

Name:

Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Program: MBA UISC

Semester – III

Subject (Course): Road & Metro Rail Technology & Management

Max. Marks : 100

Course Code : PIUI 8004

Duration : 3 Hrs

No. of page/s: 3

SECTION A

Write Short Notes of following Terms

S. No.		CO	Marks
1	Political Risk	CO1	2
2	Inflation Correction	CO1	2
3	VfM	CO1	2
4	PHPDT	CO1	2
5	Regenerative braking system	CO1	2
6	Regulatory Risk	CO1	2
7	Shadow Pricing.	CO1	2
8	WPI & CPI	CO1	2
9	TIF	CO1	2
10	TDR	CO1	2

SECTION B

Attempt All Questions

1	What are the factors affecting Road User Costs?	CO2	4
2	What are the parameters that decide the choice of a particular MRTS technology?	CO2	4

3	Write a short note on Advantages and Disadvantages of PPP in Metro Rail & BRTS.	CO3	4
4	Write a brief note on Fare Box Collection.	CO2	4
5	Write a brief note on Smart technology that can be used as a part of Smart Mobility.	CO2	4

SECTION-C
Attempt Any TWO Questions

1	Identify the important risks that are involved for a Metro Project and explain it.	CO4	15
2	Write down the parameters by which you can frame a sustainable urban transport Policy and explain in details two or three parameters.	CO3	15
3	What are the generic factors that drives value for money?	CO4	15

SECTION-D

1	<p>The Mayor of New York City wants to replace the elevated Gowanus Expressway in Brooklyn with a tunnel to enable the development of prime Brooklyn waterfront property. He is interested in using the private sector to finance, construct, and operate this project, which will require tolling of the new facility. For the sake of this problem, let us assume:</p> <ul style="list-style-type: none"> • The average toll will be \$4.50, and does not increase over time • There is no inflation • All parties use a discount rate of 10% • Traffic on the Expressway is the same for every day of the year • All years have 365 days • The annual traffic on the first year of operation of the new facility is uncertain, but every year thereafter will be the same as the first <p>Let us also assume that there are two bidders for this project , who have through their own analysis, worked out the following financial packages:</p>	CO5	30									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;"></th> <th style="width: 50%;">Cost to Build (Present Value)</th> <th style="width: 25%;">Operation and Maintenance Costs - Profits (Present Value)</th> </tr> </thead> <tbody> <tr> <td>Firm A</td> <td>\$650 Million</td> <td>\$160 Million</td> </tr> <tr> <td>Firm B</td> <td>\$700 Million</td> <td>\$70 Million</td> </tr> </tbody> </table>			Cost to Build (Present Value)	Operation and Maintenance Costs - Profits (Present Value)	Firm A	\$650 Million	\$160 Million	Firm B	\$700 Million	\$70 Million	
	Cost to Build (Present Value)	Operation and Maintenance Costs - Profits (Present Value)										
Firm A	\$650 Million	\$160 Million										
Firm B	\$700 Million	\$70 Million										

You are advising the mayor on this project, and have commissioned a traffic forecast for use by the various private players, which has the following results:

Scenario	Daily Traffic
Worst Case	43,000 vehicles/day
Expected	47,000 vehicles/day
Best Case	51,000 vehicles/day

Under the traditional contract structure, the winning bidder would build the new facility and then maintain and operate it while collecting all toll revenues for 99 years. At the end of 99 years of operations, ownership transfers over to the City. For this kind of contract, the bidders only reveal to the City their Cost to Build the facility. Please answer the following questions:

- a) For **both firms**, calculate the **minimum daily volume of traffic** required to meet their financial goals for the project. **(12)**

- b) As part of the bidding process, all bidders had to define the bonds they would sell to finance the construction of the facility. Given the forecasts that were published, if you were a banker on this deal, **which bidder's bonds** would you insist **have a higher interest rate**? Why? **(10)**

- c) Is this type of arrangement better characterized as *privatization* or *PPP*? Why? **(8)**

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SECTION A

Write Short Notes of following Terms

S. No.		CO	Marks
1	NURTC	CO1	2
2	Sky bus	CO1	2
3	Hyper loop	CO1	2
4	PHPDT	CO1	2
5	Regenerative braking system	CO1	2
6	UMTA	CO1	2
7	Kolkata metro.	CO1	2
8	Jaipur Metro	CO1	2
9	Mumbai system	CO1	2
10	London Tube rail.	CO1	2

