L-3/T-2/URP **Date : 07/08/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-2 BURP Examinations 2014-2015

Sub : **PLAN 345** (Transportation Policy and Planning)

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**.

The terms have their usual meaning.

1. (a) "The outputs of transport modeling can be helpful for evaluating and estimating the consequences of transport policies, strategies and schemes on a desktop rather than in a real network" — Explain this statement with an example. **(5)**

   (b) What is the difference between a static and a dynamic model? **(7)**

   (c) Describe two different types of methods for the treatment of uncertainty in a model. **(8)**

   (d) The following tables (Table 1 and Table 2) show the survey results of Home-based-Non-Work Trip Rates for 2016 and the projected number of households for 2020. Determine the number of trips in the year 2020 for each HH type. **(15)**

Total Home-Based-Non-Work Trip Rates (2016)

Type of Area	Vehicles per HH	Persons per Household 1	2,3	4	5+
High Density	0	0.6	2.1	4.6	7.0
	1	1.5	3.0	5.5	7.9
	2+	1.8	3.4	5.9	8.3
Low Density	0	1.0	2.5	5.0	7.4
	1	1.9	3.5	6.0	8.4
	2+	2.3	3.9	6.4	9.0

Table : 1

Number of Households in Target Year (2020)

Type of Area	Vehicles per HH	Persons per Household 1	2,3	4	5+
High Density	0	100	200	100	100
	1	200	300	200	100
	2+	100	200	100	200
Low Density	0	50	100	100	100
	1	100	200	100	100
	2+	100	100	100	10

Table : 2

2. (a) Why we need to use a zonal growth factor while updating the trip distribution matrix ? **(5)**

   (b) The following equation shows a generalized cost function for public transport (Bus) traveling from Dhanmondi to Motijheel: **(6+2=8)**

   $C_{DM} = 0.5t_1 + 0.15t_2 + 0.25t_3 + 0.25F$, where

   C_{DM} = generalized cost of travel from Dhanmondi to Motijheel

   t_1 = in-vehicle time

   t_2 = walking time (to and from stops)

   t_3 = waiting time (at bus stops)

   F = fare charged for journey.

   Explain each of the weights attached to each element. What guidelines should be followed while choosing the cost parameters?

Contd P/2

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Contd... Q. No. 2

(c) The following table shows the travel times (in minutes) between zones of Dhanmondi and Motijheel Thana. Assume that the trips made from Dhanmondi and Motijheel are 2000 and 500 trip daily, respectively, and also trips attracted to the two places are 1700 and 800 trips daily. Compute T_{ij} using the equation $T_{ij} = A_i B_j O_i D_j C_{ij}^{-2}$ and comment on the estimated productions and attractions calculated from T_{ij}. **(22)**

Origin \ Destination	Dhanmondi	Motijheel
Dhanmondi	20	50
Motijheel	50	10

3. (a) The following chart shows a simplified diversion curve of mode choice modeling: **(10+5=15)**

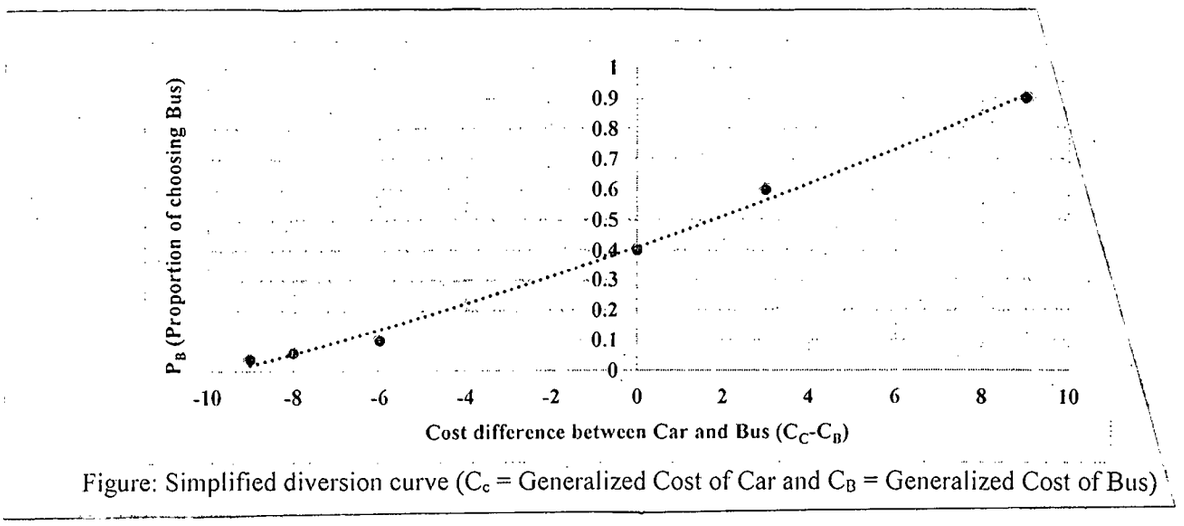

Figure: Simplified diversion curve (C_c = Generalized Cost of Car and C_B = Generalized Cost of Bus)

(i) Describe the curve by explaining the simplified diversion curve theory.

(ii) It can be seen from the graph that cost difference is 0, the proportion of choosing bus is 40%. Is such depiction correct? Explain your answer.

(b) A 26 year old person, i, needs to go to work from home. He/she has three possible modes to choose from: Car, Bus and Bike. The utility functions of these three different modes are given below: **(10+10=20)**

$$U_{icar} = -1.2 - 0.5 \times \text{cost} - 2 \times \text{Waiting Time} + 0.15 \times \text{age}$$

$$U_{ibus} = -0.6 - 0.5 \times \text{cost} - 2 \times \text{Waiting Time} + 0.15 \times \text{age}$$

$$U_{ibike} = 7.3 - 0.5 \times \text{cost} - 2 \times \text{Waiting Time} - 0.3 \times \text{age}$$

(i) What does the co-efficient value signify here? Why there are different co-efficient values for age attribute?

(ii) The following table shows values of the three attributes of that particular person. Which mode is the most desirable for that person and why?

