Registration No :

Total Number of Pages : 02   **B.Tech.**
PCI4G001

4th Semester Back Examination 2017-18
HIGHWAY & TRAFFIC ENGINEERING
BRANCH : CIVIL
Time : 3 Hours
Max Marks : 100
Q.CODE : C1144
Answer Part-A which is compulsory and any four from Part-B.
The figures in the right hand margin indicate marks.
Answer all parts of a question at a place.

Part – A (Answer all the questions)

Q1   **Answer the following questions:**   **(2 x 10)**

a) Camber in the road is provided for
   a) effective drainage   b) counteracting the centrifugal force
   c) having proper sight distance   d) none of the above

b) on a single lane road with two way traffic, the minimum stopping sight distance is equal to
   a) stopping distance   b) two times the stopping distance
   c) half the stopping distance   d) three times the stopping distance

c) The terrain may be classified as rolling terrain if the cross slope of land is
   a) upto 10%   b) between 10% and 25%
   c) between 25% and 60%   d) more than 60%

d) For a constant value of coefficient of lateral friction, the value of required super-elevation increases with
   a) increase in both speed and radius of curve
   b) decrease in both speed and radius of curve
   c) increase in speed and with decrease in radius of curve
   d) decrease in speed and with increase in radius of curve

e) The attainment of superelevation by rotation of the pavement about the inner edge of the pavement
   a) is preferable in steep terrain
   b) results in balancing the earthwork
   c) avoids the drainage problem in fiat terrain
   d) does not change the vertical alignment of road

f) The percentage compensation in gradient for ruling gradient of 4% and horizontal curve of radius 760 m is
   a) 0,1%   b) 1%
   c) 10%   d) no compensation

g) Desire lines are plotted in
   a) traffic volume studies   b) speed studies
   c) accident studies   d) origin and destination studies

h) Tie bars in cement concrete pavements are at
   a) expansion joints   b) contraction joints
   c) warping joints   d) longitudinal joints

i) The main function of prime coat is to
   a) provide bond between old and new surfacing
   b) improve riding quality of pavement
   c) provide bond between the existing base and surfacing of new construction
   d) control dust nuisance

j) As per latest IRC guidelines for designing flexible pavement by CBR method, the load parameter required is
a) number of commercial vehicles per day
b) cumulative standard axles in msa
c) equivalent single axle load
d) number of vehicles

Q2 **Answer the following questions:** (2 x 10)
a) What are the objectives of Highway Research Board?
b) What are the factors controlling the highway alignment?
c) Define PIEV theory.
d) Why are overtaking zones provided?
e) Differentiate between limiting gradient and exceptional gradient.
f) What are the factors on which PCU values depend?
g) What are the different stresses develop in rigid pavement?
h) Differentiate between hydrophilic aggregate and hydrophobic aggregate.
i) What is frost heaving in flexible pavement failure
j) Define Perpetual Pavement as per IRC: 37-2012.

Part – B (Answer any four questions)

Q3 **a)** Compare the construction methods of Telford and Macadam; bring out the points of differences. **(8)**
b) What are the significant recommendations of Jayakar Committee report? How this helped in road development in India? **(7)**

Q4 **a)** Briefly explain the engineering surveys required for locating a new highway. **(8)**
b) Explain how the obligatory points control the highway alignment. With sketches. **(7)**

Q5 **a)** Calculate the stopping sight distance on a highway at a descending gradient of 1 in 30 for design speed of 65 kmph. Assume any other data as per IRC specification. **(8)**
b) Derive an expression for finding the overtaking sight distance. **(7)**

Q6 **a)** The design speed of highway is 85 kmph. There is horizontal curve of radius 270m on a certain locality. Calculate the superelevation needed to maintain this speed. **(8)**
b) Find the total width of two lane roads on a horizontal curve for a new National highway to be aligned along a rolling terrain with a ruling minimum radius having ruling design speed of 85 kmph. Assume necessary data as per IRC **(7)**

Q7 **a)** What are the various tests for judging the suitability of road stones? Briefly explain the impact test of aggregate. **(8)**
b) Enumerate the different methods of carrying out traffic volume studies. Indicate the principle of each. **(7)**

Q8 **a)** What are the various objects and applications of spot-speed studies? **(8)**
b) Differentiate between flexible pavement and rigid pavement. **(7)**

Q9 **a)** Explain the various types of failures in rigid pavement and their causes. **(8)**
b) Specify the materials required for construction of Bituminous Macadam roads. Write down the construction steps for Bituminous Macadam road. **(7)**