| Roll No | | | | | | | | | | | | |
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# PRESIDENCY UNIVERSITY
# BENGALURU

## SCHOOL OF ENGINEERING

### TEST 1

**Winter Semester**: 2021 - 22
**Course Code**: CIV 2016
**Course Name**: Transportation Engineering
**Program & Sem**: B.tech & IV Sem

**Date**: 26-04-2022
**Time**: 03:00 PM to 04:00 PM
**Max Marks**: 30
**Weightage**: 15%

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**Instructions:**

*(i) Read the all questions carefully and answer accordingly.*
*(ii) Question paper consists of 3 parts.*
*(iii) Scientific and Non-programmable calculators are permitted.*

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## Part A [Memory Recall Questions]

**Answer all the Questions. Each question carries 4 marks. (3Qx 4M= 12M)**

1. Define Highway alignment and list the disadvantageous of improper highway alignment.
(C.O.No.1) [Knowledge]
2. List the desirable properties of aggregates to be used in pavement construction
(C.O.No.1) [Knowledge]
3. What are the stages of engineering surveys for highway location? (C.O.No.1) [Knowledge]

## Part B [Thought Provoking Questions]

**Answer both the Questions. Each question carries 5 marks. (2Qx5M=10M)**

4. In order to decide the suitability of the aggregate for use in pavement construction, following tests are carried out:
   a) Crushing test
   b) Abrasion test
   c) Impact test
   d) Soundness test
   e) Shape test

   Identify test and explain the test procedure, which is used to determine the toughness of an aggregates in laboratory. (C.O.No.1) [Comprehension]
5. Obligatory points are the control points governing the highway alignment. Explain obligatory points. With a neat sketch, discuss how these control the alignment.
(C.O.No.1) [Comprehension]

## Part C [Problem Solving Questions]

**Answer the Question. Question carries 8 marks. (1Qx8M=8M)**

6. A Marshall specimen is prepared for bituminous concrete with a bitumen content of 5 percent by weight of total mix. The theoretical and measured unit weights of mix are 2.442 g/cm$^3$ and 2.345 g/cm$^3$, respectively. The bitumen has a specific gravity of 1.02. Calculate the following data related to marshal mix design

a) Air voids percent Vv

b) Percent volume of bitumen Vb

c) Voids in mineral aggregate VMA

d) Voids filled with bitumen VFB (C.O.No.1) [Application]

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**PRESIDENCY UNIVERSITY**
**BENGALURU**

**SCHOOL OF ENGINEERING**

**TEST 2**

**Winter Semester**: 2021 - 22
**Course Code**: CIV 2016
**Course Name**: Transportation Engineering
**Program & Sem**: B.tech & IV

**Date**: 1st June 2022
**Time**: 3:00 PM to 4:00 PM
**Max Marks**: 30
**Weightage**: 15%

**Instructions:**
*(iv) Read the all questions carefully and answer accordingly.*
*(v) Question paper consists of 3 parts.*
*(vi) Scientific and Non-programmable calculators are permitted.*

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**Part A [Memory recall Questions]**

**Answer all the Questions. Each question carries FOUR marks. (3Qx 4M= 12M)**

7. Sight distance is the length of roadway visible to a driver. Define the following types of sight distance common in roadway design
   a) Stopping sight distance
   b) Over taking sight distance (C.O.No.2) [Knowledge]
8. Transition curve has a radius equal to infinite when it meets to straight Road within gradually change to designate radius towards the circular curve. List the objectives of providing transition curve. (C.O.No.2) [Knowledge]
9. Extra width provide to road at horizontal curve, to avoid off tracking due to rigidity of wheelbase. What is off tracking? Explain with sketches. (C.O.No.2) [Knowledge]

**Part B [Thought Provoking Questions]**

**Answer both the Questions. Each question carries FIVE marks. (2Qx5M=10M)**

10. Calculate the extra widening required for a pavement of width 7 m on a horizontal curve of radius 200 m. If the longest wheelbase of vehicle expected on the road is 6.5 m. Design speed is 65 Kmph. (C.O.No.2) [Comprehension]
11. The radius of a horizontal curve is 100 m. The design speed is 50 Kmph and the design coefficient of lateral friction is 0.15.
    a) Calculate the super elevation required if full lateral friction is assumed to develop
    b) Calculate the coefficient of friction needed if no super elevation is provided.

