Roll No.............................

Total. No. of Questions : 09]   [Total No. of Pages : 02

Paper ID [CE311]

(Please fill this Paper ID in OMR Sheet)

B. Tech. (Civil) (Sem. - 5th)

TRANSPORTATION ENGINEERING - I (CE - 311)

Time : 03 Hours   Maximum Marks : 60

Instruction to Candidates:

1) Section - A is **Compulsory**.

2) Attempt any **Four** questions from Section - B.

3) Attempt any **Two** questions from Section - C.

Section - A

$(10 \times 2 = 20)$

Q1) a) Briefly explain: Central Road Research Institute and Highway Research Board.

b) What are expressways?

c) Differentiate between slip and skid.

d) Discuss the necessity of providing super elevation on roads.

e) What is extra widening and why it is provided?

f) List the various tests conducted on aggregates to be used for highways.

g) What is Mastic Asphalt?

h) Discuss relative merits and demerits of parallel and angle type of kerb parking.

i) Briefly discuss different types of drains used in hill roads.

j) Calculate stopping sight distance for a road for which the designs speed is 50 kmph. The brake efficiency is 40% and reaction time of the driver is 2.5 seconds.

Section - B

$(4 \times 5 = 20)$

Q2) What are planning surveys? Explain the objective of each survey with regards to road planning.

Q3) Calculate the super elevation to be provided for a horizontal curve with radius 400 m for a design speed of 90 kmph in plain terrain. Comment on the results. What is the coefficient of lateral friction mobilized if super elevation is restricted to 0.07?

Q4) A descending gradient of 1 in 25 meets an ascending gradient of 1 in 30. Calculate the length of the valley curve; assume design speed as 60 kmph.

Q5) What is the function of transition curve in road alignment? Determine the length of transition in a horizontal alignment for a speed of 96 kmph and radius of curve as 345 m.

Q6) (a) State different type of traffic signals used at road crossings and state their relative merits.

(b) Discuss the various types of road signs.

Section - C

$(2 \times 10 = 20)$

Q7) (a) Write down the construction steps of water bound macadam road.

(b) Explain the requirements of joints filler and sealer. Discuss the desirable properties and various materials in use.

Q8) What are the factors that contribute to select the alignment of roads in plains as well as hill terrain? How do geological conditions affect the location?

Q9) (a) What are various tests carried out on bitumen? Briefly mention the principle and uses of each.

(b) Briefly explain mud pumping and bleeding.

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