

<b>Name:</b>	
<b>Enrolment No:</b>	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2019**

**Course: Safety in Rail and Road Transport**  
**Programme: B Tech (FSE)**  
**Max. Marks: 100**

**Semester: VII**  
**Time: 03 hrs.**  
**Course Code: FSEG414**

**Instructions: Write your assumptions carefully and attempt all the questions**

**Set A**

**SECTION A**

S. No.		Marks	CO
Q1.	Explain coning and canting of wheels in railway engineering. Draw relevant cross-section diagram with technical details to corroborate your answer.	4	CO1
Q2.	What are horizontal curves. Explain using relevant technical drawings and label them appropriately.	4	CO2
Q3.	Discuss the principles of track circuit control.	4	CO3
Q4.	What are the different causes of accidents on a roadway network?	4	CO4
Q5.	Explain the importance of level crossing in terms of safety.	4	CO4

**SECTION B**

Q6.	Summarize the various factors controlling the highway alignment and write about any one of the factors in detail?	10	CO6
Q7.	Write a note on highway intersections with respect to safe and efficient traffic movement.	10	CO7
Q8.	Define gauge in railway track? Draw a cross-section to explain it. Detail the types of gauge and required changes in Indian railways.	10	CO1 & CO5

**OR**

Q8.	Discuss the requirements of an ideal rail joint. Explain in detail and with diagrams how rail joints are classified based on different criteria.	10	CO2
Q9.	Write a short note on following; (i) Grade compensation on curves, (ii) Pusher gradient, (iii) Moment	10	CO3

**SECTION C**

Q10.	Evaluate the function of super-elevation in railways? Calculate the super-elevation and maximum permissible speed for a 2-degree BG transitioned curve on a high-speed route with a maximum sanctioned speed of 100 KM/h. The speed for calculating the equilibrium super-elevation is 80 KM/h and the booked speed of goods trains is 45 KM/h.	20	CO4
	<b>OR</b>		
Q10.	Write a note on sleepers. Differentiate between mono-block and two-block concrete sleepers. Draw relevant technical drawings.	20	CO5
Q11.	Discuss the importance of lighting in highway safety?  (i) List the various types of lamps available for roadway lighting. Explain the concept of luminaire distribution of light using relevant technical drawing with the technical labels. (ii) Detail the various types of spacing of lighting units, draw plans of each type? (iii) Define height and overhang mounting of roadway light?	20	CO7