

B. CIVIL ENGINEERING (EVENING) 3RD YEAR 2ND SEMESTER EXAMINATION 2018
TRANSPORTATION ENGINEERING – I

Time: 3 Hours

Full Marks: 100

Part I

(50 marks for each part)

Use Separate Answer scripts for each Part
 Answer Question No 1 and any TWO questions from the rest

1. Answer the following – 6×4
 - a. Name and Explain the different types of raised up structures on carriageway
 - b. Explain Exceptional Gradient and Minimum Longitudinal Gradient with their significance
 - c. Explain the terms used in following model of Bombay Plan used for finding the length of national highways – $A/64 + B/80 + C/96 + 32K + 8M + D$
 - d. State how are the information about following characteristics used in geometric design of highways – height of a vehicle, road surface glare and fatigue of user

 2. a) Determine the safe stopping sight distance for a single lane two-way minor district road with design speed of 40kmph, reaction time = 2.5secs, coefficient of braking friction = 0.37, braking efficiency = 90% and longitudinal slope of 4% 4

 b) Determine the desirable length of overtaking zone for a 4-lane 2-way undivided highway with design speed of 80kmph, reaction time = 2sec, maximum speed of overtaken vehicle = 64Kmph, and acceleration of overtaking vehicle = 3.6Kmph/sec.
 How and by how much this length of overtaking zone can be decreased without changing any design vehicular characteristics 6+3

 3. A horizontal curve is to be designed for a 4-lane 2-way divided highway catering mixed traffic with average wheel base length of 5m. Design the safe radius for a design speed of 60kmph checking only against super elevation (maximum permissible super elevation and coefficient of lateral friction are 7% and 0.15 respectively). Also design the required extra width and transition length if the super elevation is provided by rotating about centre line at a rate of 1 in 125.
 The highway runs on ground level with 0.5m wide side drain and 3m wide shoulder on both sides. The design SSD and OSD are 90m and 165m respectively. Find the minimum distance required between edges of side drains and building line if i) overtaking is allowed in the curve and ii) not allowed in the curve. 9+4

 4. a) Draw neatly a proper labelled conflict diagram for a perpendicular crossing of two 2-lane 2-way divided roads. 6

 b) Draw a typical Clover leaf interchange and mark the conflict points therein 5

 c) What is the compensated grade when a 200m radius curve is to be set in a +4.5% grade? 2
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B.E. CIVIL ENGINEERING (PART TIME) THIRD YEAR SECOND SEMESTER - 2018

Subject: TRANSPORTATION ENGG. – I

Time: 3 Hours

Full Marks: 50

Part – II

**Instructions: Use Separate Answer Scripts for each Part
No code or chart is allowed.
Answer all questions.**

1. a) Draw a cross section of permanent way and level all the components clearly. (5)
b) Draw a neat sketch of a turnout and level different components clearly. What is meant by heel divergence and what is its standard values for 1 in 8.5 and 1 in 12 turnouts. (5+2+2)
c) Which type of rail is being used now-a-days and what are its relative advantages? Write down the requirements of an ideal rail section. (4+4)
2. a) What are the different groups of railway routes found in India? Mention the speed potentials of those groups. (2+2)
b) Calculate the approximate maximum axle load for a 52 Kg/m rail section? What do you mean by 90 UTS rail? (2+1)
c) Define Continuous Welded Rail (CWR), LWR and SWR. (2+2+1)
d) A 5° curve diverges out from a 2° curved main line in reverse direction of a B.G line. The maximum permissible speed on branch line is 24kmph. Calculate the negative super-elevation to be provided on branch line and the maximum permissible speed on main line. (6)
3. a) Calculate the number of sleepers required to construct a track of length 2 km on a BG route with sleeper density (M+8). (2)
b) What is a Turnout? How is it classified as Left hand and Right hand? (2+2)
c) Show that $(CL \approx 2GN)$ by Coles Method in connection with turnout in railway track. (4)