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

Course: Safety in Rail and Road Transport   Semester: VII
Programme: B Tech FSE   Time: 03 hrs.
No of pages: 2   Max. Marks: 100
Instructions:

SECTION A

S. No.		Marks	CO
Q 1	Define the following terms • Camber • Carriage Way • Kerbs • Shoulders	4 x1	CO5
Q 2	Define 'creep of rail'. What are its causes and effects?	4	CO3
Q 3	Enumerate the various stresses induced on rails of a permanent way	4	CO1
Q 4	List out the various gauges prevailing in India with their gauge widths. What factors govern the selection of a suitable gauge?	4	CO1
Q 5	What are advantages of CMS crossings over built up crossing?	4	CO4
	SECTION B		
Q 6	Discuss the classification and specifications of traffic signs as per Indian Roads Congress, (IRC) 67 standard.	10	CO3
Q 7	Briefly describe semaphore signals and coloured light signals used in railways	6+4	CO4
Q 8	Draw a neat sketch of a right-hand turnout taking off from a straight broad gauge track and name various components and important terms connected with the layout	10	CO4
Q 9	Draw a typical cross section of a permanent way. Explain briefly the functions of the various components of the railway track.	3+7	CO1
	SECTION-C		
Q 10	a) Derive the expression for equilibrium superelevation on a curved track. b) Calculate the superelevation and maximum permissible speed, for a 3° curve on a high-speed BG section with a maximum sanctioned speed of 110 km/h. Assume the equilibrium speed to be 80 km/h and the booked speed of the goods	10+10	CO2

	train to be 50 km/h			
Q 11	a) Derive the equation for obtaining 'overtaking sight distance' with the help of time-space diagram.	**10**		
	b) The speed of overtaking and overtaken vehicle are 80 and 50 kmph, respectively on a two-way traffic road. The average acceleration may be 0.80m/sec square. Assume reaction time of 3 seconds Calculate the safe overtaking sight distance, minimum and desirable length of overtaking zone	**10**	**CO5**
	Or			
	c) Illustrate various cross sectional elements of highway as per IRC:73	**10**		

Name of Examination (Please tick, symbol is given)	:	MID		END		SUPPLE	⊟
Name of the School (Please tick, symbol is given)	:	SOE	⊟	SOCS		SOP	
Programme	:	B Tech FSE					
Semester	:	VII					
Name of the Course	:	Safety in Rail and Road Transport					
Course Code	:	FSEG 414					
Name of Question Paper Setter	:	Arun P A					
Employee Code	:	40001673					
Mobile & Extension	:	9072346002/1350					

Note: Please mention additional Stationery to be provided, during examination such as Table/Graph Sheet etc. else mention "NOT APPLICABLE":

FOR SRE DEPARTMENT

Date of Examination	:	
Time of Examination	:	
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Note: - Pl. start your question paper from next page

Model Question Paper (Blank) is on next page

Name:	UPES
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SECTION A

S. No.		Marks	CO
Q 1	Define the following • Stock rail • Tongue rail • Turnout • Points and crossings	5	CO4
Q 2	Explain the different aspects and meaning of upper quadrant semaphore stop signal.	5	CO4
Q 3	Compare the characteristics of the different types of sleepers used in our country.	5	CO1
Q 4	What do you understand by negative superelevation?	5	CO2

SECTION B

Q 5	What are major defects in rails? List out the causes rail defects. Categorize the types of rail wear and enumerate the methods by which wear in rails can be measured.	10	CO3
Q 6	Define 'creep of rail'. What are its causes and effects? Describe the various theories that have been put forward to explain the development of creep?	2+3+5	CO1
Q 7	Derive the expression for equilibrium superelevation on a curved track.	10	CO2
Q 8	Discuss the design parameters of turnouts with a neat sketch.	7+3	CO4

SECTION-C

Q 9	a) Draw a typical cross section of a permanent way. Explain briefly functions of various components of railway track. Or b) Illustrate various cross sectional elements of highway as per IRC:73	5+15 20	CO1 CO5
Q 10	a) Derive the equation for obtaining overtaking sight distance with the help of time-space diagram. b) The speed of overtaking and overtaken vehicle are 80 and 50 kmph, respectively on a two-way traffic road. The average acceleration may be 0.80m/sec square. Assume reaction time of 3 seconds Calculate the safe overtaking sight distance, minimum and desirable length of overtaking zone.	10+10	CO5