

END SEMESTER THEORY EXAM; NOV./DEC.-2018

Course / Program:	M. Tech. (Transportation engineering)	Year/Semester:	1ST Sem.
Subject Name:	Pavement Materials	Duration:	03:00 Hrs.
Sub. Code:	13120121	Maximum Marks:	100
Roll No.:			

Instructions:-

- 1) Write your Roll No. on the Question paper.
- 2) Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
- 3) Attempt five questions in all. Q.1 is compulsory. Attempt other five questions selecting one question from each unit. Parts of a question should be attempted in sequential order. Marks are indicated against each question.
- 4) Illustrate your answer with diagram wherever required.

- Q.1** a) Briefly explain about the function of subgrade. **(5x4 = 20)**
b) Enumerate the identification and classification tests of soils.
c) List different tests on road aggregate & mention their advantages & limitations.
d) List the materials used for cement concrete pavement construction.

UNIT - I

- Q.2** a) Explain CBR & the test procedure in the laboratory. How are the results of the test obtained and interpreted? **(10)**
b) The index properties of subgrade soil are given below **(10)**
Passing 0.074 mm sieve – 55%
Liquid limit - 50%
Plastic limit – 41%
Classify the soil by revised HRB system & discuss the suitability of the soil as subgrade material.

(OR)

- Q.3** What are the different types of bitumen materials used in road construction? Under what circumstances each of these materials is preferred? **(20)**

UNIT - II

- Q.4** a) Explain briefly the Marshall method of bituminous mix design? **(10)**
b) Explain about the different types and uses of cutbacks & bitumen emulsion? **(10)**
- (OR)**
- Q.5** a) Discuss the desirable properties of bituminous mix & superpave mix design method. **(10)**
b) Distinguish between Resilient modulus & dynamic modulus? Also mention the fatigue characteristics of bitumen mix? **(10)**

UNIT - III

- Q.6** a) What are the various tests for judging the suitability of road stones for pavement construction? Discuss the objects of carrying out each of these tests? **(10)**
b) What are modified bituminous binders? What are the advantages of these? **(10)**

(OR)

Q.7 Discuss the suitability of the following soil as a subgrade material with particular reference to stability, volume change, drainage and frost action: **(20)**

(a) GW, SM, SU, MH, CL,OH; (b) A-1-a, A-2-7, A-3,A-4 (8), A-5(11), A-6(3), A-7 (20)

UNIT - IV

Q.8 What are the different materials required for the construction of a CC pavement? Mention how a concrete mix is designed for obtaining PQC. **(20)**

(OR)

Q.9 Briefly explain with neat sketches the method of construction of
(a) contraction joints (b) expansion joints (c) construction joints (d) longitudinal joints. **(20)**

END SEMESTER THEORY EXAM; NOV./DEC.-2018

Program:	M. Tech. (Transportation Engineering)	Year/Semester:	1 st Sem.
Course/Subject:	Urban Transportation System Planning	Duration:	03:00 Hrs.
Course/Subject Code:	13120122	Maximum Marks:	100
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five questions in all. Q.1 is compulsory. Attempt other four questions selecting one questions from each section. Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

- Q.1** (a) Describe urban mass transit system? (4x5= 20)
(b) Write a short not on evolution of urban transportation?
(c) What are the trends in transit planning?
(d) List down the transit fare along with structure & levels?

UNIT-I

- Q.2** (a) What are the basic information required for preparation of base maps of a town? (10)
(b) What is the necessity of urban renewal? How would a planner identify the need for urban re-plan? (10)

(OR)

- Q.3:** What are the different tools for implementation of development plan? How the public participation in planning and implementation would be ensured in the context of a developing country? (20)

UNIT-II

- Q.4:** (a) What should be the best way to compare & select the most suitable transit mode? (10)
(b) Compare & explain about short range & long range planning? (10)

(OR)

- Q.5** (a) Illustrate the basic operational elements of transit system with their types and characteristics? (10)
(b) Define the term data collection? In what manner it can done for transit system planning? (10)

UNIT-III

- Q.6** (a) Write about the conceptual models & their procedure for transit network and system analysis? (10)
(b) Elaborate transit line analysis along with its objectives, types, geometry & characteristics? (10)

(OR)

- Q.7** Compare town planning efforts of the east and west of the modern era and comment on the evolution of new concepts? (20)

UNIT-IV

- Q.8:** Explain about the source of financing of transit services? How public and private integration of transit services implemented? (20)

(OR)

- Q.9** What is the necessity of transit demand forecasting? Also explain the transit mode evaluation? (20)

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Program:	M. Tech. (Transportation Engineering)	Year/Semester:	1st Sem.
Course/Subject:	Geometric Design of Transportation Facilities	Duration:	03:00 Hrs.
Course/Subject Code:	13120123	Maximum Marks:	100
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five (5) questions in all and Question No. 1 is compulsory. Attempt other five questions. Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

Q1. Write short note on the following

[5X4=20]

- a) Traffic separators
- b) Kerbs
- c) Road Margins
- d) Shoulders
- e) Width of formation (on way road)

UNIT - I

Q2. Answer the following

- a) What are the three main components of highway design? [5]
- b) Explain all the human characteristics in detail that affects the highway design. [5]
- c) A temporary diversion has been constructed on a highway of 4% upgrade due to repairs that are being made on a bridge. The maximum speed allowed on the diversion is 10 kmph. Determine the minimum distance from the diversion that a road sign should be located informing drivers of the diversion. (consider design speed of highway 80kmph) [10]

