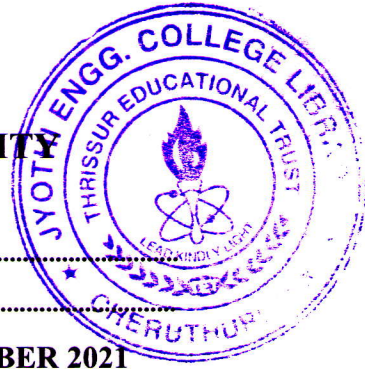


APJ ABDULKALAM TECHNOLOGICAL UNIVERSITY
08 PALAKKAD CLUSTER



Q. P. Code : TE0821301-I

(Pages: 2)

Name:

Reg. No:

THIRD SEMESTER M.TECH. DEGREE EXAMINATION DECEMBER 2021

Branch: Civil Engineering

Specialization: Transportation Engineering

08CE7201 HIGHWAY GEOMETRIC DESIGN

(Common to TE)

Time: 3 hours

Max. Marks: 60

Answer all six questions.

Modules 1 to 6: Part 'a' of each question is compulsory and answer either part 'b' or part 'c' of each question.

(Use of design tables is permitted)

Q. No.	Module 1	Marks
1.a	Highway design is based on specified design standards and controls that depend on the roadway system factors. Mention those factors.	3

Answer b or c

- | | | |
|---|----------------------------------------------------------------------------------------------------------------------------|---|
| b | Prepare the camber boards for the following case. | 6 |
| | <ul style="list-style-type: none">• Parabolic camber for WBM major district roads in areas of heavy rainfall | |
| c | Explain the terms i) Operational speed ii) Design speed and iii) Running speed | 6 |

Q. No.	Module 2	Marks
2.a	What are the advantages of Bernoulli's Lemniscates curve over the spiral curve?	3

Answer b or c

- | | | |
|---|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| b | How much should be the outer edges of the pavement be raised w.r.t the central line on a two lane road designed to cater for mixed traffic at a speed of 65kmph on a horizontal curve of radius 160m, if | 6 |
| | <ul style="list-style-type: none">• the pavement is rotated w.r.t the central line and• the pavement is rotated w.r.t to the inner edge. | |
| c | How to measure sight distance over horizontal curve in the field? | 6 |

Q. No.	Module 3	Marks
3.a	What is the criterion for selecting shape of summit curve?	3

Answer b or c

- b** A rising gradient of 1 in 25 meets a falling gradient of 1 in 50 on NH. Design a vertical curve if the existing features near the locality permit the adoption of only minimum sight distance. **6**
- c** 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 80kmph. Assume allowable rate of change of centrifugal acceleration $C = 0.60 \text{ m/sec}^3$. **6**

Q. No.	Module 4	Marks
4.a	What is geometric consistency?	3

Answer b or c

- b** List out the driver workload measurement techniques and explain any two. **6**
- c** Explain the alignment indices for evaluating the consistency of highway. **6**

Q. No.	Module 5	Marks
5.a	Define Neck down and Chicanes.	4

Answer b or c

- b** What are the deficiencies of multi – leg intersections? Using a suitable diagram show how you would correct these deficiencies. **8**
- c** What are the key defining characteristics of rotary that distinguish them from other traffic circles? **8**

Q. No.	Module 6	Marks
6.a	What colour combinations are used for regulatory signs (eg. Speed limit signs) and for general warning sign (eg. Advance railway crossing sign)? Why these combinations used?	4

Answer b or c

- b** Explain On – street parking and Off street parking with neat sketches. **8**
- c** i) What are pedestrian facilities provided in urban roads? **8**
- ii) In a four leg signalized intersection where should you provide a bus bay? Justify your answer with IRC specifications.