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Total Number of Pages: 2

B.Tech
PCCI4302

5th Semester Regular / Back Examination 2016-17
TRANSPORTATION ENGINEERING - I

BRANCH: CIVIL

Time: 3 Hours

Max Marks: 70

Q.CODE: Y438

Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 Answer the following questions: (2 x 10)

- What are the functions of IRC?
- Differentiate between Lay bay and Bus Bays.
- Define terrain. State the standard specifications of different type terrains according to IRC: 73.
- Define Thirtieth highest design hourly volume. What is 98th, 85th and 15th percentile speed?
- Why 75% of design speed is taken for design of superelevation? What do you mean by equilibrium superelevation.
- What is Critical length of grade? As per the IRC, what are the values of ruling gradient on plain, rolling, mountainous and steep terrain?
- As per IRC:37-2012, What is SAMI layer?
- Define angularity number. What is the significance of angularity test?
- Find basic capacity of the lane, If the velocity of moving vehicle on a lane is 60 kmph, stopping distance is 25 m and average length of vehicle is 5 m.
- Why Dowel bar and Tie bars are provided in rigid pavement

Q2 a) An ascending gradient of 1 in 50 meets a descending gradient of 1 in 75. Design the length of summit curve for SSD and OSD. Following data are given below: (8)

- Two-way traffic on a two lane road
- Design speed of vehicle is 80 kmph
- Coefficient of longitudinal friction is 0.35
- Overtaking acceleration is 2.56 kmph/sec
- Height of eye level of driver above roadway surface is 1.2 m
- Height of object above the pavement surface is 0.5 m

Assume any other data as per IRC

b) Calculate the absolute minimum and ruling minimum radius of horizontal curve for a design speed of 75 kmph. (2)

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- Q3 a)** What is Central Road Fund Act, 2000 and state how the fund is being distributed for different schemes of roads development activities? **(5)**
- b)** Calculate the road length required for a district based on Nagpur road plan, Following data are given below: **(5)**
- Total area = 8300 km²
 - Agricultural area = 3000 km²
 - Length of railway track = 65 km
 - Number of villages with population range < 500, 501-1000, 1001-2000, 2001-5000 and above 5001 are 410, 300, 110, 45 and 15 respectively.
 - Number of towns and village with population range 2001-5000 and 5001- 10000 are 110 and 40 respectively.
- Q4 a)** Derive an expression for finding the extra widening required on horizontal curve. How is the widening of pavements introduce in the field **(5)**
- b)** What are the various tests for judging the suitability of road stones? Explain the shape test of aggregate **(5)**
- Q5 a)** Why Origin and Destination studies are conducted for a road? What are the methods for conducting these studies? Explain any one. **(6)**
- b)** An observer travelling at a constant speed of 70 kmph with the traffic stream over a 8 km stretch is passed by 20 vehicles more than he passes. When the observer travels against the stream at the same speed, the number of vehicle he meets is 300. Calculate the flow of traffic stream. **(4)**
- Q6 a)** What are the significance of drainage? Explain how the filter material is designed for use in sub-surface drainage system. **(5)**
- b)** What are the various causes of formation of wave and corrugations in flexible pavements? Suggest remedial measures. **(5)**
- Q7 a)** Briefly explain the major difference between IRC: 37-2001 and IRC: 37-2012 guide line for design of flexible pavement. **(6)**
- b)** Differentiate between flexible pavement and rigid pavement. **(4)**
- Q8 Write short note on the following: (2.5 x 4)**
- a)** Telford Road Construction
 - b)** Perpetual Pavement
 - c)** Economic span of bridge
 - d)** Mastic Asphalt
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