    (C.O.No.2) [Comprehension]

## Part C [Problem Solving Questions]

**Answer the Question. The question carries EIGHT marks. (1Qx8M=8M)**

12. Calculate I) The length of transition curve and II) The shift of the transition curve using the following data:
    a) Design speed = 65 kmph
    b) Radius of horizontal curve = 220 m
    c) Pavement width including extra widening = 7.5 m
    d) Allowable rate of introduction of super elevation (Pavement rotated about the Centre line)
    = 1 in 150. (C.O.No.2) [Application]

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# PRESIDENCY UNIVERSITY
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## SCHOOL OF ENGINEERING

### END TERM EXAMINATION

**Winter Semester**: 2021 - 22
**Course Code**: CIV 2016
**Course Name**: Transportation Engineering
**Program & Sem**: B.Tech & IV Sem

**Date**: 30th June 2022
**Time**: 09:30 AM to 12:30 PM
**Max Marks**: 100
**Weightage**: 50%

**Instructions:**
*(vii) Read the all questions carefully and answer accordingly.*
*(viii) Question paper consists of 3 parts.*
*(ix) Scientific and Non-programmable calculators are permitted.*

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**Part A**

**Answer all the Questions. Each question carries SIX marks. (4Qx 6M= 24M)**

13. Define Highway alignment and List the requirements of highway alignment. (C.O.No.1) [Knowledge]
14. Stopping Sight Distance (SSD) is the minimum sight distance for the driver to stop without colliding at any point of the highway. List the factors on which stopping sight distance depends. (C.O.No.2) [Knowledge]
15. Traffic survey studies are carried out to analyse the traffic characteristics. List any four traffic survey studies carried out in Traffic Engineering. (C.O.No.3) [Knowledge]
16. What is Rail Gauge and list the different categories of rail gauges. (C.O.No.4) [Knowledge]

**Part B**

**Answer all the Questions. Each question carries TEN marks. (4Qx10M=40M)**

17. In order to decide the suitability of the aggregate for use in pavement construction, following tests are carried out:
    a) Crushing test
    b) Abrasion test
    c) Impact test
    d) Soundness test
    e) Shape test
    Identify the test and explain the test procedure, which is used to determine the hardness of aggregates in laboratory. (C.O.No.1) [Comprehension]
18. Estimate the theoretical capacity of a traffic lane with one-way traffic flow at a stream speed of 40 kmph. Assume the average space gap between vehicles to follow the relation

$S = 0.278\ Vt + L.$

Where V is the stream speed in kmph, t is the average reaction time = 0.7 sec and L is length of a vehicle. Assume average length of vehicles = 5 m. (C.O.No.3) [Comprehension]

19. Sleeper density is defined as the number of sleeper's required under one rail length of railway track. For a sleeper density of (n+ 5), calculate the number of sleepers required for constructing a broad gauge railway track of length 650 m. (C.O.No.4) [Comprehension]
20. Creep in rail is defined as the longitudinal movement of the rails in the track in the direction of motion of locomotives. What are the causes for Creep in rails and list the measures for prevention of Creep. (C.O.No.4) [Comprehension]

## Part C

**Answer all the Questions. Each question carries TWELVE marks. (3Qx12M=36M)**

21. A valley curve is formed by a descending grade of 1 in 25 meeting an ascending grade of 1 in 30. Design the length of valley curve to fulfill both comfort condition and head light sight distance requirements for a design speed of 80 kmph. Assume allowable rate of change of centrifugal acceleration C = 0.6 $m/sec^3$. For calculating stopping sight distance, take co efficient of longitudinal friction = 0.35 and total reaction time of a driver = 2.5 sec. (C.O.No.2) [Application]
22. Airport is a place where aircraft land and take off and where there are buildings for passengers to wait in and for aircraft to be sheltered. Draw the sketch of Airport layout and explain the functions of different components of Airport. (C.O.No.4) [Application]
23. Rail transport is a means of transferring passengers and goods on wheeled vehicles running on rails, which are located on tracks. With the help of neat sketch, explain the elements of railway track. (C.O.No.4) [Application]