK survey for preparing a road network map. (4+9+(1+4)=18) 
   (i) What are the equivalents you need to conduct the survey? 
   (ii) How would you conduct the survey? 
   (iii) You observe that the roaming has the following value- HDOP5, VDOP4. Would you accept the data for positional and geographical determine? Justify your answer. 
(c) Explain with examples why map does not reflect every geographical aspect of reality. (11)