ROADWAY DESIGN

PROCEDURES AND DETAILS WORKBOOK

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Louisiana State University and the Louisiana Department of Transportation and Development

Technology Transfer and Training

DOTD Employee Training Manual

ROADWAY DESIGN PROCEDURES AND DETAILS WORKBOOK

Louisiana Department of Transportation and Development
Louisiana Transportation Research Center
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ROADWAY DESIGN PROCEDURES AND DETAILS

ABOUT THIS COURSE

This self-study course allows an individual to proceed at their own pace. The purpose of this course is *not* to memorize material, but to provide a structured opportunity to examine and become familiar with the *Roadway Design Procedures and Details* manual. Although the manual consists of nine chapters, this workbook only focuses on four of the eight chapters, which includes:

- Chapter 1 – General Information
- Chapter 5 – Cross Section Elements
- Chapter 6 – At-Grade Intersections
- Chapter 8 – Roadway Plan Preparation

To complete this self-study course, the *Roadway Design Procedures and Details* manual should be available, either in print or electronic, which can be found on the DOTD website. Each chapter within this workbook will ask a series of questions, in which the individual is to navigate through the *Roadway Design Procedures and Details* manual to find the answer. Upon completion of this self-study course, the individual is to take an examination and pass with an 80% or higher for credit.

An answer key is provided in the back of this manual to check the accuracy of answers. It is strongly suggested that if any questions are missed, the individual is to go back and review that part or section before attempting to take the examination. The examination consists of multiple-choice questions, similar to those found in this workbook. However, the questions will be in no particular order and will not direct the individual to the associated chapter.

CHAPTER 1
GENERAL INFORMATION

Chapter 1, General Information, discusses the following:

- Purpose of the *Roadway Design Procedures and Details* manual
- Format and revisions of the manual
- Definitions of common terms used within the manual
- Other reference sources or publications adopted by DOTD
- Organization and functions of the Road Design Section
- Relationship between the manual to the overall DOTD organization
- Typical sequence of project development
- Project review and submission requirements

Chapter 1 sets a foundation to the manual and relates the policies and procedures set by DOTD and to other publications used as supplemental material. This chapter is significant in the fact that it describes necessary information for understanding of other chapter components and the relationship between DOTD departments for practical coordination of tasks.

Chapter 1 Questions

Find the answers to the following questions from each section of Chapter 1.

Section 1.1 – Introduction

1. Where is the latest issue date for each chapter of the manual presented?
    a. At the top of each page
    b. At the bottom of each page
    c. At the top right of each page
    d. At the beginning of the chapter

2. Why is the word “should” used in the manual?
    a. Advisory condition
    b. Permissive condition
    c. Mandatory condition

3. What is the principal source of information providing general guidance on the policies and procedures that should be followed in the roadway design and plan development process?
    a. *Highway Capacity Manual*
    b. *Guide for the Development of Bicycle Facilities*
    c. *Code of Federal Regulations*
    d. *Roadway Design Procedures and Details*

Section 1.2 – Organization and Functions of the Road Design Section

4. Which unit is responsible for coordinating with the owners of utilities located within each project to ensure that all utility conflicts are addressed prior to construction?

    a. The Rail Safety and Rail Construction Unit

    b. The Right-of-Way Permit Unit

    c. The PRR Unit

    d. The Utilities Relocation Unit

5. Which section of Project Development is responsible for pavement structural design, embankment stabilities analyses, settlement analyses, and soil foundation design?

    a. Pavement and Geotechnical

    b. Project Management

    c. Real Estate

    d. Location and Survey

6. Which section of the Office of Engineering provides expert advice in areas relating to the construction of roads and bridges?

    a. Contract Services

    b. Construction

    c. Public Works and Water Resources Program

    d. Project Management

7. Which section conducts short-term and long-term research and provides technology assistance, engineering training, and continuing education, technology transfer and problem-solving services to DOTD and others in the transportation community?
    a. LTRC
    b. Construction
    c. Project Management
    d. Office of Operations

8. The Office of Operations is responsible for the operations of how many highway districts?
    a. 5
    b. 8
    c. 9
    d. 10