	Cost per km (BDT)	Waiting Time (mins)
Car	5	1
Bus	3	3
Bike	1.5	0

Contd P/3

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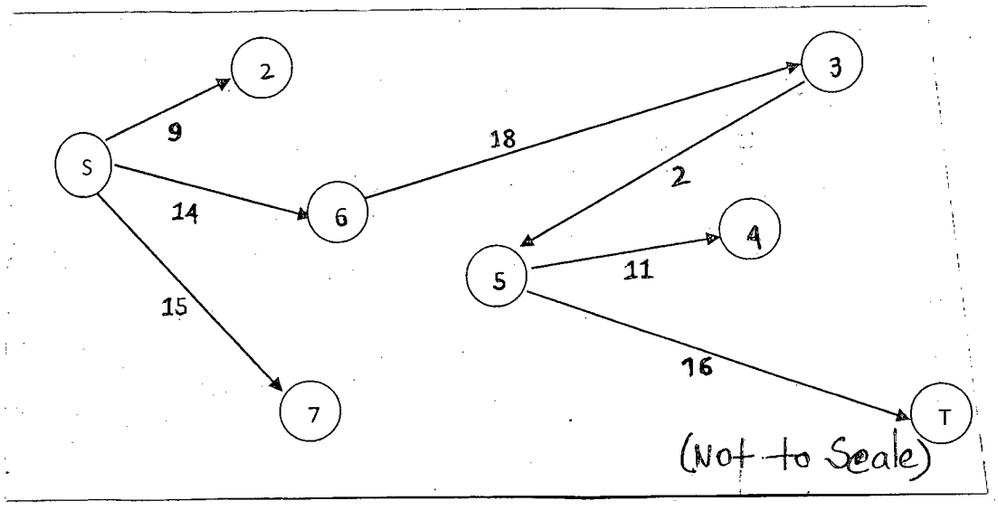
4. (a) "The fourth stage of the traditional transport model acts as a balance between the demand for travel and the supply of transportation" — Do you agree with the statement? Explain with necessary examples. **(7)**

(b) What are the inputs and outputs of an assignment model? **(10)**

(c) When and why the flow per unit in a road decreases with the decreasing speed of the modes? Explain with necessary diagram. **(5)**

(d) (i) Complete the tree table that describes the minimum tree shown in the following figure starting from S: **(8)**



(ii) The following table shows the trips emanating from node S to the network. Assign the following trips by using all or nothing assignment method. What will be the situation of the network after assigning the trips? **(5)**

	2	4	7	T
Qij	600	800	300	200

SECTION – B

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

5. (a) Experiences from Ahmedabad, India and Bogota, Colombia show that to optimise the benefits of mass transit facilities integrating transit and urban development is a must. Careful analysis of their BRT projects and urban development trends identified several major policy barriers to transit and land-use integration. Among those barriers explain the followings: **(4×6=24)**

(i) Lack of regional coordination at metropolitan level.

(ii) Sector-silo behaviour and practices at the city level.

(iii) Inconsistencies in the planning instruments and deficiencies in their implementation.

(iv) Neglected urban design at the neighbourhood and street level.

Contd P/4

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Contd... Q. No. 5

(b) Keeping in mind the policy barriers, stated in the previous question, make your own observations on the possibility of getting optimum benefits from BRT and metro transit projects undertaken in Dhaka and identify things to be done to ensure the benefits. **(11)**

6. (a) Explain why the following statements are myths **(3×6=18)**

   (i) A city should have 25% road.

   (ii) Banning rickshaws will solve the transportation problem in Dhaka.

   (iii) A project at a single point/place can solve transportation problems at that point/place for ever.

   (b) What is "articulated densities"? How does it help efficient distribution of benefits of mass transit development? **(4+4=8)**

   (c) Why policy studies and policy formulations are important before making intervention in any urban sector including transportation? **(9)**

7. (a) What is "active transport"? How can active transport support. **(4+4×4=20)**

   (i) Compact urban development

   (ii) Tourism development

   (iii) Healthy urban living

   (iv) Urban livability and safety.

   (b) With respect to transport demand management and travel demand management, briefly discuss the supports those can be made by employers to their employees. **(15)**

8. (a) Define the socio-technical approach of understanding mobility. **(6)**

   (b) List out the strategies proposed in STP for Dhaka. **(13)**

   (c) "Several things, issues and recommendations are found common while reviewing several transportation related policies and studies for Dhaka and Bangladesh." — State and discuss them. **(8)**

   (d) "Now it is found that several policy objectives and recommendations in several transportation related policies and studies for Dhaka and Bangladesh are faulty, ineffective or unsustainable." — Briefly describe them. **(8)**

L-3/T-2/BURP **Date : 17/07/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-2 B. urp. Examinations 2014-2015

Sub : **CE 363** (Elements of Civil Engineering Structures)

Full Marks : 210 Time : 3 Hours

The figures in the margin indicate full marks.

USE SEPARATE SCRIPTS FOR EACH SECTION

SECTION – A

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

1. (a) Determine minimum thickness ($t_{minimum}$) of slab '1', '2', '3', '4' and '5' (see Figure 1) as per ACI code. Note that all are one-way slabs and all supporting brickwalls are 10 inch in width. Given, f_y = 60,000 psi. **(10)**

   (b) Determine the number of bolts required, and an appropriate layout, to transmit a DL force of 45 kips and a LL of 75 kips through one C 15 × 40 (web thickness = 0.520 inch) to 0.875 inch thick gusset plate (see Figure 2). All material is A 36 steel and bolts are $\frac{3}{4}''$ diameter (A325 bolts in standard holes) in a bearing type connection with threads excluded from shear planes. Use three lines/rows of bolts across the web of the channel. Follow AISC/LRFD specification. **(16 ¼)**

2. (a) It is needed to transmit dead load of 40 kip and live load of 55 kip by a steel connection. Determine the fillet weld length (L_1 and L_2) required on the two sides of the angle (L4″×3 ½″× ½″) to connect it with ¾ inch gusset plate (see Figure 3). Follow AISC/LRFD method and use E70XX electrode. **(10)**

Table 1: Minimum size of fillet weld

Minimum fillet weld size (inch)	Maximum thickness of part (inch)
2/16	To ¼ inclusive
3/16	Over ¼ to ½
4/16	Over ½ to ¾
5/16	Over ¾ to 1½
3/8	Over 1½ to 2¼

Table 2: Minimum size of fillet weld

Maximum fillet weld size (inch)	Minimum thickness of part (inch)
Thickness of material	Less than ¼ inch
(Thickness of material – 1/16 inch)	¼ inch & over ¼ inch

(b) Determine the footing width dimensions 'b_1' and 'b_2' of the combined footing as shown in Figure 4. Given soil allowable bearing capacity = 4 ksf, Column loads = 189 kip (on left column) and 102 kip (on right column). **(16 ¼)**

Contd P/2

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3. (a) Select a lightest W14 shape as a steel column (length = 8 feet) to support an axial dead load of 70 kip and live load of 130 kip. Support conditions about X-axis and Y-axis buckling are shown in Figure 5. **(10)**

$$\sigma_{cr} = 0.658^{\lambda_c^2} F_y; \quad \text{when, } 0 \le \lambda_c \le 1.5$$

$$\sigma_{cr} = \frac{0.877}{\lambda_c^2} F_y; \quad \text{when, } \lambda_c \ge 1.5$$

Properties of W14 sections are attached at the end. Follow AISC/LRFD method and use ASTM A 36 steel.

(b) Determine the crippling/buckling load (P_{cr}) of the built-up column (2L 3″×2 ½″× ½″) section (length = 12 feet) as shown in Figure 6. Follow AISC/LRFD method and use ASTM A36 steel. Support condition about X and Y axes are shown in Figure 6 and properties of a single angle (L3″×2 ½″× ½″) section are attached in Table 3. **(16 ¼)**

4. (a) Determine concrete stresses at top and bottom fiber at mid-span section of the pre-stressed concrete beam (simply supported) as shown in Figure 7 due to the following loading condition: **(19 ¼)**

   (i) initial pre-stress only

   (ii) effective pre-stress + self-weight + dead load + live load

Draw stress distribution at these loading stages. Also, determine the decompression moment. Given, initial pre-stress (f_{si}) = 200 ksi, prestressing steel (A_{ps}) = 5 inich^2 (total), prestressing loss = 20 %, cross-sectional area = 1920 inch^2, moment of inertia of the beam section = 1450000 inch^4. Location of centroid = 26 inch (from top) and = 34 inch (from bottom).