OR

Q3. Answer the following

- a) Drive the relationship to determine the OSD (overtaking sight distance) as per Indian Standards. [10]
- b) Calculate the stopping sight distance for the design speed of 100 kmph. Take the total reaction time 2.5 second and the coefficient of friction as 0.35. [10]

UNIT - II

Q4. Answer the following

- a) Explain super-elevation. What are the factors on which the design of super-elevation depends? [5]
- b) What do you understand by absolute minimum and ruling minimum radius of horizontal curve? [5]
- c) The radius of horizontal curve is 400 m, the total pavement width at curve is 7.6 m and the super-elevation is 0.07. Design the transition curve length for the speed of 100 kmph. Assume pavement to be rotated about the inner edge. [10]

OR

Q5. Answer the following

- a) A national highway passing through a flat terrain has a horizontal curve of radius equal to the ruling minimum radius. If the design speed is 100 kmph, calculate the absolute minimum sight distance, super-elevation, extra widening and length of transition curve. Assume necessary data suitably. [10]
- b) Explain the curve resistance and compensation in gradient on horizontal curves. [10]

UNIT - III

Q6. **Answer the following**

- a) What is summit curve and valley curve? Discuss the factors governing the length of summit and valley curves and their best shapes. [10]
- b) Explain the ruling, limiting and exceptional gradients and conditions when these need to provide. [10]

OR

Q7. **Answer the following**

- a) A vertical curve is formed when an ascending gradient of 1 in 25 m another descending gradient of 1 in 100 m meet. Find the length of summit curve to provide the required stopping sight distance for a design speed of 80 kmph. [10]
- b) A 800 ft equal tangent sag vertical curve has PVC at station 200 + 00 with elevation 500 ft. The initial grade is -4 % and final grade is +1%. Determine the elevation and stationing of PVI, PVT and lowest point on the curve. [10]

UNIT - IV

Q8. **Answer the following**

- a) What are the various types of emergency escape Ramps? Explain in details. [5]
- b) What is climbing lane? [5]
- c) Explain in details three types of intersection. [10]

OR

Q9. **Answer the following**

- a) What do you understand by channelization of traffic? [5]
- b) Define roundabout. [5]
- c) What are auxiliary lanes? Explain in detail various types of auxiliary lane [5]
- d) Write various types of traffic conflict points. [5]

END SEMESTER THEORY EXAM; NOV./DEC.-2018

Program:	M. Tech (CE - Transportation Engineering)	Year/Semester:	1st Sem.
Course/Subject:	Ground Improvement	Duration:	03:00 hrs.
Subject Code:	13120126	Maximum Marks:	100
Roll No.:			

Instructions:-

1. Write your Roll No. on the Question paper.
2. Candidate should ensure that they have been provided correct question paper. Complaint(s) in this regard, if any, should be made within 15 minutes of the commencement of the exam. No complaint(s) will be entertained thereafter.
3. Attempt five questions in all. Q.1 is compulsory. Attempt other four questions by selecting one question from each unit. Parts of a question should be attempted in sequential order. Marks are indicated against each question.
4. Illustrate your answer with diagram wherever required.

- Q.1:** a) Explain in detail about the dewatering techniques used in cohesive soils? (5x4 = 20)
b) Explain the engineering benefits of lime stabilization of soil?
c) Discuss how field quality control is checked for deep treated clay soils?
d) Describe the equipment used in the grouting technique?

UNIT - I

- Q.2:** a) What are the various admixtures used in stabilization of soil? Discuss the principles and typical gradation specifications of mechanically stabilized bases and surfacing? (10)
b) What is the main difference between geo-grid and geo-textile? Explain the field applications of geo-grid and geo-textiles? (10)

(OR)

- Q.3:** An expressway is planned to be constructed at a site, where the soil conditions are of soft in nature and the SPT N values are in the order of 2 to 4 for a depth of 10 m from the ground surface. Do suggest the possible treatment technique and explain it clearly? (20)

UNIT - II

- Q.4:** a) What is soil reinforcement? List various materials to be used in soil reinforcement. Discuss the internal stability aspects of reinforced earth walls? (10)
b) Explain with clear illustrations, the philosophy involved in geo-textile material as reinforcement for improving the bearing capacity of soil? (10)

(OR)

- Q.5:** What do you understand about the bituminous stabilization? Explain how the Engineering Properties of soil are changing by the process of bituminous stabilization. Discuss how calcium chloride and sodium chloride modify the soil characteristics? (20)

UNIT - III

- Q.6:** List the various grouting techniques depending upon the stabilizer used. Explain compaction grouting, penetration grouting and fracture grouting with the neat sketches? (20)

(OR)

- Q.7:** Discuss the problems associated with expansive soils on building foundations. Explain how swelling pressure is estimated using constant volume method and from consolidation test? (20)

UNIT - IV

Q.8: Enumerate various geo-synthetic used in ground improvement technique? A geo-synthetic has to be selected to provide drainage behind a retaining wall with vertical back face. The estimated vertical flow in to the drain is $0.018\text{m}^3/\text{sec}$ then determines the required transmissivity of geosynthetic? (20)

(OR)

Q.9: Discuss the field conditions that favor the swelling of soils and write its consequences. Write a note on load carrying mechanism of under-reamed pile? (20)