9. The Office of Operations provides local experience and expertise in the areas of which topics?
    a. Traffic operations, transportation planning, construction, and design
    b. Environmental, maintenance, construction, and design
    c. Design, maintenance, construction, and project management
    d. Maintenance, construction, traffic operations, and design

Section 1.3 – Typical Sequence of Project Development

10. Where can more information be found about the major stages required before a project?

    a. *Roadside Design Guide*

    b. *Project Delivery Manual*

    c. *Highway Capacity Manual*

    d. *Designing Safer Roads*

Section 1.4 - Project Review and Submission Requirements

11. What figure lists sections that should receive submittals for review at each stage?

    a. 1-02

    b. 1-01

    c. 1-03

    d. 1-04

Chapter 1 General Questions

12. An individual is searching for a resource that provides more information about crash data and severity of crashes. What resource will be most useful?

    a. *Designing Safer Roads: Practices for Resurfacing, Restoration, and Rehabilitation (TRB Special Report 214)*

    b. *Roadside Design Guide*

    c. *Highway Safety Manual (HSM)*

    d. *Guide for the Development of Bicycle Facilities*

13. An individual is searching for the unit that will provide crash data and crash locations within districts. Which unit could provide such information?

    a. Transportation Planning

    b. Highway Safety

    c. Data Collection and Management Analysis

    d. Office of Operations

14. If an individual needs more information regarding drainage within DOTD right-of-way, which unit could be contacted?

    a. Project Management

    b. Bridge Design

    c. Location and Survey

    d. Hydraulics

15. What manual could an individual find more information about contractual requirements?

    a. *Project Managers Manual*

    b. *Construction Plans Quality Control/Quality Assurance Manual*

    c. *Louisiana Standard Specifications for Roads and Bridges*

    d. *Project Delivery Manual*

CHAPTER 5
CROSS SECTION ELEMENTS

Chapter 5, Cross Section Elements, discusses the following:

- Pavement typical sections, including pavement type determination and structural design, subgrade considerations, and drainage of pavement section
- Typical section geometrics for travel lanes, shoulders, clear zone requirements, and roadside slopes
- Pavement crowns
- Vertical clearance for the roadway, railroads, waterways, and airways
- Location, types, method of construction, and special details for curbs, in addition to raised median nose and curbed island information
- Sidewalk locations, cross-slopes, handicap ramps, and bridges
- Barriers, such as guardrails and concrete barrier rail
- Embankment widening for guardrail at bridges
- Medians in rural and urban areas
- Function classification and design standards for frontage roads
- Rural and urban right-of-way controls, including special types, utilities, expropriation, existing right-of-way, encroachments, and disposal of right-of-way
- Roadside controls
- Parking lanes in terms of policy and application

Chapter 5 includes a wide range of cross-section elements in the design of roadways and provides many resources to supplement the content presented.

Chapter 5 Questions

Find the answers to the following questions from each section of Chapter 5.

Section 5.1 – Cross Section Elements

1. Who is responsible for completing the Project Information Checklist?
    a. Project Engineer
    b. Geotechnical Design Administrator
    c. Pre-Design Conference Committee
    d. District Administrator

2. What provides guidance on the use of drainage layers and shoulder drainage systems that help remove trapped water?
    a. EDSM II.2.1.8
    b. EDSM I.1.1.2
    c. EDSM II.2.1.11
    d. EDSM II.2.1.12

Section 5.2 – Typical Section Geometrics

3. How far into the shoulder should the pavement section for the outside lane extend for four-lane divided highways?
    a. 2 feet
    b. 2.5 feet
    c. 3 feet
    d. 4 feet

4. On four-lane divided highways, what is the restricting value for the cross-slope on the median shoulder in tangent sections that is controlled by the cross-over crown restrictions?
    a. 5%
    b. 4.5%
    c. 4%
    d. 5.5%

5. What type of slope is preferred for median ditch blocks on multi-lane highways?
    a. 4:1
    b. 10:1
    c. 6:1
    d. 8:1

Section 5.3 – Pavement Crowns

6. What has a high point in the middle of the roadway and slopes downward toward both edges?
    a. One-way tangent crown
    b. Two-way tangent crown
    c. Two-way crown converted to one-way use
    d. Cross-over crown break

