

INTRODUCTION TO THE STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES

2016 EDITION



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Louisiana State University and the Louisiana Department of Transportation and Development

Technology Transfer and Training

DOTD Employee Training Manual



La Gov 10283

**INTRODUCTION TO THE
LOUISIANA STANDARD SPECIFICATIONS
FOR ROADS AND BRIDGES**

2016 EDITION

Louisiana Department of Transportation and Development
Louisiana Transportation Research Center
Technology Transfer and Training

2017

CREDITS

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ABOUT THIS COURSE

This self-study course allows an individual to proceed at their own pace. The purpose of this course is not memorization, but to provide a structured opportunity for the individual to examine and familiarize themselves with the *2016 Louisiana Standard Specifications for Roads and Bridges*. Individuals often need to refer to the specification book when they are conducting department business, and this course aids in providing the background necessary to conduct such business.

The study guide is set up similar to the *2016 Louisiana Standard Specifications for Roads and Bridges*. Looking through this study guide, the individual is introduced to ten distinct parts, each with summaries and questions relating to the same part as the Standard Specifications. Starting at Part 1, the individual will read the numbered summaries, and then look up the answers to the questions associated with that section using the *2016 Louisiana Standard Specifications for Roads and Bridges*. Individuals will continue working through all ten parts until they have read all the summaries and completed all of the practice questions.

An answer key is provided at the back of this manual to check answers. It is strongly suggested if an individual misses any questions, they go back and review that part or section before attempting to take the *Introduction to the Standard Specifications for Roads and Bridges – 2016 Edition* examination.

The questions associated with the examination consist of multiple-choice questions similar to those found in this manual; however, the questions will be in no particular order. Instead, the questions will require that the student know where to focus their efforts when trying to locate an answer within the *2016 Louisiana Standard Specifications for Roads and Bridges*.

The key to knowing how to navigate through the *2016 Louisiana Standard Specifications for Roads and Bridges* is practice, and this manual serves that purpose.

INTRODUCTION TO THE LOUISIANA STANDARD SPECIFICATIONS FOR ROADS
AND BRIDGES – 2016 EDITION

TO THE STUDENT

The *Louisiana Standard Specifications for Roads and Bridges – 2016 Edition* is a compilation of the provisions and requirements for roadway and bridge construction for general application and repetitive use by those involved in the planning and execution of Department-sponsored projects. This book, which is a legal document, is used as a directive for contracts and plans that the Department prepares for roads and bridges. Changes to contracts can be made through plan changes, special agreements, and Supplemental Agreements. Any additions or revisions to the specifications are known as supplemental specifications.

The specifications are designed to promote quality assurance at all levels of roadway construction. Quality assurance is the combined efforts of quality control and acceptance processes to assure that a project will provide the public with a durable product exhibiting a high level of performance. Quality control is the process used by the contractor to monitor, assess, and adjust material selection, production, and project construction to control the level of quality so that his product continuously and uniformly conforms to specifications. Acceptance is the process of sampling, testing, and inspection to determine the degree of compliance with specifications for acceptance of materials and/or contractor's work.

Changing technology brings innovations in construction practices, materials, and equipment. The Department is always striving to improve the product we produce for the customer. The specifications are updated to reflect changes made by the Department to standard practices using Supplemental Specifications.

Standard Specifications are developed by DOTD subcommittees appointed by the DOTD Chief Engineer. These committees submit their recommendations to the DOTD Chief Engineer for approval prior to publication or implementation.

NOTE: Only the DOTD Chief Engineer has the authority to approve changes to any aspect of these specifications.

The *Louisiana Standard Specifications for Roads and Bridges – 2016 Edition* is divided into ten parts. The organization of this book follows the logical general development of a construction project, beginning with general contractual obligations (Part 1), followed by earthwork, surface courses (aggregate, asphalt concrete, and Portland cement concrete), incidental construction to main roadways, structures, and materials (portland cement concrete and general materials).

Each of the ten parts of the Standard Specifications book is further divided into sections. Each section is divided into subsections that are set up in essentially the same manner in each section. The first subsection is a general description of the work to be covered within that section. This is often followed by a subsection on materials needed to perform the prescribed work. This subsection will only list which materials will be needed. Specifications on individual material components are found in Part X, except for asphalt concrete and Portland cement concrete, which are found in Parts V and IX, respectively.

The next subsection covers any equipment needed for the particular type of work being performed. This would include any hauling equipment or plant equipment. If the equipment is covered in another part of the book, that section will be referenced. The next subsections are construction details. Quality control and acceptance testing requirements are included here.

The last subsection of each section is devoted to measurement and payment. Measurement gives the units of measure by which payment is made to the contractor. The payment subsection explains how payment will be made and what the payment price includes; it also provides a listing of item numbers, pay items, and pay units under which the contractor is paid.

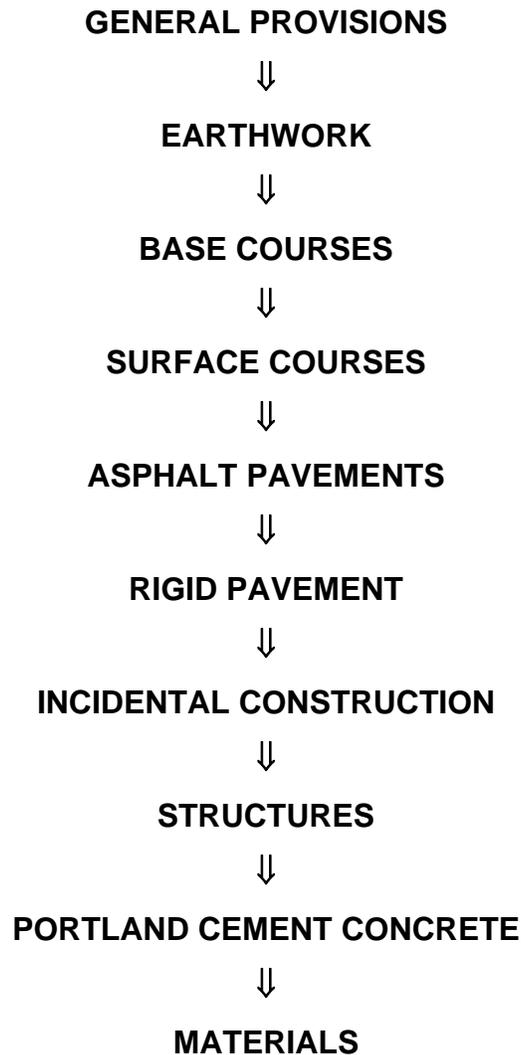
The index, which is found at the back of the *Louisiana Standard Specifications for Roads and Bridges – 2016 Edition*, is a directory of significant terminology (keywords) used throughout the specifications. The terms or keywords are arranged in alphabetical order with the section or subsection and page number(s) indicating where the information is found in the book. An example of how to use the index is shown on the following page.

INTRODUCTION TO THE STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES – 2016 EDITION

Assume you are working on a Class I Base Course, and you need to know what type of lime treatment is needed for the type of soil at the jobsite. The first step is to locate Base Course section in the index. Once you have located this section [keyword(s)], you must then locate the subsection, which is also listed in alphabetical order, for Lime Treatment. Once you have located this keyword, scan across the page to the right to find the subsection and page number(s) for this information as shown in the example below.

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Delivery of Bids	102.10	25
Examination of Bid Documents and Site of Work	102.06	20
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The following section presents a brief summary (in table form) of each part of the book. This will familiarize you with the contents as well as give a general idea of its layout.



The book begins with an overall table of contents. Each part also has a table of contents and section description. The last part of the specifications book is an alphabetized index listing subjects by section or subsection and page number.

**INTRODUCTION TO THE
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Overview and Practice Questions

INTRODUCTION TO THE LOUISIANA STANDARD SPECIFICATIONS FOR ROADS
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PART I GENERAL PROVISIONS
--

Part I of the specifications covers all contracts regardless of scope. Legal requirements, from submitting bids through payment for work, are included.

101	General Information, Definitions, and Terms	This section defines terms and abbreviations used in this book.
102	Bidding Requirements	This section gives requirements for preparing and submitting a proposal to the department to bid on a project.
103	Award and Execution of Contract	This section explains how contracts are awarded and outlines the procedures to be followed at the time of execution.
104	Scope of Work	This section gives the intent of the contract and clarifies the rights and obligations of the contractor during the length of the project.
105	Control of Work	This section delineates authority during the course of the project and establishing the duties of the contractor, the engineer, and the inspector.
106	Control of Materials	Rules and regulations governing materials used on projects are given in this section.
107	Legal Relations and Responsibility to Public	This section tells the contractor what state, federal, and local laws must be complied with to ensure the safety of the public and the preservation of the environment.
108	Prosecution and Progress	This section deals with subletting of contracts, contractual time requirements, rights of the department regarding delays, penalties for delays, and procedures for default or termination of a contract.
109	Measurement and Payment	This section deals with measurement and payment for materials, equipment, and work.