(b) A welded joint has to transmit an ultimate load (P_u) of 342 kip. Using E60XX Electrode and fillet weld size of 6/16 inch, determine the fillet weld length 'L' needed across two sides of the plate to join it with gusset plate as shown in Figure 8. **(7)**

5. (a) Determine shape factor of the double Tee beam section (see Figure 9). Consider bending about horizontal axis. Use ASTM A36 steel. **(18 ¼)**

(b) Determine the pre-stressing force needed to produce a top fiber stress of – 2 ksi (compressive) at mid-span section, when external load acting on the beam is 0.3 kip/ft (including self-weight) on a simple span of 60 feet (see Figure 10). **(8)**

Contd P/3

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SECTION – B

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

6. (a) Describe with neat sketches the behavior of R.C.C beams under increasing loads. **(10)**

   (b) Why the RCC beams are normally designed as under reinforced beams? **(5)**

   (c) Design a simply supported rectangular beam with a span of 24.0 ft. The beam has to carry the unfactored dead load of 1.5 kip/ft and a live load of 1.8 kip/ft. Material strengths are: f_c' = 4000 psi; and f_y = 60000 psi. Follow any method (either WSD or USD) for your design. **(20)**

7. (a) When a beam will be designed as a T-beam? Briefly describe the criteria followed to calculate the effective width of flange for such beams. **(12)**

   (b) An isolated T-beam is composed of a flange 30 inch wide and 5 inch deep cast monolithically with a web of 12 inch width that extends 20 inch below the bottom surface of the flange to produce a beam of 25 inch total depth. Tensile reinforcement consists of six No. 8(No. 25) bars placed in two horizontal rows separated by 1 inch clear spacing. The centroid of the bar group may be assumed to be 21 inch from the top of the beam. The concrete has a compressive strength of 4000 psi and the yield strength of the steel is 60000 psi. What is the design moment capacity of the beam section? Follow any method for your calculation. **(23)**

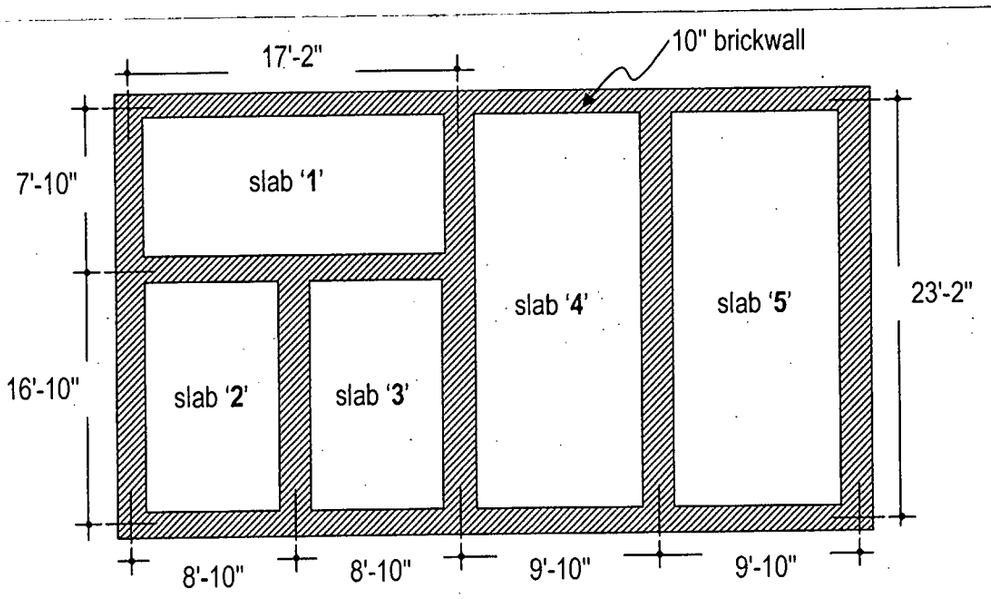
8. (a) Write down the minimum thickness for one-way slab for different edge conditions specified by the ACI code. **(7)**

   (b) Why the temperature and shrinkage reinforcements are provided in a one-way slab? Write down the ACI recommended values for such steel. **(8)**

   (c) A car porch is to be built, consisting of a cantilever one-way slab (span = 10.0 ft) as shown in Fig. 11. The service live load or the slab is 30 psf, superimposed dead load of 20 psf in addition to its self wt. Prepare a design for the slab, using material strength f_y = 60000 psi, f_c' = 4000 psi; and show the reinforcements with neat sketches. Follow any method for your design. **(20)**

9. (a) Design a tied column with 1.5% reinforcement to support a service dead load 450 kip and live load 350 kip. Due to architectural reason, one side of the column is to be 12″. Also, design the tie. Follow any design method. **(15)**

   (b) An interior column carries total service load: DL = 300 kip and LL = 200 kip. The column is 18″×18″ and is supported on a square footing with the bottom at 5′-0″ below the existing ground level. Design the footing and show the reinforcements. The allowable soil bearing pressure is 3000 psf. Use f_c' = 3 ksi; and f_y = 60 ksi for the design. **(20)**