7. Where the intersection will be signalized, the intersection should be designed using a maximum break of how much?

    a. 5%

    b. 2%

    c. 2.5%

    d. 1.5%

Section 5.4 – Vertical Clearance

8. What is the minimum vertical clearance required for a bridge structure over a railroad?

    a. 23 feet or as required by the owner of the railroad

    b. 24 feet or as required by the owner of the railroad

    c. 25 feet or as required by the owner of the railroad

    d. 26 feet or as required by the owner of the railroad

9. The Airway-Highway Clearance Form must be prepared if a project is constructed within how many miles of an airport?

    a. 1

    b. 2

    c. 3

    d. 4

Section 5.5 – Curbs

10. What method of construction is commonly used for combination curb and gutter and asphalt curbs?
    a. Integral
    b. Curb and gutter
    c. Plain
    d. Extruded

11. What type of curb is reduced in height at driveway locations by a method similar to that used for mountable curbs?
    a. Mountable curb
    b. Barrier curb
    c. Curbed driveway
    d. Curbed islands

12. What type of condition for curbed islands is placed if it appears that access control will be a problem?
    a. Replacement of existing
    b. Service stations
    c. Continuously paved area
    d. Access control

Section 5.6 – Sidewalks

13. Sidewalks should be at least how wide?

    a. 4 feet

    b. 5 feet

    c. 2 feet

    d. 3 feet

14. Where can more information be found on the placement of sidewalks on bridges in urban areas?

    a. EDSM II.3.1.4

    b. EDSM III.3.2.8

    c. EDSM I.3.5.4

    d. EDSM II.1.3

Section 5.7 – Barriers

15. What section provides details showing the construction requirements for concrete barrier rails?

    a. Contracts Management Section

    b. Real Estate Section

    c. Bridge Design Section

    d. Project Management

Section 5.8 – Embankment Widening for Guardrail at Bridges

16. What is the typical maximum slope for embankment widening?

    a. 8:1

    b. 10:1

    c. 12:1

    d. 14:1

Section 5.9 – Medians

17. The continuous left turn in an urban setting is used to _____.

    a. Increase economic activity

    b. Promote social factors

    c. Decrease environmental impacts

    d. Reduce travel time

Section 5.10 – Frontage Roads

18. Each segment of new frontage road is usually short and traffic volumes are usually _____.

    a. Low

    b. Moderate

    c. High

    d. None of the above

Section 5.11 – Right-of-Way Controls

19. Required right-of-way widths should be set at even offsets from the centerline, typically in multiples of how many feet?

    a. Two feet

    b. Five feet

    c. Ten feet

    d. Twenty feet

20. The Department reserves the right of permanent access to the lateral for maintenance for what type of right-of-way?

    a. Construction servitude

    b. Drainage servitude

    c. Right-of-way agreement

    d. Control of access

21. What is purchased from property owners along major highways?

    a. Construction servitude

    b. Drainage servitude

    c. Right-of-way agreement

    d. Control of access

22. What type of map includes information obtained from the property survey, detailing the existing right-of-way and property lines throughout the project?

    a. Base map

    b. Survey map

    c. Parcel map

    d. Property map

Section 5.12 – Roadside Controls

23. Where can information be found about roadside controls?

    a. EDSM I.1.1.1

    b. EDSM I.1.1.17

    c. EDSM I.2.1.3

    d. EDSM IV.1.1.9

Section 5.13 – Parking Lanes

24. What is the preferred method of parking for on-street parking?

    a. Angled parking

    b. On-street parking is prohibited

    c. Parallel parking

    d. None of the above

Chapter 5 General Questions

25. The cross-slope of a roadway is being considered. To meet ADA compliance, what is the allowable cross slope?

    a. 2%

    b. 2% or less

    c. Greater than 2%

    d. 2% or greater

26. What type of right-of-way is necessary when an area outside the right-of-way is necessary for the construction of the project?