PART I QUESTIONS

Find the answers to the following questions using:

SECTION 101 - DEFINITIONS AND TERMS

1. _____ is defined as work required by the contract that is not directly measured and for which no specific pay item is provided, including all work necessary to satisfactory complete all pay items.
 - a. Change Order (Plan Change)
 - b. Controlling Item(s) of Work
 - c. Contract Time
 - d. Incidental Work

2. Abbreviations or acronyms used in the contract documents are found in _____.
 - a. Subsection 101.02
 - b. Subsection 101.04
 - c. Subsection 101.03
 - d. None of the above

Find the answers to the following questions using:

SECTION 102 - BIDDING REQUIREMENTS

3. When landscaping is the predominant work on the project and no federal funds are involved, prior to receiving bid forms, the prospective bidder will be required to possess what type of license?
 - a. Current Contractor's License
 - b. Current Horticulture and Agriculture Contractor's License
 - c. Current Landscape Contractors License
 - d. No license is required on landscaping projects

4. The Construction Proposal Signature and Execution Form shall be signed either with _____ or with ink by any of the following who are legally qualified and acceptable to the state.
- a. A pencil
 - b. A certified stamp
 - c. A proxy
 - d. An authorized electronic signature

Find the answers to the following questions using:

SECTION 103 – AWARD AND EXECUTION OF CONTRACT

5. After paper or electronic bids are opened and read, they will be compared based on the summation of the products of the quantities and the unit bid prices in the _____.
- a. Contract Award Letter
 - b. Schedule of Items
 - c. Advertisement
 - d. Contract
6. At the time of execution of the contract, the successful bidder shall furnish which of the following bonds on the forms provided by the Department?
- a. Payment Bond
 - b. Insurance Bond
 - c. Performance Bond
 - d. Both A and C

Find the answers to the following questions using:

SECTION 104 - SCOPE OF WORK

7. When a portion of an item is eliminated or its quantity reduced, a deduction for the eliminated work will be made in the contract amount for that item as determined by _____.
- a. The Department
 - b. The Contractor
 - c. The Engineer
 - d. Any of the above may make deductions for the eliminated work
8. Before final acceptance, all parts of the work, including property adjacent to the right-of-way, which have been damaged or rendered unsightly during the work shall be left in satisfactory condition and when required, the right-of-way shall be mowed in accordance with _____, all at no direct pay.
- a. DOTD maintenance standards
 - b. The Contract
 - c. MUTCD
 - d. None of the above

Find the answers to the following questions using:

SECTION 105 - CONTROL OF WORK

9. When filling out a Transmittal Letter, which of the items should be included?
- a. State Project Number and Project Name
 - b. Name and Route
 - c. Transmittal Date and The Submitter's Name and Address
 - d. All of the items above are required for a Transmittal Letter

10. In case of discrepancy in the work being performed, what order of precedence should apply to the following documents?

- a. 1. Plans, 2. Standard Plans, 3. Standard Specifications, 4. Supplemental Specifications, and 5. Special Provisions
- b. 1. Special Provisions, 2. Plans, 3. Supplemental Specifications, 4. Standard Specifications, and 5. Standard Plans
- c. 1. Standard Plans, 2. Plans, 3. Standard Specifications, 4. Special Specifications, and 5. Special Provisions
- d. 1. Standard Plans, 2. Special Provisions, 3. Standard Specifications, 4. Special Specifications, and 5. Plans

**Find the answers to the following questions using:
SECTION 106 - CONTROL OF MATERIALS**

11. Distribution of certificates and requirements for further sampling and testing of certified materials is outlined in the following:

- a. Department's *Quality Control Manual*
- b. Department's *Testing Procedures Manual*
- c. Department's *Materials Sampling Manual*
- d. None of the above

12. _____ shall provide project site laboratories as required by the specifications to be used exclusively for material acceptance purposes by the Department.

- a. The Project Engineer
- b. The District Materials Lab Engineer
- c. The Contractor
- d. Any of the above

Find the answers to the following questions using:

SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO PUBLIC

13. When the Department is the contracting agency, where should any litigation arising under or relating to the contract, or the bidding, or award be instituted?
- a. The Judicial District Court of the area that the work is being completed
 - b. Any court of competent jurisdiction agreed upon by both the Contractor and the Department
 - c. The 19th Judicial District Court in and for the Parish of East Baton Rouge, in the State of Louisiana
 - d. Any meeting space designated by the Department
14. When determining Business Automobile Liability Insurance requirements for an initial contract up to \$1,000,000; what is the Minimum Insurance acceptable?
- a. \$1,000,000
 - b. \$2,000,000
 - c. \$5,000,000
 - d. None of the above. It is dependent on the total amount of the contract.

Find the answers to the following questions using:

SECTION 108 - PROSECUTION AND PROGRESS

15. When all work has been satisfactorily completed, the final inspection made, and the work accepted by the DOTD Chief Engineer, the contract:
- a. Will be reviewed by department accountants.
 - b. Will be considered complete.
 - c. Will be on hold until one year has passed.
 - d. Will be on hold until traffic is allowed on the project.

16. When a termination of a contract occurs for the Department's convenience, what is the contractor entitled to receive payment for?
- a. The quantity of units or items of work completed at the contract unit price, and, as mutually agreed, for items of work partially completed
 - b. Various costs incurred due to the termination of the contract
 - c. Reasonable direct labor costs and non-labor cash expenditures incurred for unplanned termination related activities.
 - d. Both A and C

Find the answers to the following questions using:

SECTION 109 - MEASUREMENT AND PAYMENT

17. An item included in the contract as awarded with a total cost equal to or greater than 10 percent of the original total contract amount is a(n):
- a. Alteration
 - b. Major Item
 - c. Minor Item
 - d. Supplemental Item
18. When determining payment for stockpiled or stored materials, payment will be considered only for materials anticipated to be stored for periods in excess of:
- a. 30 calendar days
 - b. 45 calendar days
 - c. 60 calendar days
 - d. Any length of time as determined by the contract

PART II EARTHWORKS AND SITE PREPARATION
--

Part II of the specifications includes the clearing and preparing of the site for construction, including: excavation, building embankments, and placing temporary erosion control.

201	Clearing and Grubbing	This section gives the requirements for clearing, grubbing, removing and disposing of vegetation and debris within the limits of the right-of-way and easement areas.
202	Removing or Relocating Structures and Obstructions	This section describes the removal or relocation and satisfactory disposal of buildings, floor slabs, foundations, septic tanks, fences, culverts, structures, pavements, abandoned pipelines, and other obstructions not designated or permitted to remain in the project right-of-way.
203	Excavation and Embankment	This section describes excavation, disposal, placement, and compaction of materials for which provisions have not been made under other sections of the specifications. It specifically provides specifications for the construction of embankments, cut and fill sections, parameters for soil use, and use of geotextile fabric in earthwork.
204	Temporary Erosion Control	This section covers temporary erosion control on the project and in areas outside the right-of-way where work is accomplished in conjunction with the project to prevent pollution of the water, detrimental effects to property adjacent to the right-of-way, and damage to work on the project.

PART II QUESTIONS

Find the answers to the following questions using:

SECTION 201 – CLEARING AND GRUBBING

1. When repairing any damage, including felled trees, to outside of the right-of-way caused by the contractor's operations, who is the responsible party?
 - a. The Department
 - b. The Contractor
 - c. Responsibility is determined by the Project Engineer
 - d. Any of the above parties are responsible

2. Explosives, when used, shall be in accordance with _____.
 - a. 107.11
 - b. 1004.03
 - c. 834.04
 - d. None of the above

Find the answers to the following questions using:

SECTION 202 – REMOVING OR RELOCATION STRUCTURES AND OBSTRUCTIONS

3. Dispose of materials not specified to be salvaged off the project right-of-way outside the view of the traveling public with _____ of the property owner on whose property the material is placed.
 - a. All completed right-of-way documents
 - b. A Certificate of Release
 - c. Notification from the Department's Material and Testing Section
 - d. Written permission

4. When a structure contains friable asbestos, request that _____ provide a confirmation letter with an Asbestos Disposal Verification Form (ADVF).
- a. DOA
 - b. DOTD
 - c. DNR
 - d. DEQ

Find the answers to the following questions using:

SECTION 203 - EXCAVATION AND EMBANKMENT

5. During excavation, when contaminated soils or underground tanks are encountered, handling shall be in accordance with:
- a. Section 204
 - b. Section 201
 - c. Section 203
 - d. Section 202
6. Headers are that portion of the embankment within _____ feet of a bridge end.
- a. 100
 - b. 200
 - c. 500
 - d. 1000

**Find the answers to the following questions using:
SECTION 204 - TEMPORARY EROSION CONTROL**

7. When working with temporary erosion control features, quality assurance requirements shall be as specified in the latest edition of the Department's publication titled:
 - a. *Approved Material List*
 - b. *Application of Quality Assurance Specifications for Embankment and Base Course*
 - c. *Testing Procedures Manual*
 - d. *Application of Quality Control Specifications for Asphalt Concrete Mixtures*

8. When working with the control of erodible soils, prevent the transmission of soil particles into:
 - a. Streams and canals
 - b. Lakes
 - c. Reservoirs or other waterways
 - d. All of the above

PART III
BASE COURSES

Part III of the specifications covers base and subbase courses. It covers the materials used to construct them, placement of those materials, and the equipment used.

