JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS-2024

B.Tech-Vth Semester (1 to 1) (Civil)

COURSE CODE (CREDITS): 18B11CE511(3)   MAX. MARKS: 35

COURSE NAME: Highway Engineering

COURSE INSTRUCTORS: Dr. Amardeep   MAX. TIME: 2 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q1. At a right angled intersection of two roads, Road 1 has four lanes with a total width of 12 m and Road 2 has two lanes with a total width of 6.6 m. The volume of traffic approaching the intersection during deign hour are 900 an 743 PCU/hour on the two approaches of road 1 and 278 and 180 PCU/hour on the two approaches of Road 2. Design the traffic signals timings as per IRC guidelines. [CO5]   [6]

Q2. Discuss in detail about the different warrants required for the traffic control signal installation. [CO5]   [4]

Q3. Discuss different method of design of traffic signals. [CO5]   [5]

Q4. Please specify the PCU values of Bus, Car and Two Wheeler at signalized intersection and Kerb parking for an urban road. [CO3]   [2]

Q5. Please discuss the application of origin and destination study in details and make a list of the different methods of the same. [CO3]   [3]

Q6. The speed of overtaking and overtaken vehicles are 80 kmph and 60 kmph respectively on a two way traffic road. If the acceleration of the overtaking vehicle is 0.9 m/sec^2, calculate the safe overtaking sight distance. [CO2 & 3]   [5]

Q7. A major district road of WBM is to be constructed for a width of 3.8 m in a heavy rainfall region. Calculate the height of the crown with respect to the edges. [CO3]   [1]

Q8. A car follows a slow moving truck (travelling at a speed of 20 m/s) on a two- lane two-way highway. The car reduces its speed to 10 m/s and follows the truck maintaining a distance of 16 m from the truck. On finding a clear gap in the opposing traffic stream, the car accelerates at an average rate of 4 m/s2, overtakes the truck and returns to its original lane. When it returns to its original lane, the distance between the car and the truck is 16 m. The total distance covered by the car during this period (from the time it leaves its lane and subsequently returns to its lane after overtaking). [CO3]

a. 64 m b. 72 m c. 128 m d. 144 m   [3]

Q9. The radius of a horizontal circular curve on a highway is 120 m. The design speed is 60 km/hour, and the design coefficient of lateral friction between the tyre and the road surface I 0.15. The estimated value of superelevation required (if full lateral friction is assumed to develop), and the value of coefficient of friction needed (if no superelevation is provided) will, respectively, be [CO2]

a. 1/11.6 and 0.10   **b.** 1/10.5 and 0.37   **c.** 1/11.6 and 0.24   **d.** 1/12.9 and 0.24   [3]

Q10. A two lane, one-way road with radius of 50 m is predominantly carrying lorries with wheelbase of 5 m. The speed of lorries is restricted to be between 60 kmph and 80 kmph. The mechanical widening and psychological widening required at 60 kmph are designated as $W_{me,60}$ and $W_{ps,60}$ respectively. The mechanical widening and psychological widening required at 80 kmph are designated as $W_{me,80}$ and $W_{ps,80}$ respectively. The correct values of $W_{me,60}$, $W_{ps,60}$, $W_{me,80}$, $W_{ps,80}$, respectively are [CO3]   [3]

a. 0.89 m, 0.50 m, 1.19 m, and 0.50 m
b. 0.50 m, 0.89 m, 0.50 m, and 1.19 m
c. 0.50 m, 1.19 m, 0.50 m, and 0.89 m
d. 1.19 m, 0.50 m, 0.89 m, and 0.50 m