    a. Construction servitude

    b. Drainage servitude

    c. Right-of-entry

    d. Controlled access

27. What is the standard cross-slope for travel lanes adopted by DOTD?

    a. 2%

    b. 2.5%

    c. 3%

    d. 4%

28. What type of crown is intended for roadways with one-way traffic?

    a. One-way tangent crown

    b. Two-way tangent crown

    c. Two-way crown converted to one-way use

    d. Cross-over crown break

29. Generally, the right-of-way line should be set how far from the proposed limits of construction?

    a. 2 feet

    b. 5 feet

    c. 10 feet

    d. 15 feet

30. What method of construction involves the concrete curb being poured while the roadway is still in a plastic state?

    a. Integral

    b. Curb and gutter

    c. Plain

    d. Extruded

CHAPTER 6
AT-GRADE INTERSECTIONS

Chapter 6, At-Grade Intersections, discusses the following:

- Intersection geometrics, including right-of-way flares, turn lanes, and channelization
- Signalization warrants, installation, additions, and replacements
- Turnouts for rural and urban settings
- Intersection joint layouts and median openings
- Driveway criteria for location and application, in addition to typical sections, materials, horizontal geometry, and vertical geometry of driveways
- Railway-highway grade crossings, including materials, traffic control devices, vertical geometry, and plan procedures
- Roundabout details for operation, geometry, markings, signage, and accommodations for pedestrians, bicycles, and transit users.

Chapter 6 includes design information required for intersections, which are critical for the efficiency, safety, speed, cost of operation, and capacity of the facility. To support, the chapter emphasizes certain criteria based on the setting of the intersection.

Chapter 6 Questions

Find the answers to the following questions from each section of Chapter 6.

Section 6.1 – General

1. What chapter from the AASHTO Green Book provides an in-depth discussion of at-grade intersection design and criteria?

    a. 4

    b. 6

    c. 7

    d. 9

Section 6.2 – Intersection Geometrics

2. What is used to enhance safety by providing better sight conditions, usually 100 ft. x 100 ft. for a rural intersection?

    a. Right-of-way flares

    b. Turn lane

    c. Channelization

    d. Signalization

3. What taper is used for design speeds up to and including design speeds of 50 mph for turn lanes?

    a. 8:1

    b. 6:1

    c. 15:1

    d. 20:1

4. What is included at intersections to reduce excessive pavement areas?
    a. Right-of-way flares
    b. Turn lane
    c. Channelization
    d. Signalization

Section 6.3 – Signalization

5. Where can more information be found regarding warrants for traffic signals?
    a. EDSM II.2.1.7
    b. EDSM VI.3.1.6
    c. EDSM IV.7.1.5
    d. EDSM IV.2.1.4

Section 6.4 – Turnouts

6. In a rural setting, side roads that intersect the main roadway at an angle larger than _____ should be realigned.
    a. 125°
    b. 145°
    c. 135°

7. In an urban setting, if the intersecting roadway serves a facility where larger vehicles are expected, the turnout radii may be adjusted based on the criteria in what chapter of the AASHTO Green Book?

    a. 6

    b. 7

    c. 8

    d. 9

Section 6.5 – Intersection Joint Layout

8. When is an intermediate longitudinal joint required?

    a. When the width of the pavement slab exceeds 15 ft.

    b. When simple-curve radii are greater than 38 feet

    c. Between angles less than 50°

    d. For compound curves

Section 6.6 – Median Openings

9. What provides more information on the requirements for median openings?

    a. EDSM II.2.1.7

    b. EDSM VI.3.1.6

    c. EDSM IV.7.1.5

    d. EDSM IV.2.1.4

Section 6.7 – Driveways

10. What criteria topic for divided highway driveway locations states that driveway locations should not be located or relocated to fall opposite median cross-overs?

    a. Existing access

    b. Safe operation

    c. Opposite median crossovers

    d. Severed property

11. What criteria for driveway locations states that driveways will not be allowed within the limits of the turnout radii at an intersection?

    a. New frontage

    b. At intersections

    c. Opposite median crossover

    d. Severed property

12. What application of criteria for driveway locations states that the Project Engineer may move the location of approaches within the limits of the property, which is subject to consideration of criteria and if the property owner requests during construction?

    a. Changes during construction

    b. Approaches added during construction

    c. Right-of-way considerations

    d. Divided highways on new location

13. What type of driveway ranges in width from a minimum of 12 feet to a maximum of 35 feet?

    a. Rural Residential Drives

    b. Urban Residential Drives

    c. Commercial Drives

    d. Residential Drives

14. Driveway grades should not exceed _____, positive or negative, for passenger cars, other than special cases.

    a. 25%

    b. 20%

    c. 35%

    d. 30%

Section 6.8 – Railway – Highway Grade Crossings

15. Who is responsible for the construction and cost of a crossing that is required on a privately owned spur, such as to a plant or mill?