301	Class I Base Course	The section covers the furnishing and placing of Class I Roadway and Shoulder Base Courses on a subgrade layer conforming to Section 305 of these specifications. It includes specifications for materials, production equipment (central mix plant), finishing and compaction equipment, time limits, and maintenance of the base until surfacing is placed. This section is for central mix plant only.
302	Class II Base Course	This section covers the furnishing and placing of Class II Roadway and Shoulder Base Courses on a prepared surface, including materials, equipment, time limits, and maintenance until the surface course is placed.
303	In-place Cement - Stabilized and Treated Base Courses	This section covers the scarifying, pulverizing, blending, shaping, and stabilizing of roadbed materials.
304	Lime Treatment	This section covers the construction of one or more courses of a mixture of lime and soil, or soil-aggregate, and water.
305	Subgrade Layer	This section covers the treatment of subgrade soil materials with Portland cement, Portland-pozzolan cement, a combination of Portland cement and lime, or construction of a subgrade layer of stone, crushed slag, recycled Portland cement concrete, blended calcium sulfate, or asphalt concrete.
306	Scarifying and Compacting Roadbed	This section covers scarifying, shaping, and compacting an existing roadbed to form a subbase or base course.

307	Permeable Bases	This section covers the construction of a permeable asphalt base or permeable concrete base on a prepared subbase in accordance with the specifications, and conforming to the line, grades, thicknesses, and typical sections shown on the plans.
308	Vacant	This section is vacant at this time.
309	In-place Cement - Treated Subgrade	This section covers the scarifying, pulverizing, blending, shaping, and treating of roadbed material with Portland cement, Portland-pozzolan, or Portland blast-furnace slag cement in accordance with the lines, grades, thicknesses, and sections established or shown on the plans.

PART III QUESTIONS

Find the answers to the following questions using:

SECTION 301 - CLASS I BASE COURSE

1. Soils for soil cement base course shall consist of materials that will stabilize with cement in accordance with DOTD TR 432. Such materials are those soils classified as A-1-a, A-1-b, A-2-4, A-2-6, A-4 and A-6 in accordance with:
 - a. DOTD TR 428
 - b. DOTD TR 413
 - c. DOTD TR 423
 - d. DOTD TR 407

2. On soil cement base courses, tie each day's construction into the completed work of the previous day by a _____ .
 - a. Straight Transverse Construction Joint
 - b. Longitudinal Joint
 - c. Base Joint
 - d. None of the above

Find the answers to the following questions using:

SECTION 302 - CLASS II BASE COURSE

3. When working with Class II Base Course, acceptance of soils with organic content between 2 and 5 percent may be allowed based on determination of increased cement percentages in accordance with _____ , whichever is applicable, using the design compressive strength criteria listed for stabilization.
 - a. DOTD TR 432 Method B
 - b. DOTD TR 413 Method D
 - c. DOTD TR 432 Method C
 - d. Both A and C

4. After placement of soil and prior to in-place mixing with cement, shape the soil to required section and compact to at least _____ percent of maximum dry density at the required grade.
 - a. 94.0
 - b. 95.0
 - c. 100.0
 - d. 93.0

Find the answers to the following questions using:

SECTION 303 - IN-PLACE CEMENT STABILIZED AND TREATED BASE COURSES

5. The contractor, while working with in-place cement stabilized base course, shall perform initial compaction using _____.
 - a. Conventional sheepfoot type roller
 - b. Self-propelled tamping foot compactor-type roller
 - c. Both A or B
 - d. None of the above

6. Scarify and pulverize the roadbed to at least _____ in accordance with DOTD TR 431 prior to mixing with cement for in-place cement stabilized base course.
 - a. 60 percent passing the No.4 sieve
 - b. 70 percent passing the No.4 sieve
 - c. 93 percent passing the No.4 sieve
 - d. 80 percent passing the No. 4 sieve

Find the answers to the following questions using:

SECTION 304 - LIME TREATMENT

7. Dimensional tolerances of Type B Lime Treatment for shoulder base course width shall not vary from plan width in excess of:
 - a. + 3 inches
 - b. + 6 inches
 - c. + 12 inches
 - d. None of the above

8. Type B lime treatment is used for:
 - a. Conditioning for cement treatment or stabilization
 - b. Working table
 - c. Conditioning and drying
 - d. Base or subbase

Find the answers to the following questions using:

SECTION 305 - SUBGRADE LAYER

9. In treatment of the subgrade layer, use minimum quantities of portland cement concrete and lime in accordance with _____ .
 - a. Section 304
 - b. Table 305-1
 - c. DOTD TR 428
 - d. All of the above

10. When working with the gradation requirements for treated subgrade layers, what percent should pass by weight through the No.4 sieve?
- a. 9%
 - b. 50%
 - c. 6%
 - d. 95%

Find the answers to the following questions using:

SECTION 306 - SCARIFYING AND COMPACTING ROADBED

11. The quality assurance requirements for the scarifying and compacting of a roadbed are specified in the department's publication titled:
- a. *Materials and Testing Manual*
 - b. *Quality Assurance Standards*
 - c. *Base and Subbase Course Standards*
 - d. *Application for Quality Assurance Specifications for Embankment and Base Course*
12. On an existing roadbed, materials shall be scarified for the full width of the roadbed and to a minimum depth of:
- a. 12 inches
 - b. 8 inches
 - c. 6 inches
 - d. 10 inches

Find the answers to the following questions using:

SECTION 307 – PERMEABLE BASES

13. The asphalt for asphalt treated permeable base shall be an approved polymer modified asphalt cement, or, complying with Section 1002. The percentage of asphalt cement shall be _____ by weight of the total mixture.
- a. 3.0 percent to 5.0 percent
 - b. 2.0 percent to 4.0 percent
 - c. 4.0 percent to 6.0 percent
 - d. None of the above
14. The finished surface of permeable asphalt base and permeable concrete base shall be uniform and shall not vary at any point more than:
- a. 0.05 foot above or below the established grade
 - b. 0.03 foot above or below the established grade
 - c. ± 0.003 foot/foot above or below the established grade
 - d. ± 0.005 foot/foot above or below the established grade

Find the answers to the following questions using:

SECTION 309 – IN-PLACE CEMENT TREATED SUBGRADE

15. Depending on the materials to be treated for in-place cement treated subgrade, normal testing time to determine the required cement content may require _____ .
- a. Up to 21 calendar days
 - b. 3 percent of moisture content above optimum
 - c. Materials in accordance with Section 203
 - d. None of the above
16. Payment for in-place cement treated subgrade will be made at the contract unit per square yard, which includes:
- a. Cement
 - b. Cement treatment
 - c. Water
 - d. All of the above

PART IV
SURFACE COURSES

Part IV of the specifications deals with roadway and shoulder surface courses other than asphalt surface treatment, asphalt concrete, or Portland cement concrete.

401	Aggregate Surface Course	The section covers the furnishing and constructing of aggregate surface courses for shoulders, drives, or other facilities.
402	Traffic Maintenance Surfacing	This section covers the furnishing and constructing of aggregate surfacing for maintenance of traffic on driveways, pipe crossings, short-term traffic on raw embankment, slope corrections, or other disturbed roadway sections.

PART IV QUESTIONS

Find the answers to the following questions using:

SECTION 401 - AGGREGATE SURFACE COURSE

1. On existing roadway, where only placing aggregate surface course, remove vegetation, shape, and satisfactorily compact the surface prior to placing aggregate surfacing. For new or reconstructed surfaces construct subgrade in accordance with _____ .
 - a. Section 203
 - b. Section 201
 - c. Section 202
 - d. Section 204

2. Uniformly mix sand-clay-gravel with _____ lime by volume; for central mixing, use 5 percent lime.
 - a. 6 percent
 - b. 8 percent
 - c. Stone, crushed slag, and reclaimed asphalt concrete
 - d. Shell

Find the answers to the following questions using:

SECTION 402 – TRAFFIC MAINTENANCE SURFACING

3. For mainline surfacing, _____ will be either asphalt concrete or excavatable flowable fill with a minimum thickness of 6 inches.
 - a. Traffic Maintenance Surfaces
 - b. Aggregate
 - c. Hard surface
 - d. None of the above

4. Aggregate material that has been reloaded, hauled, and reused will be paid at _____ of the contract price.
 - a. 45 percent
 - b. 50 percent
 - c. 60 percent
 - d. 75 percent

PART V
ASPHALT PAVEMENTS

Part V of the specifications deals with asphalt pavements. This includes asphalt concrete mixtures as well as asphalt tack and prime coats, asphalt curing membrane, asphalt surface treatment, asphalt-treated drainage blanket, and cold planing asphalt pavement.

501	Thin Asphalt Concrete Applications	This section covers the furnishing and constructing of one or more courses of asphalt concrete mixture.
502	Asphalt Concrete Mixtures	This section consists of asphalt concrete mixtures of aggregates, asphalt, and additives.
503	Asphalt Concrete Equipment and Processes	This section specifies requirements for the certification of asphalt concrete plants and paving equipment. It includes methods and equipment for handling and storing materials, producing asphalt concrete, and transporting and placing asphalt concrete at the job site.
504	Asphalt Tack Coat	This section covers preparing and treating existing asphalt or Portland concrete pavement surfaces with asphalt tack coat in preparation for paving.
505	Asphalt Prime Coat	This section covers the preparation and treatment of a newly constructed unbound and/or un-stabilized base courses with an asphalt prime coat as a seal.
506	Asphalt Curing Membrane	This section covers the application and maintenance of an asphalt curing membrane to the surface of cement or lime treated or stabilized base/subgrade layers.

507	Asphalt Surface Treatment	This section covers the furnishing of properly distributed asphalt material followed by a uniform application of aggregate for building a riding surface, improving the surface friction of the roadway, sealing cracks in the roadway, reducing the rate of oxidation of a surface mixture, or as an interlayer to delay or reduce the occurrence of reflective cracking.
508	Vacant	This section is vacant at this time.
509	Milling Asphalt Pavement	This section covers the removal of asphalt concrete surfacing by milling.
510	Asphalt Concrete Pavement Patching, Widening, and Joint Repair	This section covers the use asphalt concrete to patch, widen and repair joints of existing asphalt concrete pavements.