plan view of building slabs

Figure 1

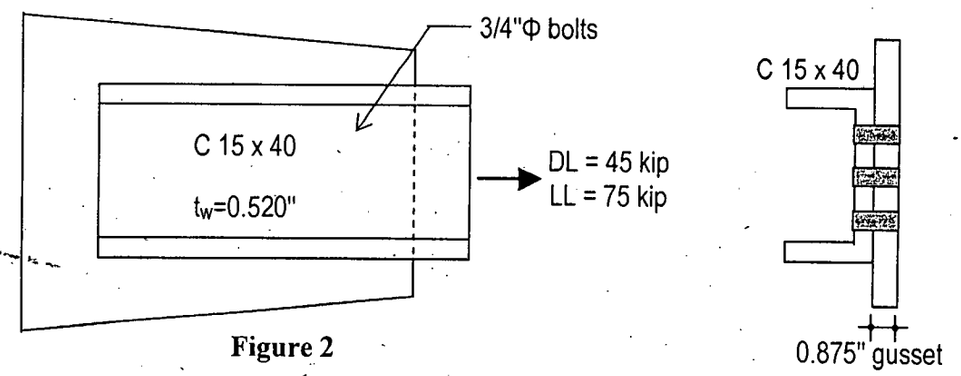


Figure 2

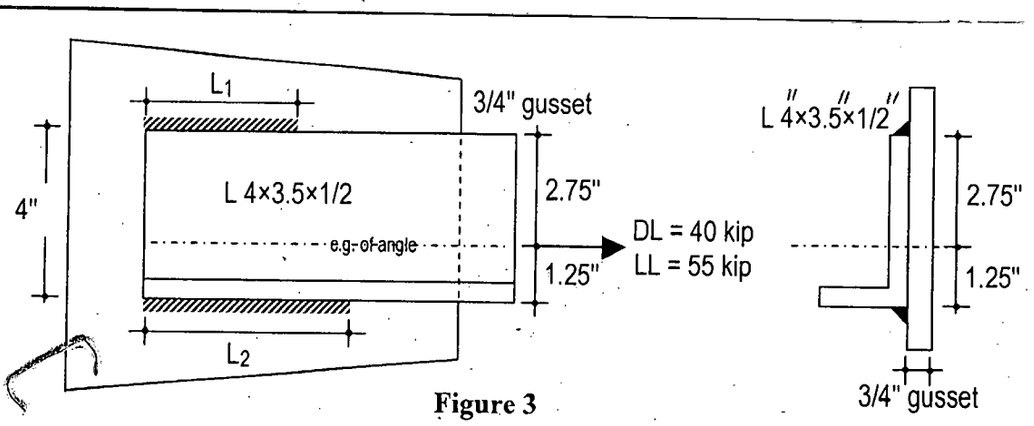


Figure 3

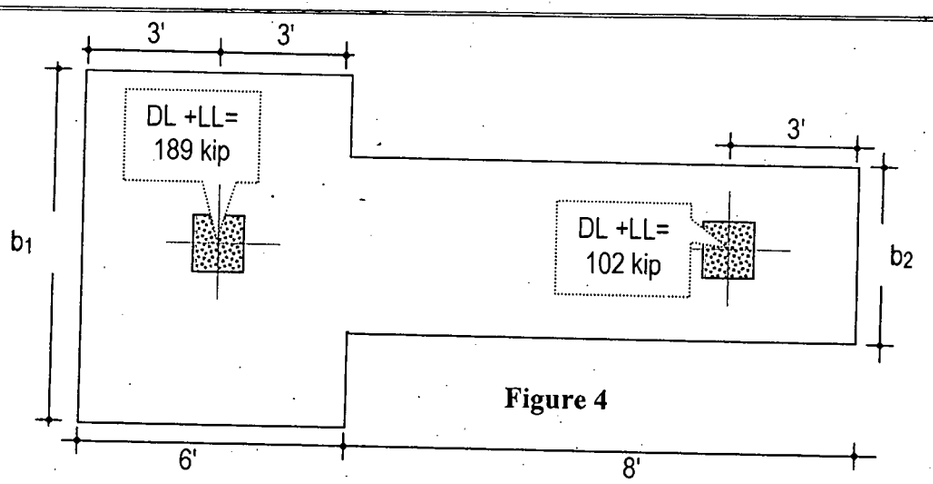


Figure 4

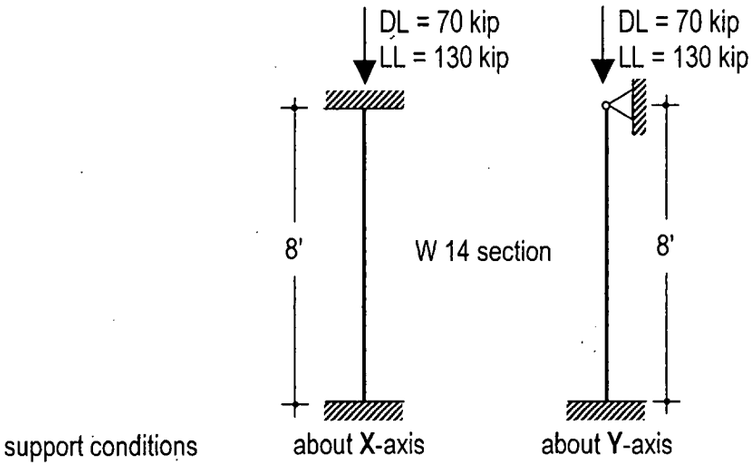


Figure 5

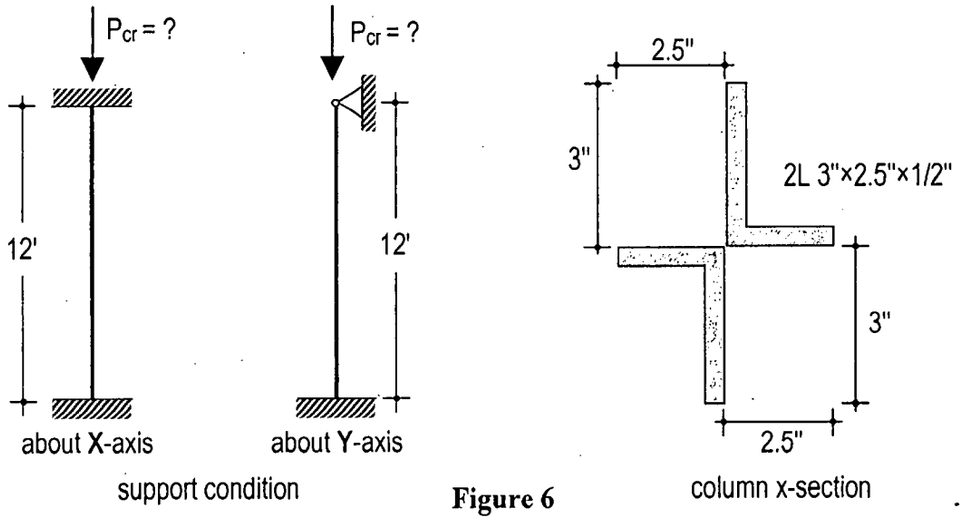
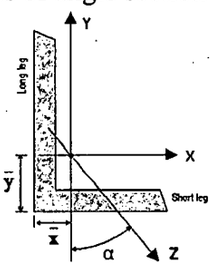


Figure 6

Table 3: Properties of angle section (long leg vertical)



Designation	Area (A)	Axis X - X				Axis Y - Y			
		I	S	r	$\bar{y}$	I	S	r	$\bar{x}$
inch	$inch^2$	$inch^4$	$inch^3$	inch	inch	$inch^4$	$inch^3$	inch	inch
L $3\times2\frac{1}{2}\times\frac{1}{2}$	2.50	2.08	1.04	0.913	1.00	1.30	0.744	0.722	0.750