    a. DOTD

    b. AREA

    c. The owner of the railway

    d. None of the above

16. The highway surface should _____ than the top of the nearest rail, at a point thirty feet from the rail, unless track superelevation dictates otherwise.

    a. Be more than 3 inches higher

    b. Not be more than 3 inches higher or 6 inches lower

    c. Be 6 inches lower

    d. Be more than 3 inches higher or 6 inches lower

Section 6.9 – Roundabout Design

17. What is the design speed for vehicles entering the roundabout?

    a. 45 mph

    b. 25 mph

    c. 35 mph

    d. 15 mph

18. The minimum length of a curbed splitter island for a posted speed of greater than 45 mph should be _____ feet.

    a. 50

    b. 75

    c. 100

    d. 150

19. The size for the inscribed circle shall have a diameter of at least how much for a multi-lane roundabout?

    a. 175 ft.

    b. 110 ft.

    c. 150 ft.

    d. 75 ft.

20. How far should the pedestrian crossing be located from the yield point to the center of the crosswalk?

    a. 45 ft

    b. 90 ft

    c. 30 ft

    d. At least 20 ft

21. What is not permitted within the circulatory roadway?

    a. Fishhook pavement markings

    b. Lane arrows

    c. Bike lane markings

    d. Edge line markings

Chapter 6 – General Questions

22. What type of driveway criteria occurs when driveway approaches are provided to restore existing access to abutting property?
    a. Existing access
    b. Safe operation
    c. Opposite median crossovers
    d. Severed property

23. What kind of taper should be used for all shoulders and bike lanes to be ended 100 ft. in advance?
    a. 6:1
    b. 7:1
    c. 8:1
    d. 10:1

24. The inscribed circle for a single lane roundabout should be at least _____ ft. in diameter.
    a. 110
    b. 175
    c. 30
    d. 32

25. Use low profile landscaping in the corner radii if a crosswalk is provided to not obstruct _____.

    a. Bicyclists

    b. Transit users

    c. Pedestrians

    d. The mini-roundabout

CHAPTER 8
ROADWAY PLAN PREPARATION

Chapter 8, Roadway Plan Preparation, discusses the following:

- General preparation procedures for symbols, line styles, and abbreviations
- Drafting, submittal, and organization of sheets
- General preparation of survey data, base map preparation, plan revisions, and change orders
- Format and content development of sheets necessary for the project, including, but not limited to, the title sheet, summary sheets, plan and profile sheets, special details, right-of-way maps, standard plans, and cross-section sheets
- Engineer's estimate requirements and stages
- Specifications to consider when preparing plans

Chapter 8 provides many details on the different types of sheets for roadways plan preparation, which includes identifying the purpose of each sheet or component and discussing the requirements for sheets to include in the plans.

Chapter 8 Questions

Find the answers to the following questions from each section of Chapter 8.

Section 8.1 – General

1. What is not used for pay items on any of the tables on the summary sheets?
    a. Standard symbols
    b. Line styles
    c. Abbreviations

2. What type of general drafting procedure emphasizes accuracy, completeness, and neatness?
    a. Workmanship
    b. Type of lettering
    c. Size of lettering
    d. Sheet border and logo

3. What is the size for a half-size plan submittal?
    a. 22” x 34”
    b. 11” x 17”
    c. 8.5” x 11”
    d. 44” x 68”

4. What are changes to the construction plans made before bids are taken and after the Chief Engineer signs the plans?
    a. Plan revisions
    b. Paper plan delivery
    c. Digital plan delivery
    d. Change order

5. What are revisions made after bids are taken and usually occur while the project is under construction?
    a. Plan revisions
    b. Change order
    c. Digital plan delivery
    d. Paper plan delivery

Section 8.2 – Format and Content of Plan Sheets

6. What part of the title sheet is placed directly above the layout map?
    a. Caption
    b. Vicinity map
    c. Index
    d. Traffic data