PART V QUESTIONS

Find the answers to the following questions using:

SECTION 501 – THIN ASPHALT CONCRETE APPLICATIONS

1. Do not begin daily asphalt plant operations unless the contractors' _____ is at the plant.
 - a. Certified Plant Mix Designer (Level 2 or Level 3)
 - b. Materials Testing Engineer
 - c. District Laboratory Engineer
 - d. Certified Asphalt Concrete Plant Technician (Level 2 or Level 3)

2. When working with Thin Asphalt Concrete Applications, sample and test in accordance with the *Material Sampling Manual* and the test procedures described in _____.
 - a. The Approved Materials List
 - b. Table 502-1
 - c. DOTD TR 317
 - d. Table 501-6

Find the answers to the following questions using:

SECTION 502 - ASPHALT CONCRETE MIXTURES

3. What test procedure should be used for Superpave Volumetric Mix Design:
 - a. DOTD TR 306
 - b. AASHTO M 323
 - c. AASHTO D 3690
 - d. DOTD TR 644

4. _____ describes the friction ratings and corresponding usage allowed for the current average daily traffic (ADT) shown on the plans.
- a. Section 1003.01.2.4
 - b. Table 1003-14
 - c. Section 1002.02.5
 - d. Table 502-3

Find the answers to the following questions using:

SECTION 503 - ASPHALT CONCRETE EQUIPMENT AND PROCESSES

5. The Department will certify plant furnishing asphalt mixtures _____ with current Departmental procedures or when any major component is repaired, replaced, or upgraded.
- a. Every six years
 - b. Every three years
 - c. Every two years
 - d. Annually
6. The Certified Asphalt Concrete Plant Technician shall notify the DOTD certifying District Laboratory _____ prior to plant calibration.
- a. Two days
 - b. Two weeks
 - c. Two months
 - d. None of the above

Find the answers to the following questions using:

SECTION 504 - ASPHALT TACK COAT

7. Do not apply asphalt tack coat on a wet surface, or when the ambient air temperature is below _____ .
 - a. 160° F
 - b. 40° F
 - c. 70° F
 - d. 35° F

8. Using Table 504-1, what rate should tack coat be applied to a cold planed/milled surface?
 - a. 0.08 gal/sq yd
 - b. 0.09 gal/sq yd
 - c. 0.06 gal/sq yd
 - d. 0.12 gal/sq yd

Find the answers to the following questions using:

SECTION 505 - ASPHALT PRIME COAT

9. Do not apply asphalt prime coat when ambient air temperature is less than _____ .
 - a. 40°F in the shade
 - b. 45°F in the shade
 - c. 35°F in the shade
 - d. 30°F in the shade

10. When applying prime coat, extend it _____ beyond the width of surfacing shown on the plans.
- a. 6 inches
 - b. 7 inches
 - c. 8 inches
 - d. 12 inches

Find the answers to the following questions using:

SECTION 506 - ASPHALT CURING MEMBRANE

11. Using Table 506-1, what application temperature should be used when applying Emulsified Asphalt:
- a. A minimum of 60 degrees Fahrenheit
 - b. A minimum of 70 degrees Fahrenheit
 - c. A minimum of 40 degrees Fahrenheit
 - d. Table does not specify minimum temperature
12. When using asphalt curing membrane, undiluted EPR shall consist of:
- a. A mixture of water and resin as determined by the manufacturer
 - b. 5 parts water and 1 part resin concentrate and comply with Section 1002
 - c. 5 parts aggregate and 1 part resin concentrate and comply with Section 1002
 - d. Undiluted EPR mixtures are at the discretion of the District Laboratory Engineer

Find the answers to the following questions using:

SECTION 507 – ASPHALT SURFACE TREATMENT

13. Asphalt Surface Treatment (AST) is sometimes referred to as:
- a. Polymer Modified Asphalt
 - b. Chip Seal
 - c. Emulsified Applied Asphalt
 - d. Any of the above
14. At what adjustment rate should asphalt emulsion be applied on smooth, non-porous surfaces?
- a. -0.1 to -0.06 gal/sq yd
 - b. 0.03 to 0.09 gal/sq yd
 - c. 0.00 gal/sq yd
 - d. Any of the above are sufficient application rates

Find the answers to the following questions using:

SECTION 509 – MILLING ASPHALT PAVEMENT

15. During milling asphalt operations, limit the maximum depth to _____ per day when traffic is being maintained on the roadway.
- a. 2 inches
 - b. 2 feet
 - c. There is no maximum depth to consider when milling asphalt roadways.
 - d. The maximum depth is determined by the Project Engineer

16. When determining payment for asphalt milling operations, what is the pay unit for Contractor Retained Reclaimed Asphalt Pavement?
- a. Square Yard
 - b. By the ton
 - c. Cubic Yard
 - d. Any of the above are sufficient application rates

Find the answers to the following questions using:

SECTION 510 – ASPHALT CONCRETE PAVEMENT PATCHING, WIDENING, AND JOINT REPAIR

17. When widening asphalt concrete pavement, thickness and width shall be measured in accordance with:
- a. AASHTO T 324
 - b. DOTD TR 306
 - c. AASHTO T 312
 - d. DOTD TR 602
18. When determining payment for asphalt concrete pavement patching, where are the payment adjustment provisions?
- a. Section 502.14
 - b. Section 202 at no direct pay
 - c. Table 502-7 with 4-inch cores allowed
 - d. Payment is based on unit prices per square yard

PART VI RIGID PAVEMENTS
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Part VI of the specifications deals with the construction of Portland cement concrete pavement on a project.

601	Portland Cement Concrete Pavement	This section covers the construction of Portland cement concrete pavement, on a prepared subgrade or base course. It includes specifications for equipment, sequence of operations, construction details, and quality control inspection and acceptance.
602	Portland Cement Concrete Pavement Rehabilitation	This section covers the repair and rehabilitation of existing, aged portland cement concrete pavements.

PART VI QUESTIONS

Find the answers to the following questions using:

SECTION 601 – PORTLAND CEMENT CONCRETE PAVEMENT

1. The artificial turf shall be made of molded polyethylene with synthetic turf blades approximately _____ .
 - a. 0.75 inch long containing approximately 7,200 individual blades per square foot.
 - b. 0.75 inch long containing approximately 7,200 individual blades per square yard.
 - c. 0.85 inch long containing approximately 7,200 individual blades per square foot.
 - d. 0.85 inch long containing approximately 7,200 individual blades per square yard.

2. For transverse tine texturing, the depth of groove produced in the concrete shall be 3/16 inch maximum and 1/16 inch minimum, measured in accordance with:
 - a. DOTD TR 829
 - b. DOTD TR 644
 - c. DOTD TR 229
 - d. DOTD TR 928

Find the answers to the following questions using:

SECTION 602 – PORTLAND CEMENT CONCRETE PAVEMENT REHABILITATION

3. For fill depth corner patching of jointed concrete pavement, when the engineer orders additional thickness of patching, in excess of plan thickness, payment will be made for the additional thickness in accordance with:
 - a. 1005.02.1
 - b. 602.17.4
 - c. 601.03.7
 - d. 1018.01

4. When patching continuously reinforced concrete pavement, patching operations should be conducted:
 - a. Prior to pavement removal
 - b. In one lane at a time
 - c. Within the allotted time
 - d. With lanes closed to traffic for a minimum of 2 hours per square foot of patchwork

PART VII
INCIDENTAL CONSTRUCTION

Part VII of the specifications covers items required to supplement construction such as fences, revetments, traffic signals, landscaping, culverts, guardrails, and detour roads. Information is given relating to the size, type, and placement of these items.

701	Culverts and Storm Drains	This section contains specifications concerning the furnishing, installation and cleaning of pipes, pipe arches, storm drains, and sewers referred to as culverts or conduits.
702	Manholes, Junction Boxes, Catch Basins, and End Treatments	This section contains specifications for the construction, installation, and adjustment of manholes, junction boxes, catch basins, culvert end treatments and safety ends.
703	Underdrain Systems	This section contains specifications for constructing pipe underdrain systems.
704	Guardrail	This section contains specifications for furnishing and constructing Beam-type highway guardrail.
705	Fences	This section contains specifications for constructing fences and gates.
706	Concrete Walks, Drives, and Incidental Paving	This section contains specifications for furnishing and constructing Portland cement concrete walks, drives, handicap curb ramps, and incidental paving slabs.
707	Curbs and Gutters	This section contains specifications for furnishing and constructing Portland cement concrete and asphalt concrete curbs and gutters.
708	Right-of-Way Monuments	This section contains specifications for installing contractor-furnished right-of-way monuments and right-of-way monument witness posts at various locations.