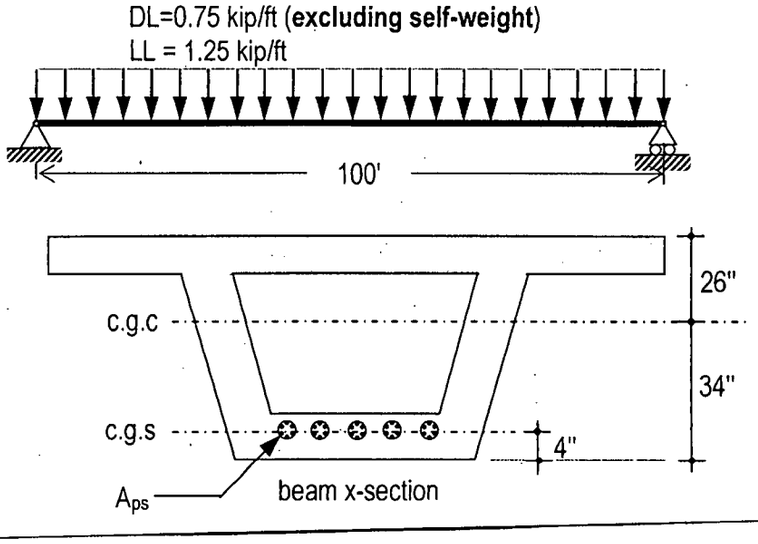


Figure 7

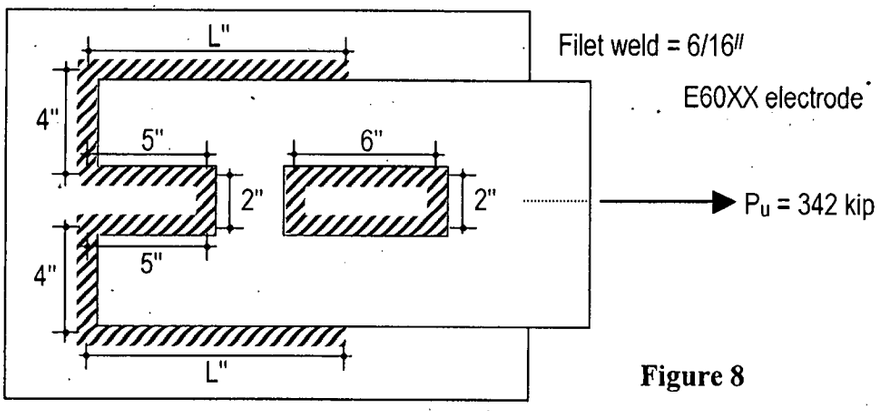


Figure 8

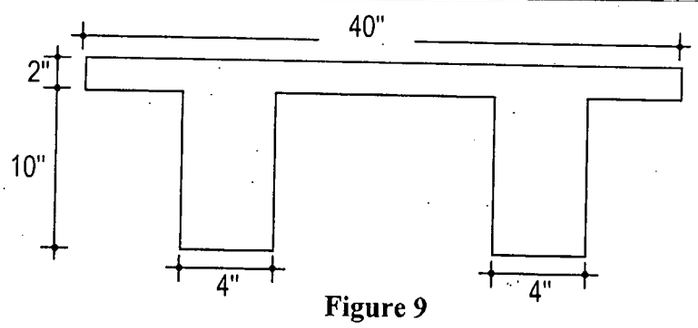


Figure 9

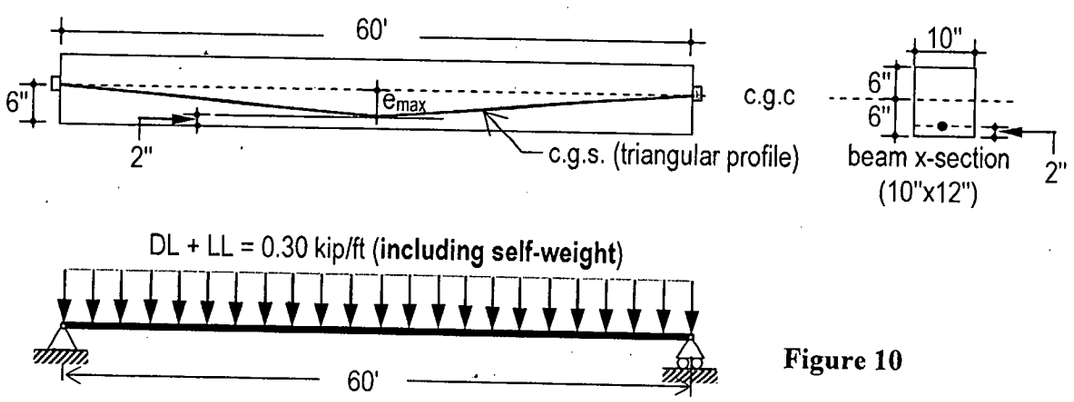


Figure 10

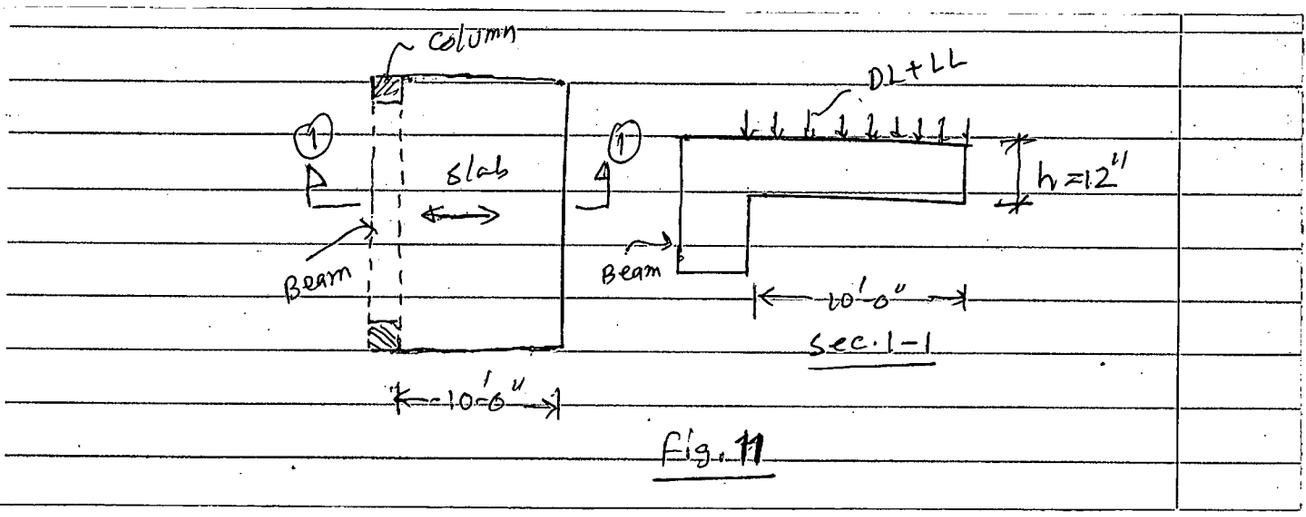
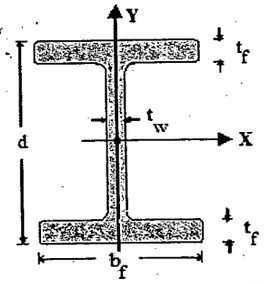


Fig. 11



Wide Flange Section (W Shapes)