7. What part of the title sheet contains a complete listing of all sheets changed after the plans were signed by the Chief Engineer and prior to letting?

    a. Caption

    b. Index

    c. Signatures

    d. Schedule of revisions

8. What type of sheet varies considerably depending on the type of project?

    a. Title Sheet

    b. Typical Sections

    c. Summary Sheets

    d. Plan/Profile Sheets

9. The scale on Typical Section sheets are _____.

    a. 1 inch = 1 mile

    b. 1 inch = 10 miles

    c. 1 cm = 1 mile

    d. Not established for uniformity

10. What represents the sum of the preceding tables, the bridge summary, and other computations not listed in the tables?

    a. Drafting

    b. Tabulation and computation

    c. Summary of estimated quantities table

    d. Plan portion of the sheet

11. What weight of line and lettering is intended for the north arrow?

    a. Light weight

    b. Medium weight

    c. Heavy weight

12. What is shown by a thin, solid line that connects the PI to the PC and PT?

    a. Tangent line

    b. Delta

    c. Radius

    d. Length of curve

13. Where are the station numbers on the Plan/Profile Sheets?

    a. Middle of the page, above the border

    b. Top of the grid, above the border

    c. Bottom of the page, located on the right

    d. Bottom of the grid and lower border

14. For required cross drain structures, what is ***not*** noted on the preliminary plan, with arrows drawn from the notes to the proposed structure?

    a. Station

    b. Round pipe circumference

    c. Material type

    d. Angle of crossing, if not 90°

15. Drainage structures for urban projects are numbered consecutively, with the structure number increasing in the direction of _____.

    a. Increasing station numbers

    b. Flow

    c. The north arrow

    d. Decreasing station numbers

16. Circles for roadway grades are used to indicate all ***except*** which of the following?

    a. PVI

    b. PVC

    c. PVT

    d. C

17. Where are temporary erosion control items tabulated?

    a. Plan/Profile Sheets

    b. Summary Sheets

    c. Summary of Estimated Quantities Sheets

    d. Typical Sections

18. Storm drain plan/profile sheets used for horizontal geometric designs of ramps is what type of condition?

    a. Plan/Profile

    b. Plan only

    c. Utilities

    d. Geometrics and driveways

19. What shows the drainage areas for all cross-drains and includes flooding information?

    a. Storm Drain Plan/Profile Sheet

    b. Existing drainage map

    c. Design drainage map

    d. Summary of drainage structures

20. What hydrologic information is ***not*** required for each cross-drain on Design Drainage Maps?

    a. Drainage area

    b. Flow direction

    c. Design headwater elevation

    d. Watershed slope (%)

21. What scale is usually plotted on urban drainage maps?

    a. 1” = 1 mile

    b. 1” = 100’

    c. 1” = 10’

    d. 1” = 500’

22. Special details are necessary when an installation is not covered by standard plans for _____, which includes special end treatments, ties to structures, and height adjustments.

    a. Drainage structures

    b. Concrete barrier rail

    c. Guardrails

    d. Retaining wall

23. What type of geometric layout is normally plotted on the plan/profile sheets and/or the storm drain sheets?

    a. Interchanges

    b. Connections

    c. Paved driveways

    d. Turnouts

24. What is placed in the plans to aide in the construction of a project and is shown as “suggested”?

    a. Detail of turnouts and intersections

    b. Graphical grade layout

    c. Joint layout

    d. Pavement marking layout

25. Tick marks are plotted every _____ along the centerline.

    a. 50’

    b. 200’

    c. 100’

    d. 500’

26. What sheet will show the project centerline, centerline alignment data, and existing right-of-way?

    a. Right-of-way maps

    b. Bridge plans

    c. Standard plans

    d. Cross section sheets

27. Standard plans show details for all ***except*** which of the following?

    a. Drainage structures

    b. Guardrails

    c. Cattle guards

    d. Earthwork

28. What section is responsible for maintaining the right-of-way monuments and witness posts?

    a. Road Design

    b. Bridge Design

    c. Hydraulics

    d. Location and Survey

29. What scale is preferred on Cross Section Sheets for both horizontal and vertical plotting?

    a. 1” = 4’

    b. 1” = 5’

    c. 1” = 10’

    d. 1” = 15’

