Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
Online End Semester Examination, June 2021

Course: Bridge Engineering **Semester: II**
Program: M.Tech Civil Engg **Time 03 hrs.**
Course Code: CIVL 7022P **Max. Marks: 100**

Instructions: This is open book examination . Use of notes, codes and other reference material is permitted. Any data required and not provided should be assumed suitably and clearly stated.

SECTION A (30 Marks)

S. No.		Marks	CO
Q 1	In a medium span, beam and slab bridge, what is the condition of economic span.	**5**	**CO1**
Q 2	In a narrow space which type of segmental bridge is preferred, deck type or through type. Give reason.	**5**	**CO1**
Q 3	How much width should be provided in a two lane highway bridge, after allowing for crash barriers and railings.	**5**	**CO1**
Q 4	A box girder culvert bridge does not normally require substructure like piers and embankments. Why.	**5**	**CO4**
Q 5	What is the role of PTFE pad in an elastomeric bearing.	**5**	**CO4**
Q 6	In a cantilever type of construction of precast segmental metro viaducts, construction should be carried out simultaneously on both sides of pier. Why.	**5**	**CO4**
	SECTION B (50 Marks)		
Q 7	A box culvert bridge of span 20m is to be constructed over a two lane state highway crossing a river having maximum water depth as 2m. Design the bridge for Class A loading as per IRC code. Assume free board of 0.5m. Design a box section in the middle of bridge as follows: Fixing dimensions of box section for the bridge.	**10**	**CO2**
Q 8	In continuation of Q7 of section B. Do the following: Calculation of maximum loading intensity from effective width considerations.	**10**	**CO2**
Q 9	In continuation of Q7 of section B. Do the following: Calculation of fixed end moments due to dead load and live load	**10**	**CO2**
Q 10	In continuation of Q7 of section B. Do the following: Moment distribution and Design of box section	**10**	**CO2**
Q 11	In continuation of Q7 of section B. Do the following: Sketch of reinforcement in box section.	**10**	**CO2**

SECTION-C (20 Marks)			
Q 12	A deck type two track precast segmental bridge is to be constructed for metro train. The bridge has spans of effective length 80m each. The bridge is constructed from box type precast segments having following dimensions: Width of top flange = 7.5m Flange outstands from box section= 1.5m each Flange thickness varies from 0.2m at end to 0.5m to box junction Box segment thickness = 0.25m Suggest a suitable depth for the segment, and calculate: a. Location of neutral axis from the top of segment, b. Moment of Inertia of the segment about the neutral axis c. Section modulus of the segment above and below the neutral axis. Sketch the segment showing all the above details. **OR** What is match casting and wet casting process for joining the segments for construction of segmental long bridges. Explain through figure the difference between segments used in match casting and wet casting process. Illustrate through sketches, how in the balanced cantilever method, the prestressing wires are installed in segments in various stages for design and construction of segmental long bridges.	**20**	**CO3**