Dimensions & Properties

Designation	Area (A)	Depth (d)	Web Thickness (t_w)	Flange Width (b_f)	Flange Thickness (t_f)	Nominal weight per foot	Axis X - X I	Axis X - X S	Axis X - X r	Axis Y - Y I	Axis Y - Y S	Axis Y - Y r
	$inch^2$	inch	inch	inch	inch	lb.	$inch^4$	$inch^3$	inch	$inch^4$	$inch^3$	inch
W 14×132	38.8	14.66	0.645	14.725	1.030	132	1530	209	6.28	548	74.5	3.76
W 14×120	35.3	14.48	0.590	14.670	0.940	120	1380	190	6.24	495	67.5	3.74
W 14×109	32.0	14.32	0.525	14.605	0.860	109	1240	173	6.22	447	61.2	3.73
W 14×99	29.1	14.16	0.485	14.565	0.780	99	1110	157	6.17	402	55.2	3.71
W 14×90	26.5	14.02	0.440	14.520	0.710	90	999	143	6.14	362	49.9	3.70
W 14×82	24.1	14.31	0.510	10.130	0.855	82	882	123	6.05	148	29.3	2.48
W 14×74	21.8	14.17	0.450	10.070	0.785	74	796	112	6.04	134	26.6	2.48
W 14×68	20.0	14.04	0.415	10.035	0.720	68	723	103	6.01	121	24.2	2.46
W 14×61	17.9	13.89	0.375	9.995	0.645	61	640	92.2	5.98	107	21.5	2.45
W 14×53	15.6	13.92	0.370	8.060	0.660	53	541	77.8	5.89	57.7	14.3	1.92
W 14×48	14.1	13.79	0.340	8.030	0.595	48	485	70.3	5.85	51.4	12.8	1.91
W 14×43	12.6	13.66	0.305	7.995	0.530	43	428	62.7	5.82	45.2	11.3	1.89
W 14×38	11.2	14.10	0.310	6.770	0.515	38	385	54.6	5.87	26.7	7.88	1.55
W 14×34	10.0	13.98	0.285	6.745	0.455	34	340	48.6	5.83	23.3	6.91	1.53
W 14×30	8.85	13.84	0.270	6.730	0.385	30	291	42.0	5.73	19.6	5.82	1.49
W 14×26	7.89	13.91	0.255	5.025	0.420	26	245	35.3	5.65	8.91	3.54	1.08
W 14×22	6.49	13.74	0.230	5.000	0.335	22	199	29.0	5.54	7.00	2.80	1.04

L-3/T-2/URP **Date : 23/07/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-2 BURP Examinations 2014-2015

Sub : **PLAN 393** (Operation Research and System Analysis)

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) RAJUK is looking for a suitable site for low income housing. Four sites are available: Site A, Site B, Site C and Site D. Urban planners have agreed on two major criteria- Social (X) and Physical (Y) and have developed the following comparison matrices. **(18)**

   (i) Recommend a suitable site for housing and rank them in order of priority.

   (ii) Demonstrate the whole process by a diagram.

   Assume that the pairwise comparison is reasonably consistent.

$$A = \begin{array}{c} \\ X \\ Y \end{array} \begin{array}{c} \begin{array}{cc} X & Y \end{array} \\ \begin{pmatrix} 1 & 2 \\ 1/2 & 1 \end{pmatrix} \end{array}$$

$$A_x = \begin{array}{c} \\ A \\ B \\ C \\ D \end{array} \begin{array}{c} \begin{array}{cccc} A & B & C & D \end{array} \\ \begin{pmatrix} 1 & 2 & 1/5 & 1/3 \\ 1/2 & 1 & 1/6 & 1/4 \\ 5 & 6 & 1 & 2 \\ 3 & 4 & 1/2 & 1 \end{pmatrix} \end{array} \qquad A_y = \begin{array}{c} \\ A \\ B \\ C \\ D \end{array} \begin{array}{c} \begin{array}{cccc} A & B & C & D \end{array} \\ \begin{pmatrix} 1 & 1/2 & 1/3 & 1/4 \\ 2 & 1 & 1/2 & 1/3 \\ 3 & 2 & 1 & 1/2 \\ 4 & 3 & 2 & 1 \end{pmatrix} \end{array}$$

(b) Planners have to determine the priority of rural roads of Bangladesh for further upgradation and maintenance. Rural roads will be evaluated under different criteria and sub-criteria as mentioned in the following table. Planners will assess the relative importance of different criteria and sub-criteria based on expert opinion. The pair-wise comparison matrices are given below (Figure 1-3). **(17)**

(i) Find the overall weights of different sub-criteria

(ii) Check the consistency of the expert opinion.

Criteria	Sub-criteria
Social (S)	Population served (P)
	Number of facilities (F)
	Number of growth center (G)
Environmental (En)	Number of days under submergence (Sb)
	Likelihood of natural disaster (D)
Economic (Ec)	Internal Rate of Return (IRR)

Contd P/2

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Contd... Q. No. 1(b)

Fig: 01

$$S = \begin{array}{c} \\ S \\ E_n \\ E_c \end{array} \begin{array}{c} \begin{array}{ccc} S & E_n & E_c \end{array} \\ \begin{pmatrix} 1 & 3 & 2 \\ 1/3 & 1 & 1/3 \\ 1/2 & 3 & 1 \end{pmatrix} \end{array}$$

Fig: 02

$$S = \begin{array}{c} \\ P \\ F \\ G \end{array} \begin{array}{c} \begin{array}{ccc} P & F & G \end{array} \\ \begin{pmatrix} 1 & 1/2 & 1/4 \\ 2 & 1 & 1/3 \\ 4 & 3 & 1 \end{pmatrix} \end{array}$$

Fig: 03

$$E_n = \begin{array}{c} \\ S_b \\ D \end{array} \begin{array}{c} \begin{array}{cc} S_b & D \end{array} \\ \begin{pmatrix} 1 & 3 \\ 1/3 & 1 \end{pmatrix} \end{array}$$

2. (a) Consider the following game in context of international cooperation for reduction of green house gas emission. Each country has two alternatives to pollute and to abate the emission. Find the Nash equilibrium of the game and explain why international cooperation and social optimum output is not always possible to cut the green house gas emission. **(15)**

Country A	**Country B**		
	Strategies	**Abate**	**Pollute**
	Abate	(10,10)	(0,11)
	Pollute	(11,0)	(1,1)

(b) Solve the following game using graphical method. Assume the payoffs are for player A. **(20)**

		Player B		
		B1	**B2**	**B3**
Player A	**A1**	1	-1	3
	A2	0	4	1
	A3	3	-2	5
	A4	-3	6	2

Contd P/3

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3. (a) A pre-timed signal controls a four-way intersection. The East bound (EB) and the West bound (WB) traffic volumes are 800 veh/hr and 1000 veh/hr, and the two movements share the same green and red portions of cycles. The North bound (NB) and the South bound (SB) directions also share cycle times, with volumes 500 veh/hr and 400 veh/hr respectively. If the saturation flow of all approaches is 2000 veh/hr, the cycle length is 60 seconds, and D/D/1 queuing applies, optimize the signal timing of the intersection. **(15)**

(b) The saturation flow of an approach in a signalized intersection is 1600 veh/hr. The flow rates in three consecutive cycles are 800 veh/hr, 450 veh/hr and 220 veh/hr respectively. The cycle length is 60 seconds with green time duration of 20 seconds. Determine the total delay assuming a D/D/1 queuing system. **(12)**

