Name: **Enrolment No:**	UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2021

Course: Metro System and Engineering — **Semester: VII**
Programme: B Tech (Civil + ID) — **Time: 03 hrs.**
Max. Marks: 100 — **Course Code: CIVL 4027**
Instructions: Write your assumptions carefully and attempt all the questions

SECTION A

S. No.		Marks	CO
Q1.	List four parameters which will help ascertain the requirement of metro rail for any city.	**4**	**CO1**
Q2.	Enumerate the four different methods of metro project financing?	**4**	**CO2**
Q3.	List any six basic components of Electronic Communications Systems required for a metro rail project.	**4**	**CO3**
Q4.	Why is there a need for a PIDS and a PAS system at a metro station? Is it possible to have only one of the two selected?	**4**	**CO3**
Q5.	Which are the various site components required at the construction site of a metro rail project in an urban setting.	**4**	**CO4**
	SECTION B		
Q6.	Discuss the use of a metro rail as a demand management strategy for an urban region. Is there any requirement of a metro rail for a city of population 30 lakh?	**10**	**CO1**
Q7.	Elaborate on the various multimodal transportation connectivity to be provided for a metro project.	**10**	**CO2**
Q8.	Differentiate between the short-line method and long-line method utilized for pre-cast elements for a metro project. Use technical drawings and explanations to corroborate your points.	**10**	**CO4**
	OR		
Q8.	Discuss the use of pre-cast segments for viaduct construction versus cast-in situ construction. Which is preferable for an urban environment, the exception case and limitations of both.	**10**	**CO4**
Q9.	Why is AFC required at any metro rail system and how does it aid in faster travel times? Explain how the advancements in electrical, electronic & communications, mechanical, mechatronics, IT and computers aid in making transportation facilities efficient in any growing urban environment.	**10**	**CO3**
	SECTION C		
Q10.	What are the various types of platform doors? And how the various inter-disciplinary involvements are required for deploying an appropriate platform door system at any metro project.	**20**	**CO3**

	OR		
Q10.	List the various types of rail signal system. Draw the grid for types of light and signals for railways. Discuss any two rail signal system type in detail.	**20**	**CO3**
Q11.	Discuss the two different methods of underground construction, namely cut-and-cover and tunneling using TBM. Consider the parameters of ease of construction, space required during construction, types of terrain and types of TBM, land acquisition, construction time, accuracy and social impact in an urban environment when discussing your perspective. Use technical drawings and explanations to corroborate your points.	**20**	**CO4**