709	Steel Cattle Guards	This section contains specifications for constructing, furnishing, and installing welded steel cattle guards at locations shown on the plans.
710	Flowable Fill	This section covers furnishing, placing, and consolidating a controlled low strength flowable fill as an alternative to compacted soil. Applications for this material include, but are not limited to, general backfilling of drainage structures, entrenchments across pavements, encasements, beddings, void filling, and other uses as shown on the plans or as approved by the engineer.
711	Riprap	This section contains specifications for furnishing and placing riprap, which is graded stone or recycled Portland cement concrete placed on soil to protect against erosion.
712	Revetments	This section contains specifications for furnishing and constructing revetments for protection of embankment slopes, stream channels, culvert end treatments, and other areas.
713	Temporary Traffic Control	This section contains specifications for furnishing, installing, maintaining, and removing temporary construction barricades, precast concrete barriers, lights, signals, pavement markings, and signs; providing flaggers; and complying with all other requirements regarding the protection of the work, workers, and safety of the public.
714	Sodding	This section contains specifications for furnishing, hauling, planting, rolling, watering, and maintaining live grass sod at locations shown on the plans or as directed.
715	Topsoil	This section contains specifications for furnishing and placing topsoil.
716	Vegetative and Fiber Mulch	This section contains specifications for furnishing and placing an approved vegetative or fiber mulch with a tacking agent on seeded areas to promote seed germination and growth while temporarily protecting the soil from erosion.

717	Seeding	This section contains specifications for preparing seed beds and furnishing and sowing grass seed on the areas designated on the plans or as directed.
718	Fertilizer and Agricultural Lime	This section contains specifications for furnishing and applying commercial fertilizer and agricultural lime on the areas designated on the plans or as directed.
719	Landscaping	This section contains specifications concerning the furnishing and planting of various plant materials, excluding grass covering.
720	Erosion Control Systems	This section contains specifications for furnishing and placing of erosion control systems in accordance with the plan requirements for use as soil retention blankets on slopes or as flexible channel liners in ditches.
721	Mowing, Trimming, and Debris Collection	This section contains specifications for mowing grass and weeds, trimming overhanging branches, vegetation and trees, and collecting and removing trimmings and debris.
722	Field Laboratories	This section contains specifications for furnishing laboratory buildings at project sites or plant sites exclusively for the use of the Department personnel involved in the Department's Quality Assurance Program.
723	Granular Material	This section contains specifications for furnishing and placing granular material in accordance with the specifications and in conformity with the lines, grades, and typical sections shown on the plans or as directed
724	Rumble Strips	This section covers the construction of rumble strips in accordance with the details in the plans and as directed.

725	Temporary Detour Roads	This section contains specifications for furnishing, constructing, maintaining and subsequently removing temporary detour roads.
726	Bedding Material	This section contains specifications for furnishing and placing aggregate bedding material on geotextile fabric for drainage structures.
727	Mobilization	This section consists of preparatory work and operations, including those necessary for movement of personnel, equipment, supplies and incidentals to the project site, the establishment of offices, buildings, and other facilities necessary for work on the project, the costs of bonds and any required insurance, and other preconstruction expenses necessary for start of work, excluding the costs of construction materials.
728	Jacked or Bored Pipe	This section contains specifications for furnishing and installing pipe in embankments at the locations shown on the plans by jacking or boring. Jacking or boring operations install pipe through or beneath an existing embankment without trenching.
729	Permanent Signs	This section contains specifications for the furnishing and installation of traffic signs, dead end road markers, other markers and delineators with accessories, posts, and overhead spans of specified materials, sizes, shapes, weights, and designs.
730	Vacant	This section is vacant at this time.
731	Raised Pavement Markers	This section contains specifications for the furnishing and placement of raised pavement markers in accordance with plan details.

732	Plastic Pavement Markings	This section contains specifications for the furnishing and placement of reflective pavement markings of hot applied thermoplastic or preformed (cold or hot applied) plastic at the locations shown on the plans. Plastic pavement markings include stripes, gore markings, lines, legends, and symbols.
733	Vacant	This section is vacant at this time.
734	Rubblizing Portland Cement Concrete Pavement	This section covers the rubblizing and compaction of the existing reinforced or non-reinforced Portland cement concrete in accordance with the lines, grades, and typical sections shown in the plans without damaging the subgrade.
735	Mailboxes and Mailbox Supports	This section covers the removal and replacement of mailboxes, newspaper delivery tubes, and mailbox supports in accordance with these specifications, the plans, and as directed.
736	Traffic Signals	This section covers the furnishing and installation of necessary materials and equipment to complete new traffic signal systems or modify existing systems in accordance with plan details, Traffic Signal Standard Details, and these specifications..
737	Painted Traffic Striping	This section covers the furnishing and application of reflective white or yellow paint for pavement striping in accordance with plan details, the MUTCD, and these specifications.
738	Mulch Sodding	This section contains specifications for furnishing, hauling, spreading, rolling, watering, and the maintenance of live grass roots with topsoil at locations shown on the plans or as directed. Fertilizing and applying and lime (if required).

739	Hydro-Seeding	This section contains specifications for preparing seed beds and sowing grass seed using hydro-seeding equipment in order to establish a turf grass cover.
740	Construction Layout	This section covers all the requirements for construction layouts. It consists of line and grade establishments, taking all cross sections, and staking out of the construction work according to specifications, plan details, and as directed.
741	Water Distribution Systems (Supplemental Specifications)	These specifications are located under a separate cover.
742	Sanitary Sewer Systems (Supplemental Specifications)	These specifications are located under a separate cover.
743	Airport Pavement Markings (Supplemental Specifications)	These specifications are located under a separate cover.
744	Traffic Control Devices (Supplemental Specifications)	These specifications are located under a separate cover.

PART VII QUESTIONS

Find the answers to the following questions using:

SECTION 701 – CULVERTS AND STORM DRAINS

1. Many different materials are used when installing culverts and storm drains. When using reinforced concrete pipe, the pipe shall conform to which section and subsection of the specifications?
 - a. 1006.03
 - b. 1016.02
 - c. 1007.03
 - d. 1016.03

2. When using corrugated metal pipe, the backfill material shall be tested and shall have a resistivity greater than 1500 ohm-cm and a pH greater than 5 when tested in accordance with _____ respectively.
 - a. DOTD TR 418 and DOTD TR 425
 - b. DOTD TR 504 and DOTD TR 525
 - c. DOTD TR 318 and DOTD TR 325
 - d. DOTD TR 429 and DOTD TR 430

Find the answers to the following questions using:

SECTION 702 – MANHOLES, JUNCTION BOXES, CATCH BASINS, AND END TREATMENTS

3. Construct _____ to control erosion at the ends of cross drains and side drains in accordance with these specifications, the plans, and as directed.
 - a. Culvert end treatments
 - b. Catch basins
 - c. Junction boxes
 - d. Manholes

4. Payment for new and adjusted junction boxes, manholes, catch basins, culvert end treatments, and safety ends will be made at the contract unit price per _____ which will include all materials, tools, equipment, labor, and incidentals necessary to complete the work.
- a. Cubic foot
 - b. Cubic yard
 - c. Each
 - d. None of the above

Find the answers to the following questions using:

SECTION 703 – UNDERDRAIN SYSTEMS

5. Shoulder under-drains will be measured by _____ along the pavement or shoulder edge.
- a. Linear yard
 - b. Linear foot
 - c. Square feet
 - d. Square yard
6. For shoulder outlet under-drains, required excavation, plastic pipe and fittings, backfill, replacement of shoulder base course and surfacing, concrete headwalls, rodent screens and disposal of excavated materials:
- a. Will be measured by the linear foot
 - b. Will be paid for by the land owner
 - c. Will not be measured for payment
 - d. Both a and b

Find the answers to the following questions using:

SECTION 704 – GUARDRAILS

7. Metal Beam Guardrail shall comply to Subsection:
 - a. 901
 - b. 1010.09
 - c. 1010.10
 - d. 1010.11

8. Payment for guardrail is by the:
 - a. Linear yard
 - b. Linear foot
 - c. Linear inch
 - d. Each

Find the answers to the following questions using:

SECTION 705 – FENCES

9. Use the same _____ of posts throughout a section of fence.
 - a. Type
 - b. Shape
 - c. Treatment
 - d. All of the above

10. The bottom of gates shall clear the ground:
 - a. At least 5 inches at all points of its swing
 - b. At least 6 inches at all points of its swing
 - c. At least 4 inches at all points of its swing
 - d. At least 3 inches at all points of its swing

Find the answers to the following questions using:

SECTION 706 – CONCRETE WALKS, DRIVES, AND INCIDENTAL PAVING

11. When placing and finishing concrete walks, drives, and incidental paving, round joints and edges with an edging tool having a:
 - a. 1/8 inch radius
 - b. 1/2 inch radius
 - c. 1/4 inch radius
 - d. 1 inch radius

12. Install expansion joints at maximum _____, and between intersecting paving and any fixed structure, such as a building, bridge, or curbing, and between intersecting paving and the handicapped curb ramps.
 - a. 100-foot intervals
 - b. 200-foot intervals
 - c. 300-foot intervals
 - d. 400-foot intervals

Find the answers to the following questions using:

SECTION 707 – CURBS AND GUTTERS

13. Place concrete for curbing and thoroughly tamp within _____ after pavement has been finished.
 - a. 1 hour
 - b. 30 minutes
 - c. 24 hours
 - d. 12 hours

14. _____ may be placed after completion of pavement, provided steel reinforcement is placed in the pavement of the size, type, and spacing shown on the plans at no direct pay.
- a. Slip-formed concrete
 - b. Integral type curb
 - c. Concrete joints
 - d. Gutters

Find the answers to the following questions using:

SECTION 708 – RIGHT-OF-WAY MONUMENTS

15. Right-of-Way monument witness posts shall be standard _____ in length as shown on the plans or an approved equal.
- a. 4 feet
 - b. 6 feet
 - c. 5 feet
 - d. 3 feet
16. Position and set of right-of-way monuments by or under the responsible charge of _____ .
- a. The Department of Agriculture
 - b. The contractor
 - c. DOTD
 - d. A Louisiana licensed professional land surveyor