(c) Only a single toll booth is considered in Padma bridge for collection of tolls from the vehicles. The arrival rate is 220 veh/hr and follows Poisson's distribution. The time required to collect toll from each vehicle is 15 seconds but varies according to arrival process. Determine average number of vehicles in the queue and average waiting time. **(8)**

4. (a) Three water treatment plants will supply water to three residential areas: Pallabi, Dhanmondi and Lalbagh. The following table summarizes the supply capacity of the plants, demand of the residential areas, and cost of water supply from the plants to the residential areas. Allocate water supply from the plants to each residential areas to optimize the cost using Modified Distribution (MODI) Method. **(25)**

	Pallabi	Dhanmondi	Lalbagh	**Supply**
Plant 1	5	4	3	**100**
Plant 2	8	4	3	**300**
Plant 3	9	7	5	**300**
Demand	**300**	**200**	**200**	**700**

(b) For the upcoming planting season, a farmer can plant paddy (A_1), wheat (A_2), soybeans (A_3) or use the land for grazing (A_4). The pay-offs associated (showing the cost) with the different actions are influenced by the amount of rain: heavy rainfall (S_1), moderate rainfall (S_2), light rainfall (S_3) or drought season (S_4). **(10)**

Recommend an alternative for the farmer under the following criteria.

(i) Laplace Criteria

(ii) Savage Regret

	Rainfall Scenario			
Alternatives	**S1**	**S2**	**S3**	**S4**
A1	-20	60	30	-5
A2	40	50	35	0
A3	-50	100	45	-10
A4	12	15	15	10

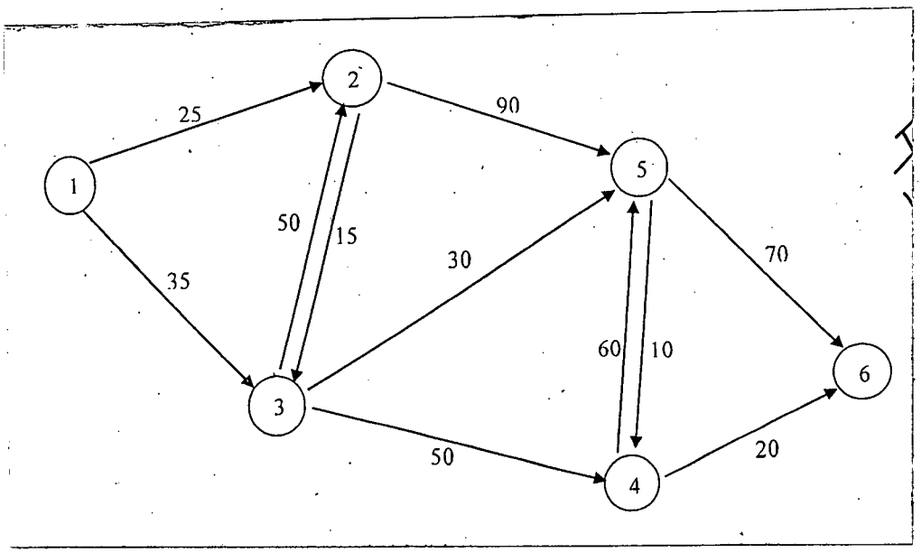
Contd P/4

PLAN 393

SECTION – B

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

5. Find the minimum tree emanating from node 1 for the following network. Also develop the final tree table of the network. **(25+10=35**



6. (a) In a rural development project, the available agricultural lands are 300 acres and there are five different types of products that can be produced in the land: Rice, Maize, Wheat, Pulses and Others. The objective of the project is to maximize the profit from these five different types of crops. The outputs from Rice, Maize, Wheat, Pulses and Others are BDT 100, 115, 250, 35 and 100 lakh per acre respectively. Total production cost of the crops cannot exceed BDT 90,000. Farmers should give at least 180 hours of labour per day for the cultivation. As the pulses is the least profitable crop, the production cost of this crop cannot exceed 35% of the combined total production cost of rice and other products. The costs and labour requirement of these five types of products are given in the following table (table 1). Develop a linear program to maximum the profit. **(15)**

Table 1: Production Costs and Labours Requirement for the cultivation of five different crops.

	Production Costs/acres (in Lakh)	Labour (B) working hours/acres
Rice	20	3
Maize	45	2
Wheat	65	8
Pulses	6	0.5
Others	11	1

Contd P/5

PLAN 393

Contd... Q. No. 6

(b) A farmer has 80 hectares of his farm available for planting potatoes and cabbages. He must grow at least 10 hectares of potatoes and 20 hectares of cabbages to meet demands. He prefers to plant more cabbages than potatoes but his work force and equipment will only allow him to cultivate a maximum of three times the quanity of cabbages to that of potatoes. If the profit on potatoes is BDT 800 per ha and on cabbages BDT 500 per ha how should the farmer plant the two crops to make a maximum profit and what is the profit. Solve the problem through graphical method. **(20)**

7. (a) A real estate company in Dhaka can offer two different types of apartments: Duplex and Normal, with varying in size (Duplex: A = 4,000 sft, B = 3,000 sft and C = 2,000 sft; Normal: A = 2,500 sft, B = 2,000 sft and C = 1,500 sft). The company should produce monthly at least 25,000 sft, 50,000 sft and 30,000 sft for A, B , and C apartments, respectively to run the business smoothly. The construction cost of the duplex apartments is BDT 2,500 per sft whereas the construction cost of the normal apartments is BDT 1,500 per sft. **(12)**

Now, consider the real estate company is under severe business loss and wants to sale its resources to another real estate company. The challenge for this company then is to set the selling prices of the resources in such a way that those should not exceed their construction cost. In this way the offer of the selling price will be acceptable to the other company while the current company can maximize their revenue from the selling of the resources. Considering all the above situation construct a linear program for the problem.

(b) Write the dual problem of the following linear program and solve the problem through simplex method: **(3+20=23)**

Minimize, $v = 24y_1 + 60y_2$

Subject to,

$$0.5y_1 + y_2 \geq 6$$
$$2y_1 + 2y_2 \geq 14$$
$$y_1 + 4y_2 \geq 13$$
$$y_1 \geq 0,\ y_2 \geq 0$$

8. (a) A bus service provider in the Dhaka city has two types of bus services: type A: Normal and type B: Double-Decker. In every five years they buy x of type A and y of type B. The following constraints control the purchase of the buses: **(15)**

(i) Not more than 50 buses of type A and 40 buses of type B can be purchased.

(ii) The maximum number of buses that can be purchased is 80.

(iii) The maximum number of buses that can be purchased is 80.

Contd P/6

PLAN 393

Contd... Q. No. 8(a)

The profit from type A bus service is BDT 300 and from type B bus service is BDT 150. Develop a linear program for the above scenario.

(b) Solve the following problem through Big M technique **(20)**

Maximize $z = 2x_1 + x_2$

Subject to,

$$x_1 + x_2 \leq 10$$
$$-x_1 + x_2 \geq 2$$
$$x_1 \geq 0,\ x_2 \geq 0$$

L-3/T-2/URP **Date : 27/07/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-2 B. urp. Examinations 2014-2015

Sub : **PLAN 331** (Rural Development Planning)

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** questions.