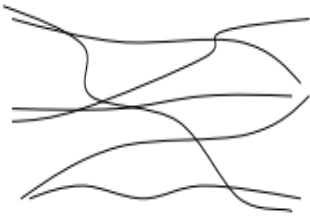
SECTION B

Attempt All Questions

1	What are the factors affecting Vehicle Operating Costs?	CO2	4
2	What are the parameters that decide the choice of a particular MRTS technology?	CO2	4
3	Write a short note on Advantages and Disadvantages of DBFOT SPV structure.	CO3	4

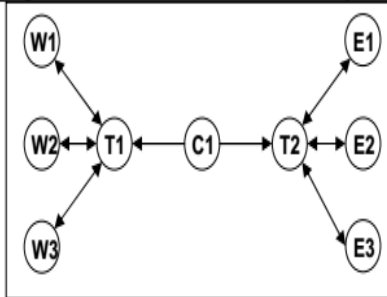
4	Write a brief note on Shadow Pricing.	CO2	4
5	Write a brief note on Smart technology that can be used as a part of BRTS	CO2	4
SECTION-C Attempt All			
1	Draw a SPV and Financial Consortium structure for a PPP project and development company for a Metro Project or a High Speed Railway project. Assumptions can be done, but clarify it. Explain National Urban Transport policy.	CO4	15
2	Explain Transport Demand Analysis for MRTS Projects.	CO3	15
SECTION-D			
1	<p>You are a transport consultant working for the mayor of a growing city in a developing country. The bus network in this city currently looks something like the map shown in Fig. 1 below. The Mayor is going to invest in a central East-to-West exclusive busway and in strategic station facilities as shown in Fig. 2 and Fig. 3 below.</p> <p>The mayor is unsure whether to regulate bus services after making the investment. He is considering two alternatives, A1 and A2, shown in Fig. 2 and Fig. 3 below. The key regulatory difference between these two alternatives is that in A1 the busway and stations will be available only to operators under contract by the city to operate certain routes. In A2, the busway and stations are available to any bus operator that chooses to participate in the market.</p>	CO5	30

Fig 1: Unregulated Network, no Investment



No investment in facilities
 Unregulated services run by a range of private operators

Fig 2: A1: Investment, Closed System, Regulated Trunk & Feeder Services



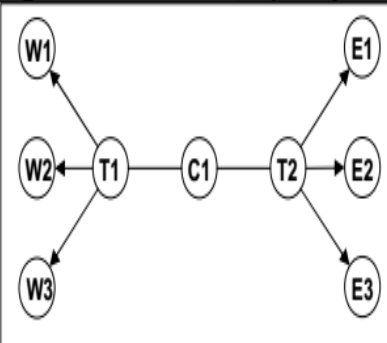
Investment:

- Exclusive Busway between T1 - T2
- Station Facilities at nodes

Regulated services – Closed Access:

- Low-capacity **feeder bus** between W1, W2, W3 and T1
- Low-capacity **feeder bus** between E1, E2, E3 and T2
- High capacity **trunk services** between T1 and T2, via C

Fig 3: A2: Investment, Open System, no Regulation of Services



Investment:

- Exclusive Busway between T1 - T2
- Station Facilities at nodes

Unregulated services – Open Access:

- Expect **point to point** bus services between **all combinations** of W1, W2, W3 and E1, E2, E3, via T1,C,T2

The Mayor has hired you because of your expertise in modeling the demand for transportation services. Before the Mayor makes the investment, you will conduct a

survey and develop a logit model to understand the way residents of this city choose between the using the Bus and using other modes.

- a) Before thinking about demand models, it is useful to think about what kind of service is likely to be provided in both alternatives. Under both A1 and A2, the Mayor hopes to make use of competition in the private sector to keep costs low. What kind of competition would we expect to see in A1? What about in A2? Explain. **(5)**.
- b) How would the two types of competition you answered in part (a) likely affect the actual service that is delivered to passengers? **(5)**
- c) A1 and A2 represent very different ways to run a bus network. In terms of the factors, that affect passenger demand for buses, what are the three most important ways in which A1 and A2 will differ? This can include factors that result from differences in the regulatory structure or in the network structure. Please be as specific as possible, and feel free to include your answers from part (b). **(10)**
- d) Please specify the function you will use for the Bus mode (don't worry about other modes). You will use this model for forecasting demand for A1 and A2, so it is important that this utility function includes the factors you listed in part (c). **(10)**