Section 8.3 – Engineer’s Estimate

30. What stage of the Engineer’s estimate involves determining quantities for major construction items?

    a. Preliminary

    b. Plan-in-hand

    c. Final

    d. None of the above

Section 8.4 – Specifications

31. What are additions and revisions to the Standard Specifications?

    a. Special Provisions

    b. Project Specifications

    c. Supplemental Specifications

    d. Standard Specifications

Chapter 8 – General Questions

32. What will the Hydraulics Section furnish for drainage structures?

    a. Classes

    b. Retaining walls

    c. Channel changes

    d. Modifications to existing minor structures

33. Cross-drain structures for rural projects include all ***except*** which of the following on the Plan/Profile Sheets?

    a. Material type

    b. Structure number

    c. Angle of crossing, if not 90°

    d. Any outlet erosion controls required

34. Elevations for roadway grades on the Plan/Profile Sheets are rounded to how many decimal places?

    a. 1

    b. 2

    c. 3

    d. 4

35. What is the size of a full size submittal of paper plans?

    a. 22” x 34”

    b. 11” x 17”

    c. 8.5” x 11”

    d. 44” x 68”

36. In the Typical Sections, vertical dimensions are shown in _____.

    a. Feet

    b. One-half foot

    c. Yards

    d. Inches

37. The miscellaneous data directly beneath the layout map and to the left of the project length table includes _____.

    a. Design speed

    b. State project number

    c. Datum used

    d. Design classification

38. When the Soil Conservation method is used in the design drainage map, what may be shown?

    a. Flow direction

    b. Soil class

    c. Hydrologic coefficient

    d. Design headwater elevation

39. What are specifications that are additions and revisions to the standard and supplemental specifications?

    a. Standard Specifications

    b. Special Provisions

    c. Project Specifications

    d. Supplemental Specifications

40. The third sheet of the Summary Sheets should be numbered as _____.

    a. 2b

    b. 2c

    c. 3b

    d. 3c

PRACTICE TEST

Use the following chapters from the *Roadway Design Procedures and Details* manual to answer the practice exam questions:

- Chapter 1 – General Information
- Chapter 5 – Cross Section Elements
- Chapter 6 – At-Grade Intersections
- Chapter 8 – Roadway Plan Preparation

The questions are derived from the manual and will *not* be in any particular order. Use the Table of Contents, located at the beginning of the manual, to help find the answers. Review answers using the Answer Key located in the back of this workbook. If any questions were missed, review the questions and find the correct answer in the manual.

Practice Test Questions

Find the answers to the following questions from the *Roadway Design Procedures and Details Workbook.*

1. A median is being placed in the project for an urban setting. How long is a commonly used median desgined as a continuous left turn lane on urban arterials and collectors?
    a. 13 ft.
    b. 14 ft.
    c. 15 ft.
    d. 16 ft.

2. What part of the title sheet includes the federal aid number (if any), the state project number, the project name, and the parish(es) that the project is within?
    a. Layout map
    b. Index
    c. Type of construction
    d. Caption

3. What section of DOTD develops, administers, and regulates the Department's Materials Quality Assurance Program, environmental evaluation programs, and the geotechnical exploration and testing programs in cooperation with public and private partners?

    a. Project Management

    b. Materials and Testing

    c. Construction

    d. Transportation Planning

4. What is ***not*** a purpose of curbs?

    a. Esthetics

    b. Right-of-way reduction

    c. Reduction in orderly roadside development

    d. Reduction in construction operations

5. What type of roundabout shall only be installed on a state highway where the 85th percentile speed is 30 mph or less?

    a. Single-lane

    b. Multi-lane

    c. Mini

    d. All roundabouts

6. What type of pavement marking should not be used in roundabouts?
    a. Fishhook pavement markings
    b. Fishhook arrows
    c. Yield lines (shark teeth)
    d. Bike lane markings

7. What part of the Plan/Profile Sheets includes the survey data, showing all cultural and natural details in the vicinity of the centerline?
    a. Plan portion of the sheet
    b. Summary of Estimated Quantities
    c. Construction Notes
    d. Profile portion of the sheet

8. What section of DOTD is responsible for the roadway inventory of all state and local highways?
    a. Highway Safety
    b. Transportation Planning
    c. Office of Operations
    d. Data Collection and Management Analysis