1. (a) The sixth five year plan (2011 – 2015) had some certain features/characteristics that distinguished it from the previous five year plans. Briefly explain those features of the sixth five year plan, in context of rural development in Bangladesh. **(15)**

   (b) In the context of Bangladesh, evaluate the role of NGOs (Non-government Organizations) as Entrepreneurs in delivery of social services. **(12)**

   (c) Write a short note on – Head Count Index of Poverty. **(8)**

2. (a) The seventh five year plan (2016-2020) aims at ensuring rural development by bringing widespread and extensive improvement in the quality of life. Explain the strategies that are proposed in this plan to fulfill the aim. **(12)**

   (b) Briefly describe the categories of road network in Bangladesh. Also mention the authorities responsible for the construction and maintenance of each type of road category. **(15)**

   (c) Define "Growth Center" – in the context of Bangladesh. **(8)**

3. (a) Differentiate between the concepts of "Absolute Poverty" and "Relative Poverty". Discuss the issues associated with the fixation of poverty line. **(12)**

   (b) Describe the hierarchy of rural markets in Bangladesh. **(10)**

   (c) "Poverty gap index does not capture the differences in severity of poverty"- explain the statement with an appropriate example. **(13)**

4. (a) Center-Periphery Model of economic development argues that economic prosperity is transmitted by "two sets of opposing forces". Briefly explain those forces. **(15)**

   (b) Discuss the general considerations for growth center development in Bangladesh. **(8)**

   (c) "Implementation of Rural Infrastructure Improvement Project 1 (RIIP-1), to some extent, helped in achieving certain Millennium Development Goals (MDGs)"- do you agree with this statement? Justify your answer with relevant examples. **(12)**

Contd P/2

PLAN 331

SECTION – B

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

5. (a) Define the major dimensions for rural development. **(8)**

   (b) Describe the first model adopted of institution building in rural areas during Pakistan period. What were the limitations of this model? **(10)**

   (c) Differentiate between the basic functions of Bangladesh Academy for Rural Development (BARD) and Bangladesh Rural Development Board (BARD). **(5)**

   (d) "The prime mandate of LGED is to plan, develop and maintain local level infrastructures through the country" – Briefly explain this statement. **(12)**

6. (a) Differentiate between Participatory Rural Appraisal (PRA) and Rapid Rural Appraisal (RRA). **(10)**

   (b) Explain the process of investigating sustainable rural livelihood with necessary illustrations. **(15)**

   (c) How different types of participatory tools can be applied to evaluate the pentagonal asset base of a particular village? **(10)**

7. (a) "The option of sustainable livelihood strategies does not solely depend on the available resource base, it also depends on the spatial and temporal scale at which the livelihood assessment takes place. – Justify this statement. **(10)**

   (b) State the main features of compact township. **(8)**

   (c) Do you think that the idea of compact towns will ensure improved economic and infrastructural facilities in rural areas, as well as accelerate the overall GDP growth of Bangladesh? – Justify your answer with two examples of potential compact towns. **(12)**

   (d) Define land reform. Name the different types of land reform with examples. **(5)**

8. (a) Discuss the "Virtuous Circle" model of rural-urban development. **(8)**

   (b) Write down the categories of urban-rural interactions with examples. What are the issues that create controversies while delineating urban and rural areas? **(4+8=12)**

   (c) The following table represents the socio-economic profile and the status of well-being of different livelihood groups of coastal region, Bangladesh. Explain how the overall economic and social situation of this region can be improved by adopting any two Integrated Rural Development (IRD) models. **(15)**

Livelihood	Livelihood Group (%)	Population below Poverty Line (%)	PrimaryEducation (%)	Food Security (Average of Secure Months in a Year)	Access to safe water (%)	Access to Sanitation (%)	Access to Electricity (%)	People Living in Vulnerable Housing Condition (%)
Agriculture	24.8	68.5	91.9	8.01	82.7	61.3	20	69.4
Wage Earner	17.4	85.9	96.2	5.45	83.3	57.7	15.6	60.3
Fisherman	20.4	69.2	92.3	8	81.4	64.8	19.8	61.5
Craftsman	11.4	74.5	94.1	5.88	80	66.7	19.6	56.9
Business	26	50.9	81.9	10.21	87.1	56	20	66.4

L-3/T-2/URP **Date : 01/08/2016**

BANGLADESH UNIVERSITY OF ENGINEERING AND TECHNOLOGY, DHAKA

L-3/T-2 B. Sc. Engineering Examinations 2014-2015

Sub : **PLAN 333** (Regional Development Planning)

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) In practice, what problems are being faced while determining profit maximizing location for industries? Explain briefly. **(25)**

   (b) "Both Weber and Lösch's theories of industrial location lag behind while determining profit maximizing location for industry" — do you agree with the statement? Justify your answer. **(10)**

2. (a) Between "growth pole policies" and "growth centre policies" which one you think is more appropriate in the context of Bangladesh? Explain your reasoning. **(10)**

   (b) "Propulsive firms within a leading industry can capitalize the advantage of agglomeration economies". What are the agglomeration economies? Explain. **(15)**

   (c) Do you think promoting small and medium sized enterprizes can be useful in flourishing the regions of Bangladesh? Discuss with examples. **(10)**

3. (a) In case of Bangladesh, which concept related to growth pole theory can explain the issue of urbanization of the capital city and its consequences on surrounding areas? Discuss briefly. **(15)**

   (b) Do you think threshold population and market range of any service facility is connected with it's hierarchy? Discuss with necessary examples. **(15)**

   (c) State the major difference between concepts of central place theory and growth pole theory. Which one do you think is more reasonable? **(5)**

4. (a) How do you think devolution of control of macro policy options can help to develop a stressed region of a country? Discuss briefly. **(15)**

   (b) What policy options would you suggest for management of lands while planning for regions? **(7)**

   (c) How a demand cone in Lösch's theory of "market area analysis" is formed? What factors are indicated through the different components of such demand cone? **(13)**

Contd P/2

PLAN 333

SECTION – B

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

5. (a) Briefly discuss the importance and scope of regional planning. **(15)**

(b) "Regionalization is a process of grouping together local units based on certain criteria. The process depends on - (i) the purpose of regionalization, (ii) criteria/criterion to be used, and (iii) data availability." Explain the statements. **(20)**

6. (a) Briefly explain the usefulness of regional economic theories. **(7)**

(b) Mention three approaches for analyzing and predicting short run changes in the regional economy. **(3)**

(c) Write short notes on–

(i) Technical co-efficient in input-output analysis. **(5)**

(ii) Output multiplier. **(10)**

(iii) Backward and forward linkage multiplier. **(5)**

(iv) Closed model for input-output analysis. **(5)**

7. (a) Discuss the shift and share components of industrial structure analysis. **(20)**

(b) Briefly discuss the limitations of economic base theory. **(15)**

8. (a) According to Harries-Todaro Model, decision to migrate depends on expected urban-rural real wage differentials, which is measured by actual rural-urban wage differentials and probability of getting urban job. Explain the model using necessary illustration(s). **(25)**

(b) Briefly explain policy implications of Harris-Todaro Model. **(10)**