Find the answers to the following questions using:

SECTION 709 – STEEL CATTLE GUARDS

17. For cattle guards, use the minimum size steel specified and fabricate in accordance with Section:
- a. 901
 - b. 1007.11
 - c. 1009.01
 - d. 809
18. When placing the cattle guard in the roadway, the compaction requirements shall conform to _____ .
- a. 815.01
 - b. 303.04
 - c. 203.07
 - d. 709.02

Find the answers to the following questions using:

SECTION 710 – FLOWABLE FILL

19. The flowable fill shall be a cementitious mixture of portland cement, fly ash, _____, entrained air, and appropriate admixtures for the particular application.
- a. Course aggregate
 - b. Slag
 - c. Water
 - d. Mortar

20. Flowable fill will be measured by the _____ by batch tickets as adjusted by the project engineer.
- a. Cubic foot
 - b. Cubic yard
 - c. Pound
 - d. None of the above

Find the answers to the following questions using:

SECTION 711 – RIPRAP

21. When tested in accordance with AASHTO T 85, the solid weight of stone shall be at least _____ (based on bulk specific gravity).
- a. 150 pounds per cubic foot
 - b. 155 pounds per cubic foot
 - c. 125 pounds per cubic foot
 - d. 160 pounds per cubic foot
22. Take care not to damage the geotextile fabric when placing riprap. Do not place riprap by:
- a. Rolling riprap down slope
 - b. Placing in accordance with subsection 203.11.3
 - c. Dropping riprap from extreme heights
 - d. Both a and c

Find the answers to the following questions using:

SECTION 712 – REVETMENTS

23. For wet-batched sacked concrete, sacks shall comply with:
- a. 1019.01
 - b. 1018.07
 - c. Section 901
 - d. Section 711
24. Revetments will be measured by the _____ to be re-vetted as shown on the plans and as directed.
- a. Square yard of surface area
 - b. Square foot of surface area
 - c. Square inch of surface area
 - d. All of the above

Find the answers to the following questions using:

SECTION 713 – TEMPORARY TRAFFIC CONTROL

25. For temporary signs and barricades, do not begin construction work until _____ have been erected and approved.
- a. Signs
 - b. Barricades
 - c. Other traffic control devices
 - d. All of the above

26. On all Asphalt Surface Treatments that are open to traffic and used as a final wearing course or as an interlayer, temporary pavement markings (tabs) on 20-foot centers shall be used in lieu of:
- a. A minimum of 8-foot long
 - b. The 4-foot tape on 40-foot centers
 - c. Standard 10-foot lane lines
 - d. All of the above can be used

**Find the answers to the following questions using:
SECTION 714 – SODDING**

27. St. Augustine grass is a:
- a. Field grown sod
 - b. Fertilizer
 - c. Nursery grown sod
 - d. Noxious weed
28. Cut sod to a minimum soil depth of _____ inches for field grown grass and 1 inch for nursery grown grass.
- a. 1 1/2
 - b. 1/2
 - c. 2
 - d. Both a and b

Find the answers to the following questions using:

SECTION 715 – TOPSOIL

29. Topsoil shall have a minimum PI of 4, a maximum PI of _____, a pH of 5.5 to 8.0, a minimum organic content of 2 percent, and shall be capable of supporting adequate vegetation.
- a. 12
 - b. 13
 - c. 4
 - d. 5.5
30. Uniformly spread topsoil over the areas to a depth of:
- a. 4 feet
 - b. 1 foot
 - c. 6 inches
 - d. 3 inches

Find the answers to the following questions using:

SECTION 716 – VEGETATIVE AND FIBER MULCH

31. In order to prevent defacing structures, _____ mulch around structures.
- a. Do not spread
 - b. Use a mulcher to spread
 - c. Manually spread
 - d. Both a and b

32. Vegetative mulch and fiber mulch products will be measured for payment by _____ .
- a. The contract unit per ton
 - b. The number of bales or bags
 - c. The ton of mulch material used
 - d. The average weight per bale

Find the answers to the following questions using:

SECTION 717 – SEEDING

33. Seed shall be selected on the basis of which of the following soil areas?
- a. Coastal prairie soils and coastal plain soils
 - b. Mississippi terraces and loess hill soils
 - c. Alluvial soils of Mississippi and Red River Bottoms and Ouachita River Bottom
 - d. All of the above
34. The preferred seeding dates for Type E - Pensacola Bahia seed mixture are the months of _____ .
- a. March – September
 - b. February – March
 - c. September – October
 - d. October – December

Find the answers to the following questions using:

SECTION 718 – FERTILIZER AND AGRICULTURAL LIME

35. Fertilizer shall be an approved brand complying with _____.
- a. 1004.01
 - b. 1011.02
 - c. 1008.06
 - d. 1003.05
36. Deliver fertilizer in:
- a. Sack or bulk
 - b. Cans
 - c. Boxes
 - d. Jars

Find the answers to the following questions using:

SECTION 719 – LANDSCAPING

37. Prepare backfill soil as follows:
- a. 5 parts topsoil and 3 parts pine bark
 - b. Water management gel and mycorrhizal inoculant
 - c. 1 part sand and 1 part manure
 - d. All of the above

38. Payment for bed preparation and top dressing mulch will be made at the contract unit prices per _____.
- a. Square foot
 - b. Square yard
 - c. Square acre
 - d. All of the above

**Find the answers to the following questions using:
SECTION 720 – EROSION CONTROL SYSTEMS**

39. Sample erosion control systems that are not accompanied by a Certificate of Delivery in accordance with _____.
- a. DOTD S 613
 - b. DOTD S 619
 - c. DOTD S 610
 - d. DOTD S 612
40. Erosion control systems, including hardware, will be measured by the _____ of surface area covered.
- a. Number of gallons
 - b. Square foot
 - c. Square yard
 - d. None of the above

Find the answers to the following questions using:

SECTION 721 – MOWING, TRIMMING, AND DEBRIS COLLECTION

41. Skip the following areas when mowing:
- a. Swamp areas or areas having ponded water.
 - b. Areas with large rocks or other obstructions that might damage the mowers.
 - c. Shoulder edge when shoulder material has been left in a windrow.
 - d. All of the above
42. Mowing will be measured by the cycle and will include all of the following except?
- a. Labor
 - b. Equipment
 - c. Materials
 - d. Debris collection

Find the answers to the following questions using:

SECTION 722 – FIELD LABORATORIES

43. Field laboratories are to be provided exclusively for the use of the Department personnel involved in the Department's:
- a. Maintenance Management Program
 - b. Quality Assurance Program
 - c. Construction Overlay Program
 - d. None of the above
44. Each laboratory shall have a minimum floor space of _____ that provides sufficient space with a minimum ceiling of 7 feet.
- a. 160 square feet or other approved size
 - b. 140 square feet or other approved size
 - c. 180 square feet or other approved size
 - d. 150 square feet or other approved size

Find the answers to the following questions using:

SECTION 723 – GRANULAR MATERIAL

45. When specifying net section measurement, the thickness and width of completed granular material courses will be checked for acceptance in accordance with _____ .
- a. DOTD TR 415
 - b. DOTD TR 403
 - c. DOTD TR 602
 - d. DOTD TR 109

46. Vehicular measurement of granular materials will be _____
in approved hauling vehicles at the point of delivery in accordance with
109.01.
- a. By the cubic yard
 - b. By the cubic foot
 - c. By the scaled weight
 - d. None of the above

**Find the answers to the following questions using:
SECTION 724 – RUMBLE STRIPS**

47. A set would be _____ rumble clusters in one lane.
- a. 2
 - b. 3
 - c. 4
 - d. 5
48. Payment for rumble strips (intersection) will be made at _____ .
- a. The contract unit per square yard
 - b. The contract unit per mile
 - c. The contract unit per each set shown on the plans
 - d. Each rumble strip

Find the answers to the following questions using:

SECTION 725 – TEMPORARY DETOUR ROADS

49. Temporary pavement markings shall comply to Section:
- a. 601
 - b. 306
 - c. 1015.08
 - d. None of the above
50. Surface low profile runaround type detour roads with approved aggregate. Place aggregate surfacing to _____ .
- a. A minimum depth of 5 inches and a minimum width of 30 feet
 - b. A minimum depth of 6 inches and a minimum width of 40 feet
 - c. A minimum depth of 4 inches and a minimum width of 20 feet
 - d. A minimum depth of 3 inches and a minimum width of 15 feet

Find the answers to the following questions using:

SECTION 726 – BEDDING MATERIAL

51. Bedding material shall comply with the following subsection:
- a. 203.10
 - b. 1019.19
 - c. 1003.10
 - d. Both a and c

52. Bedding material, including plastic soil material, completed and accepted, will be measured by:
- a. The square foot (net section)
 - b. The square yard (net section)
 - c. The ton per contract unit price (net section)
 - d. The cubic yard (net section)

**Find the answers to the following questions using:
SECTION 727 – MOBILIZATION**

53. Mobilization consists of preparatory work and operations, including those necessary for _____ .
- a. Movement of personnel, equipment, supplies, and incidentals
 - b. The establishment of offices, buildings, and other facilities necessary for work on the project
 - c. Other preconstruction expenses necessary for the start of work, excluding the cost of construction materials
 - d. All of the above
54. Partial payments for mobilization will be made in accordance with the schedule of _____ up to a maximum of 10 percent of the original total contract amount, including this item.
- a. Mobilization payments
 - b. Payment Adjustments
 - c. Section 722
 - d. Table 727-1

