Name:

Enrolment No:

UPES
UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2019

Course: Design of Flexible and Rigid Pavements (IRC codes) **Semester: VIII**
Program: B Tech Civil Engineering **Time 03 hrs.**
Course Code: CEEG 472 **Max. Marks: 100**

Instructions: use of IRC 37 and IRC 58 allowed

SECTION A
Answer all questions

S. No.		Marks	CO
Q 1	Define flexible pavement according to IRC 37 2001.	**4**	**1**
Q 2	Differentiate edge stresses and corner stresses.	**4**	**2**
Q 3	Write a note on surface dressing.	**4**	**3**
Q 4	Define rutting.	**4**	**4**
Q 5	When and where overlays are used.	**4**	**4**
	SECTION B Answer all questions		
Q 6	Calculate the MSA for a dual carriageway, flexible pavement to be constructed with an initial traffic of 4000 cvpd, 7.5 % annual growth rate on a hilly terrain.	**10**	**1**
Q 7	Calculate the edge temperature stresses developed for a rigid pavement of dimensions 4m X 3m, thickness = 20 cm, modulus of subgrade reaction = 8 kg/cm^3 and coefficient of thermal expansion = 10 X 10 $^{-6}$/°C in Varanasi region.	**10**	**2**
Q 8	Critically explain the steps involved in Flexible pavement construction.	**10**	**3**
Q 9	Explain how benkelmen beam method is used in finding road deflections. (OR) Explain how LCCA plays a role in understanding the future of Indian roads	**10**	**4**
	SECTION-C Answer all questions		
Q 10	Design a flexible pavement for Bengaluru region with an initial traffic of 5000 cvpd and CBR value of 6.0, assume the data and support your assumptions, critically comment on the design.	**20**	**1**
Q 11	List the failures of flexible pavements, and explain their causes, support your answers with neat sketches. OR List the maintenance techniques adopted by PWD and NHAI and comment on their specifications, also support your answers with the investments needed for maintenance	**20**	**4**

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SECTION A
Answer all questions

S. No.		Marks	CO
Q 1	Define flexible pavement according to IRC – 37 , 2012.	**4**	**1**
Q 2	Differentiate warping stresses and frictional stresses.	**4**	**2**
Q 3	Write a note on bituminous carpeting.	**4**	**3**
Q 4	Define stripping in flexible pavements.	**4**	**4**
Q 5	Define serviceability of a road.	**4**	**4**
	SECTION B Answer all questions		
Q 6	Calculate the MSA for a four-lane single carriageway road, flexible pavement to be constructed with an initial traffic of 3000 cvpd, 7. 0% annual growth rate on a plain terrain.	**10**	**1**
Q 7	Calculate the edge temperature stresses developed for a rigid pavement of dimensions 4.5m X 3.5m, thickness = 18 cm, modulus of subgrade reaction = 6 kg/cm^3 and coefficient of thermal expansion = 10 X 10 $^{-6}$/°C in Ahmedabad region.	**10**	**2**
Q 8	Critically explain the steps involved in Rigid pavement construction.	**10**	**3**
Q 9	Explain how MERLIN method is used in finding road deflections. (OR) Explain how PSI plays a role in understanding the future of Indian roads.	**10**	**4**
	SECTION-C Answer all questions		
Q 10	Design a Rigid pavement for Bengaluru region with an initial traffic of 8000 cvpd and CBR value of 8.0, assume the data and support your assumptions, critically comment on the design.	**20**	**2**
Q 11	List the failures of Rigid pavements, and explain their causes, support your answers with neat sketches. OR List the methods of overlaying of roads, mention their advantages and disadvantages and their suitability on existing road condition.	**20**	**4**