Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2019

CE3EL07 Transportation Bridges & Tunnels

Programme: B.Tech. Branch/Specialisation: CE

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Fish plate is used: **1**

(a) To connect two rails at the end

(b) To connect the rail with sleeper

(c) To reduce creep

(d) For all three purposes

ii. Sand ballast is covered by stone layer to: **1**

(a) Prevent blowing off sand

(b) To strengthen the sand ballast

(c) to provide proper drainage

(d) None of these

iii. Safe speed of the railway track is calculated by using: **1**

(a) Using martins formula

(b) Using cant formula

(c) Using length of transition curve

(d) All of these

iv. Which of the transition curve is used in Indian railway: **1**

(a) Spiral (b) Cubic parabola

(c) Circular (d) Bernoulli lemniscate

v. The runway orientation is mad so that landing: **1**

(a) Against the wind direction

(b) Along the wind direction

(c) Perpendicular

(d) None of these

P.T.O.

vi. Which of the following signal is installed as the second signal post for better visibility: **1**
(a) Routing signal (b) Calling on signal signal
(c) Co-acting signal (d) Repeating signal

vii. What is the twisting force on a bridge called? **1**
(a) Shear (b) Torsion (c) Tension (d) Jay-Z

viii. What are the two ends of a bridge that support its weight? **1**
(a) Span (b) Abutment (c) Cable (d) Pier

ix. Which of the following methods of tunnelling is used for long tunnels at great depths? **1**
(a) Army method (b) Needle beam method
(c) Austrian method (d) English method

x. Circular section of tunnels is not suitable for: **1**
(a) Carrying water
(b) Non-cohesive soils
(c) Tunnels driven by shield method
(d) Placement of concrete lining

Q.2 Attempt any two:

i. Explain the Railway transportation in India and all over the world. **5**

ii. How rails are welded? Explain the advantages of welding rails. **5**

iii. What are the requirements of good sleepers? Compare the different types of sleepers. **5**

Q.3 i. What is superevlevation? Explain briefly. **3**

ii. Discuss the various types of Tractive Resistances which a locomotive has to overcome on railway track. **7**

OR iii. Calculate the maximum permissible speed on a curve of high speed B.G. track having following particulars: **7**

Degree of the curve = 1^0
Amount of superelevation = 8.0 cm
Length of transition curve = 130 m
Maximum speed of the section likely to be sanctioned = 153 KMPH.

Q.4 i. Explain briefly the different types of station yards. **4**

ii. Explain transition curves and why it is necessary in Railway track. Write down equation to setting these curves. **6**

OR iii. What are the objects of signalling? Describe the engineering principles of signalling and explain the different types of signals used in station yard. **6**

Q.5 i. Explain causes of foundation failures. **3**

ii. Describe the procedure of construction of well foundation. **7**

OR iii. Explain the various forces, loads and stresses which are to be considered in the design of a bridge. **7**

Q.6 i. How an ideal route is selected for tunnel. **3**

ii. Discuss the different methods of construction of tunnel in soft soil through neat sketches. **7**

OR iii. Explain the various types of linings with the help of neat sketches. **7**

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Marking Scheme
CE3EL07 Transportation Bridges & Tunnels

Q.1	i.	Fish plate is used: (a) To connect two rails at the end		**1**
	ii.	Sand ballast is covered by stone layer to: (a) Prevent blowing off sand		**1**
	iii.	Safe speed of the railway track is calculated by using: (d) All of these		**1**
	iv.	Which of the transition curve is used in Indian railway: (b) Cubic parabola		**1**
	v.	The runway orientation is mad so that landing: (a) Against the wind direction		**1**
	vi.	Which of the following signal is installed as the second signal post for better visibility: (c) Co-acting signal		**1**
	vii.	What is the twisting force on a bridge called? (b) Torsion		**1**
	viii.	What are the two ends of a bridge that support its weight? (b) Abutment		**1**
	ix.	Which of the following methods of tunnelling is used for long tunnels at great depths? (c) Austrian method		**1**
	x.	Circular section of tunnels is not suitable for: (d) Placement of concrete lining		**1**
Q.2		Attempt any two:		
	i.	Railway transportation in India	3 marks	**5**
		Railway transportation world	2 marks	
	ii.	Welding of rails	2 marks	**5**
		Advantages of welding rails		
		Any three 1 mark for each (1 mark * 3)	3 marks	
	iii.	Requirements of good sleepers	3 marks	**5**
		Comparison of different types of sleepers.	2 marks	
Q.3	i.	Definition of superevlevation	1 mark	**3**
		Explanation	1 mark	
		Formula	1 mark	
	ii.	Tractive Resistances	1 mark	**7**
		Types of Tractive Resistances		
		Any three 2 marks for each (2 marks * 3)	6 marks	
OR	iii.	Calculation of volume of R	3.5 marks	**7**
		Calculation of volume of e	3.5 marks	
Q.4	i.	Types of station yards with diagram		**4**
		At least two types 2 marks for each	(2 marks * 2)	
	ii.	Definition of transition curves	1 mark	**6**
		Necessity in Railway track	1 mark	
		Explanation and equation to setting these curves	4 marks	
OR	iii.	Objects of signalling	1 mark	**6**
		Engineering principles of signalling	1 mark	
		Types of signals used in station yard	4 marks	
Q.5	i.	At least three causes of foundation failures.		**3**
		1 mark for each cause	(1 mark * 3)	
	ii.	Procedure of construction of well foundation.		**7**
		Diagram	2 marks	
		Explanation	5 marks	
OR	iii.	Forces on bridges	2 marks	**7**
		Forces on loads	2 marks	
		Forces on stresses	3 marks	
Q.6	i.	Ideal route criteria		**3**
		At least three points 1 mark for each	(1 mark * 3)	
	ii.	Construction of tunnel in soft soil		**7**
		Enlist of methods	2 marks	
		Explanation of any two	5 marks	
OR	iii.	Tunnel lining	1 mark	**7**
		Three types of linings with diagram		
		2 marks for each type (2 marks * 3)	6 marks	

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