Find the answers to the following questions using:

SECTION 728 – JACKED OR BORED PIPE

55. Corrugated metal pipe to be jacked or bored shall have corrugated bands a minimum of _____ with four lines of approved gasket material.
- a. 36 inches wide
 - b. 24 inches wide
 - c. 28 inches wide
 - d. 32 inches wide
56. Bore mechanically using a pilot hole approximately:
- a. 2 inches in diameter
 - b. 6 inches in diameter
 - c. 4 inches in diameter
 - d. 3 inches in diameter

Find the answers to the following questions using:

SECTION 729 – PERMANENT SIGNS

57. The term _____ shall mean border strip, letters, numerals, and symbols that convey the message on signs.
- a. Sign
 - b. Panel
 - c. Markers
 - d. Legend

58. Fabricate signs of Types A, B, D, and E; overhead signs, and sign face overlay panels in accordance with:
- a. MUTCD
 - b. The *Standard Highway Signs Booklet*
 - c. Signing detail sheets of the plans
 - d. All of the above

Find the answers to the following questions using:

SECTION 731 – RAISED PAVEMENT MARKERS

59. When working with raised pavement markers, _____ shall be responsible for field layout and alignment.
- a. The Contractor
 - b. The Department
 - c. The Project Engineer
 - d. None of the above
60. While working with bituminous adhesive in raised pavement markers, apply markers when the ambient air temperature reaches _____ , or in accordance with the manufacturer's recommendations.
- a. 40°F or greater
 - b. 35°F or greater
 - c. 55°F or greater
 - d. 45°F or greater

Find the answers to the following questions using:

SECTION 732 – PLASTIC PAVEMENT MARKINGS

61. Thermoplastic marking material shall be a plastic compound reflectorized by internal and external application of:
- a. Epoxy adhesive
 - b. Glass beads
 - c. Orange tape
 - d. Heat
62. Do not apply thermoplastic pavement markings within 12 hours after rain, if moisture is present, or when the surface temperature or ambient temperature is below _____ .
- a. 50°F
 - b. 45°F
 - c. 40°F
 - d. 35°F

Find the answers to the following questions using:

SECTION 734 – RUBBLIZING PORTLAND CEMENT CONCRETE PAVEMENT

63. Use a self-contained, self-propelled, resonant frequency breaker for rubblizing existing pavement that is capable of producing _____ force blows at a rate of not less than _____ per second with an amplitude of less than 1 inch.
- a. 1000 pound / 22 cycles
 - b. 2000 pound / 44 cycles
 - c. 1000 pound / 44 cycles
 - d. 2000 pound / 22 cycles

64. For rubblizing existing pavement, a pass using Method 1 shall be defined as:
- a. In the middle of the same path
 - b. Forward in the same path
 - c. Backward in the same path
 - d. Both b and c.

Find the answers to the following questions using:

SECTION 735 – MAILBOXES AND MAILBOX SUPPORTS

65. Fabricate mailboxes with _____ complying with the requirements of the USPS.
- a. Light sheet metal
 - b. Steel
 - c. Plastic
 - d. Either a or c
66. Install mailbox supports a maximum of _____ in the ground. Do not set supports in concrete.
- a. 12-inches
 - b. 18-inches
 - c. 24-inches
 - d. 30-inches

Find the answers to the following questions using:

SECTION 736 – TRAFFIC SIGNALS

67. When existing traffic signal systems are to be modified, the existing material shall be _____, as specified.
- a. Incorporated in the revised system
 - b. Salvaged
 - c. Abandoned
 - d. All of the above
68. The material for the support cable used for traffic signal systems shall conform to:
- a. Subsection 203.06
 - b. Subsection 1020.03.4
 - c. Subsection 1018.04
 - d. Subsection 1016

Find the answers to the following questions using:

SECTION 737 – PAINTED TRAFFIC STRIPING

69. Do not paint striping when pavement surface is wet or damp, when air is foggy or misty, when air or surface temperature is below _____, or when wind or other conditions create a dust film on the clean pavement surface before striping can be applied or causes displacement of striping material.
- a. 45°F
 - b. 50°F
 - c. 40°F
 - d. 35°F

70. When field testing painted pavement markings, what is the minimum required readings for a length of roadway (segment) greater than 6 miles?
- a. 5 evenly spaced readings per line for each 1 mile segment
 - b. 10 evenly spaced readings per line for each 1 mile segment
 - c. Visual nighttime inspection only
 - d. 10 evenly spaced readings per line

Find the answers to the following questions using:

SECTION 738 – MULCH SODDING

71. For mulch sodding, use a single or double type soil roller or culti-packer weighing:
- a. Not less than 600 pounds and not more than 1500 pounds
 - b. Not more than 1000 pounds not more than 1500 pounds
 - c. Not less than 500 pounds and not more than 1500 pounds
 - d. Not less than 700 pounds and not more than 1500 pounds
72. Mulch sod will be measured by the _____ in approved hauling vehicles at the point of delivery in accordance with 109.01.
- a. Square foot
 - b. Cubic yard
 - c. Cubic foot
 - d. Square yard

Find the answers to the following questions using:

SECTION 739 – HYDRO-SEEDING

73. Prepare seed beds and sow grass seed utilizing hydro-seeding equipment and methods in order to establish a turf grass cover to areas _____ , as directed.
- a. The contractor disturbed
 - b. Determined by the Department
 - c. Designated on the plans
 - d. None of the above
74. Do not apply any mixture containing polyacrylamide tackifier during rainy weather, or when soil temperatures are below _____ , or if the wind speed is above 20 miles per hour.
- a. 41°F
 - b. 32°F
 - c. 40°F
 - d. 35°F

Find the answers to the following questions using:

SECTION 740 – CONSTRUCTION LAYOUT

75. _____ shall be liable for the accuracy of the initial layout and all subsequent alignment and evaluations and shall, at no additional pay, rebuild, repair, or make good any portion of the work found to be incorrectly positioned either horizontally or vertically at any time before final acceptance.
- a. The Department
 - b. The Project Engineer
 - c. The Right-of-Way Section
 - d. The Contractor
76. Construction layout and utility oversight and coordination will be measured _____ , which will include all labor, materials, tools, equipment, and incidentals required to complete the work.
- a. Per lump sum
 - b. By square foot
 - c. Per each
 - d. None of the above

**PART VIII
STRUCTURES**

Part 8 of the specifications deals with structures, which are bridges, culverts, catch basins, junction boxes, retaining walls, cribbing, manholes, endwalls, and other similar features. This part covers different aspects of constructing structures including excavation, pilings, metals used for supports, timber, welding, and paint and other protective coatings.

801	General Requirements for Structures	This section sets forth general content for plans and requirements for submittals and project documentation.
802	Structural Excavation, Backfill, and Earth Retaining Systems	This section contains requirements for removal of all materials necessary for the facilitation of construction.
803	Drilled Shafts	This section contains requirements for furnishing of all materials, labor, tools, equipment, services, and all necessary to construct drilled shafts.
804	Piles	This section contains specifications for furnishing and driving foundation piles other than sheet piles. It includes specifications for hammers for concrete, timber, and steel piles and tests for determining bearing capacity, and for splicing and jetting.
805	Structural Concrete	This section contains requirements for the furnishing, placing, finishing, and curing of Portland cement concrete in bridges, culverts, and other structures. It includes placing concrete in precast and prestressed units, and in all parts of cast in place structures and firming joints. Specifications for falsework, concrete forming, and finishes is also included.

806	Deformed Reinforcing Steel	This section contains requirements for furnishing and placement of reinforcing steel for reinforced concrete structures in accordance with the plans.
807	Structural Metals	This section contains requirements for furnishing and placing structural metals for structures.
808	Steel Grid Flooring	This section contains requirements for furnishing and installing steel grid flooring of the open or concrete-filled type. Steel grid flooring is used primarily in bridge decks.
809	Welding	This section contains requirements for the welding of structural steel, steel pipe, and tubular members, reinforcing steel and aluminum alloys (including qualification of procedures, welders and welding operators, destructive and nondestructive testing, etc.).
810	Bridge Railings, Hand Railings, Permanent Roadway Barriers, and Pier Protection Systems	This section contains requirements for furnishing and constructing bridge railings and barriers.
811	Painting and Protective Coatings	This section contains the cleaning, surface preparation, containment, collection, sampling and testing, storage and disposal of waste, and application of paints and other protective coatings for metals and other materials.
812	Treated Timber	This section contains requirements for furnishing lumber of the sizes and grade specified and of furnishing timber of the stress-grade, sizes and dimensions for the different uses specified, treated, and of preparing, framing, assembling and erecting the same, including painting where specified, and all hardware. Unless specified, all timber shall be treated.
813	Concrete Approach Slabs	This section contains requirements for furnishing and constructing concrete approach slabs for bridges and other structures.
814	Bearings	This section contains the furnishing and construction of bearings of the type and dimensions at the specified location.