9. Which of the following is ***not*** criteria for driveway locations?

    a. Safe operation

    b. Severed property

    c. New frontage

    d. Parking

10. What section has the responsibility of handling erosion control of standard plans?

    a. Road Design

    b. Bridge Design

    c. Hydraulics

    d. Location and Survey

ANSWER KEY

Chapter 1 – General Information

1. B – At the bottom of each page
2. A – Advisory condition
3. D – *Roadway Design Procedures and Details*
4. D – The Utilities Relocation Unit
5. A – Pavement and Geotechnical
6. B - Construction
7. A - LTRC
8. C - 9
9. D – Maintenance, construction, traffic operations, and design
10. A – *Road Design Guide*
11. A – 1-02
12. C – *Highway Safety Manual (HSM)*
13. B – Highway Safety
14. D – Location and Survey
15. C – *Louisiana Standard Specification for Roads and Bridges*

Chapter 5 – Cross Section Elements

1. D – District Administrator
2. A – EDSM II.2.18
3. C – 3 feet
4. B – 4.5%
5. B – 10:1
6. B – Two-way tangent crown
7. C – 2.5%
8. A – 23 feet or as required by the owner of the railroad
9. B – 2
10. D – Extruded
11. B – Barrier curb
12. D – Access control
13. A – 4 feet
14. A – EDSM II.3.1.4
15. C – Bridge Design Section
16. B – 10:1
17. D – Reduce travel time
18. A – Low
19. B – Five feet
20. B – Drainage servitude
21. D – Control of Access
22. A – Base map
23. B – EDSM I.1.1.17
24. C – Parallel parking
25. B – 2% or less
26. A – Construction servitude
27. B – 2.5%
28. A – One-way tangent crown
29. C – 10 feet
30. A – Integral

Chapter 6 – General

1. D – 9
2. A – Right of way flares
3. C – 15:1
4. C – Channelization
5. B – EDSM VI.3.1.6
6. C - 135°
7. D – 9
8. A – When the width of the pavement slab exceeds 15 ft.
9. D – EDSM IV.2.1.4
10. C – Opposite median crossovers
11. B – At intersections
12. A – Changes during construction
13. C – Commercial Drives
14. B – 20%
15. A – DOTD
16. B – Not be more than 3 inches higher or 6 inches lower
17. D – 15 mph
18. D – 150
19. A – 175
20. D – at least 20 ft
21. C – Bike lane markings
22. A – Existing access
23. B – 7:1
24. A – 110
25. C - Pedestrians

Chapter 8 – Roadway Plan Preparation

1. C – Abbreviations
2. A – Workmanship
3. B – 11” x 17”
4. A – Plan revisions
5. B – Change order
6. A – Caption
7. D – Schedule of revisions
8. B – Typical Sections
9. D – Not established for uniformity
10. C – Summary of estimated quantities table
11. B – Medium weight
12. A – Tangent line
13. D – Bottom of the grid and lower border
14. B – Round pipe circumference
15. B – Flow
16. D – C
17. B – Summary Sheets
18. D – Geometrics and driveways
19. B – Existing drainage map
20. D – Watershed slope (%)
21. B – 1” = 100’
22. C – Guardrails
23. C – Paved driveways
24. C – Joint layout
25. C – 100’
26. A – Right-of-way maps
27. D – Earthwork
28. D – Location and Survey
29. B – 1” = 5’
30. B – Plan-in-hand

31. C – Supplemental Specifications
32. A – Classes
33. B – Structure number
34. B – 2
35. A – 22” x 34”
36. D – Inches
37. C – Datum used
38. B – Soil class
39. B – Special Provisions
40. C – 3b

Practice Test

1. B – 14 ft. (5.9.3)
2. D – Caption (8.2.2, 2)
3. B – Materials and Testing (1.2.3)
4. D – Reduction in construction operations (5.5)
5. C – Mini (6.9.3, 5)
6. C – Yield lines (shark teeth) (6.9.8, 4)
7. A – Plan portion of the sheet (8.2.5, 3)
8. D – Data Collection and Management Analysis (1.2.3)
9. D – Parking (6.7)
10. C – Hydraulics (8.2.27)