B.E . Construction Engineering 3rd year First Semester   EXAMINATION-2018

Time 3 hours   Transportation Engineering   **Full Marks 100**

Question no 6 is mandatory and answer any four questions from the remaining.

Assume relevant data if required.

Q-1. (a) Prove that the degree of a curve is equal to 1750/R if R is in metre.   (5)

(b) write notes on the following (i) Cant deficiency (ii) Cant excess (iii) Equilibrium speed (iv) Cant gradient   (4*3 = 12)

© A rising gradient of 1 : 100 meets a falling gradient of 1 : 200 on a group A route. The intersection point has a chainage of 1100 m and its R.L is 90 m . Calculate the length of the vertical curve, RL of start and end point on curve in order to set a vertical curve at this site.   (6)

Q-2. (a) Describe with neat sketch the details of a rail crossing .   (5)

(b) Find out the maximum axle load in relation to a 90 R section and 60 kg rail (3)

© Discuss the correlation between the carrying capacity of railway track and its UTS. (5)

(d) If the sleeper density of a BG track is (M+6) in metric units. Determine the numbers of sleepers required in 1.04 km length of track.   (5)

(e) Determine the depth of ballast required in a BG track. Name the factors on which the pressure distribution in the ballast section depends significantly.   (5)

Q-3.(a) Calculate the super elevation , maximum permissible speed , and the transition length for a 3 degree curve on a Mumbai-Delhi Rajdhani route , with a maximum sanctioned speed of (10A kmph where, A is the last digit of exam roll number). Assume the equilibrium speed as 85 kmph and the booked speed of goods train as 50 kmph.   (15)

(b) Calculate the basic capacity of a lane of a road of a state highway for light weight vehicle and heavy commercial vehicle located at plain terrain. Assume the average length of light weight vehicle as 4.5 m and heavy commercial vehicle as 6.0 m.   (8)

Q-4. (a) A two lane undivided national highway is passing through kharagpur area of West Bengal without any raised kerbs .If the design speed is considered as 8A in kmph , (where A is the last digit of exam roll number) find out the radius of the curve considering equal to the minimum ruling radius and also the length of the transition curve and the extra widening at curve if required. Assume relevant data if necessary.   (16)

(b) Explain the significance of journey speed and running speed in relation to the traffic management of a city.   (7)

Q-5(a) write notes on the following

(i) Lucknow plan (ii) Right of way (iii) Grade compensation (iv) PIEV theory (v) Pavement shoulder

(5*4 = 20)

(b) Define space mean speed.

(3)

Q-6 (i) A rail brand has a mark IRS-52 kg:- 710-TISCO-II 1998 –OB; here OB represents (a) Brand of rail (b) type of boiler used (c) process of steel making (d) classification of strength

(ii) To prevent percolation of water in to the formation , moorum is used as a blanket for (a) black cotton soil (b) sandy soil (c) clayey soil (d) all of these

(iii) Recommended width of ballast for BG (A) route is (a) 3650 mm (b) 3350 mm (c) 2750 mm (d) 2290 mm

(iv) The rail section for group A route having traffic density more than 20 GMT is (a) 52 kg (b) 60 kg (c) 90 R (d) 75 R

(v) What do you mean by PMGSY ?

(vi) Define camber of a road

(vii) What do you mean by PCU ?

(viii) Define ruling gradient .

(1*8 = 8)