815	Joints	This section contains the furnishing and construction of joints of the type, dimensions, and at the locations specified.
816	Bridge Drainage Systems	This section consists of furnishing and installing the complete deck drainage system for the structure in accordance with plan details.
817	Temporary Works	This section consists of the construction and removal of temporary facilities that are generally designed and employed by the contractor in the execution of the work, and whose failure to perform properly could adversely affect the character of the contract work or endanger the safety of adjacent facilities, property, workers, and the public.
818	Marine Pier Protection	This section contains the furnishing, installation, and construction of pier protection systems and components of the type and dimensions at locations specified.
819	Vacant	This section is vacant at this time.
820	Movable Bridges	This section contains requirements for furnishing, fabricating and erecting movable span bridges and all appurtenances required for their operation such as machinery, operating house, traffic barriers, and machinery houses.
821	Mechanical Systems	This section provides for all material, equipment, tools, measuring devices, and labor to purchase/fabricate, shop test, transport, install/erect, align/adjust, paint, lubricate, field test, and setup all Mechanical Items/Systems.
822	Electrical Systems	This section contains requirements for furnishing of all equipment, materials, tools, and labor to purchase/fabricate, shop test, transport, install/erect, wire, align/adjust, paint, field test, and setup electrical items/systems.
823	Facilities	This section contains general architectural requirements for the construction of the new Department facilities and/or renovation of existing Department facilities.

824	Vacant	This section is vacant at this time.
825	Vacant	This section is vacant at this time.
826	Vacant	This section is vacant at this time.
827	Vacant	This section is vacant at this time.
828	Vacant	This section is vacant at this time.
829	Instrumentation and Evaluation	This section contains requirements for furnishing of all instrumentation, power and backup power systems, access for installation and removal of instrumentation, and provide specified loadings for structural evaluation
830	Repair and Rehabilitation	The section contains specifications for performing structural repairs and rehabilitation.

PART VIII QUESTIONS

Find the answers to the following questions using:

SECTION 801 – GENERAL REQUIREMENTS FOR STRUCTURES

1. Plans will be in accordance with _____, and include all original contract drawing sheets and other information sheets produced by the Department prior to bid, and change order sheets produced by the Department or the contractor after the bid
 - a. 105.02.1
 - b. 106.03.3
 - c. 107.08.2
 - d. 701.09.3

2. Transportation and erection plans shall be designed, sealed, and dated by _____.
 - a. The fabricator
 - b. A professional engineer registered in Louisiana
 - c. The manufacturer
 - d. Either a or c

Find the answers to the following questions using:

SECTION 802 – STRUCTURAL EXCAVATION, BACKFILL, AND EARTH RETAINING SYSTEMS

3. If excavating or dredging at the site of the foundation, then, under agreement with permitting agencies and _____, backfill such excavation to the original ground surface or river bed with satisfactory material after the foundation is in place.
 - a. The Contractor
 - b. The Department
 - c. The Project Engineer
 - d. The Bridge Design Section

4. Backfill reinforced concrete box culverts and attached headwalls prepared in accordance with _____ .
- a. 701.08
 - b. 702.04
 - c. 711.02
 - d. None of the above

Find the answers to the following questions using:

SECTION 803 – DRILLED SHAFTS

5. At least four weeks prior to the start of drilled shaft construction, submit to the engineer _____ copies of the Drilled Shaft Installation Plan.
- a. six
 - b. two
 - c. three
 - d. four
6. Drilling equipment shall have adequate capacity, including power, torque, and down thrust, to excavate the maximum plan diameter to a depth of _____ .
- a. 24-foot or 24 percent beyond the maximum plan shaft depth, whichever is greater
 - b. 20-foot or 20 percent beyond the maximum plan shaft depth, whichever is greater
 - c. 10-foot or 10 percent beyond the maximum plan shaft depth, whichever is greater
 - d. 18-foot or 18 percent beyond the maximum plan shaft depth, whichever is greater

Find the answers to the following questions using:

SECTION 804 – PILES

7. Steel H-Piles are to comply with Subsection _____.
 - a. 1013.11
 - b. 1013.09
 - c. 1014.34
 - d. 1008.04

8. Furnish piles in accordance with an itemized order list, which will be provided by the engineer showing the _____ .
 - a. Number of permanent piles
 - b. Size and length of all permanent piles
 - c. Location of all permanent piles
 - d. All of the above

Find the answers to the following questions using:

SECTION 805 – STRUCTURAL CONCRETE

9. Quality assurance requirements for structural concrete shall be as specified in the latest edition of the Department's publication titled:
 - a. *Application of Quality Assurance Specifications for Portland Cement Concrete Pavement and Structures*
 - b. *Manual for Quality Control for Plants and Production of Precast-Prestressed Concrete Products (MNL-116-Latest Edition)*
 - c. *Application of Quality Assurance Specifications for Precast-Prestressed Concrete Plants*
 - d. Both a and c

10. For minor structures, which class of structural concrete should be used?
- a. S
 - b. M
 - c. P2
 - d. A3

**Find the answers to the following questions using:
SECTION 806 – DEFORMED REINFORCING STEEL**

11. Ship deformed reinforcing steel in standard bundles, tagged and marked in accordance with the:
- a. *Materials Sampling Manual*
 - b. *Associated Materials Laboratory (AML)*
 - c. *American Standards Manual (ASTM)*
 - d. *Manual of Standard Practice of the Concrete Reinforcement Steel Institute (CRSI)*
12. Do not splice deformed reinforced steel bars, except as indicated in the plans, without approval of the _____ .
- a. Engineer of Record
 - b. Fabricator
 - c. Contractor
 - d. Department

Find the answers to the following questions using:

SECTION 807 – STRUCTURAL METALS

13. Structural metals will be inspected in the field as deemed necessary by _____ to verify conformance with the plans, specifications, and working drawings.
- a. The Contractor
 - b. The Engineer
 - c. The Department
 - d. The District Laboratory
14. When working with structural metalwork (access system), how should payment be handled?
- a. By linear foot
 - b. As specified by the Plans
 - c. By lump sum
 - d. In accordance with 109.04

Find the answers to the following questions using:

SECTION 808 – STEEL GRID FLOORING

15. Paint and protective coatings for steel grid flooring shall comply to Section:
- a. 815
 - b. 811
 - c. 1011
 - d. 303
16. Connect steel grid flooring to its steel supports by:
- a. Welding
 - b. Plates
 - c. Panels
 - d. Bolts

Find the answers to the following questions using:

SECTION 809 – WELDING

17. All costs incidental to welding qualifications shall be the responsibility of:
 - a. The Contractor
 - b. The Engineer
 - c. The Department
 - d. None of the above

18. In structural welding, qualified welding procedures, welders, and welding operators are provided in accordance with the latest edition of:
 - a. ANSI/ASSHTO/AWS D1.5 Welding Code – Reinforcing Steel
 - b. ANSI/ASSHTO/AWS D1.5 Bridge Welding Code
 - c. ANSI/ASSHTO/AWS D1.5 Structural Welding Code-Aluminum
 - d. ANSI/ASSHTO/AWS D1.5 Structural Steel Welding Code

Find the answers to the following questions using:

SECTION 810 – BRIDGE RAILINGS, HAND RAILINGS, PERMANENT ROADWAY BARRIERS, AND PIER PROTECTION SYSTEMS

19. Allow bridge deck concrete to attain a minimum compressive strength of _____ before placing reinforcement, forms, concrete, or metal for bridge railings.
 - a. 3200 psi
 - b. 2400 psi
 - c. 4000 psi
 - d. 1800 psi

20. Quantities for bridge railing and hand railing will be the design quantities per _____ as specified on the plans.
- a. Lump sum
 - b. Linear foot
 - c. Square yard of concrete
 - d. None of the above

Find the answers to the following questions using:

SECTION 811 – PAINTING AND PROTECTIVE COATING

21. What is the Top Coat Federal Color Number for Dark Bronze (Steel)?
- a. 36463
 - b. 30040
 - c. 30045
 - d. 30440
22. Coating material shall not be used until _____ has inspected the materials and each batch of paint has been tested by the DOTD Materials and Testing Section and accepted.
- a. The Project Engineer
 - b. The Contractor
 - c. The Fabricator
 - d. None of the above

Find the answers to the following questions using:

SECTION 812 – TREATED TIMBER

23. Timber and lumber used in permanent structures, unless otherwise specified in the plans, are:
- a. Douglas Fir
 - b. Southern Yellow Pine
 - c. Live Oak
 - d. Either a or b
24. When working with treated timber, quantities will be the design quantities measured by _____ .
- a. The number of linear feet
 - b. The number of board feet
 - c. The number of thousand board feet
 - d. The number of linear board feet

Find the answers to the following questions using:

SECTION 813 – CONCRETE APPROACH SIDES

25. For concrete approach slabs, place geotextile fabric as a separation layer between the embankment and the bedding material beneath the approach slab in accordance with _____ .
- a. 1003.03.1
 - b. 703
 - c. 1019
 - d. 203.11
26. Payment for concrete approach slabs (precast) will be made at the contract unit price per:
- a. Square yard
 - b. Square foot
 - c. Linear mile
 - d. Linear yard

Find the answers to the following questions using:

SECTION 814 – BEARINGS

27. Stainless steel components for bearings shall conform to _____ .
- a. ASTM A240 / A240M – Type 304
 - b. AASHTO M 270, Grade 50
 - c. AASHTO A260 / A260M – Type 310
 - d. ASTM M 270, Grade 50

28. The design of the bearing assembly shall be in accordance with the latest edition of the _____ and shall be stamped, signed, and dated by a professional engineer registered in Louisiana.
- a. *AASHTO LRFD Bridge Construction Specifications*
 - b. *AASHTO LRFD Bridge Design Specifications*
 - c. *AASHTO LRFD Bridge Standard Specifications*
 - d. All of the above

**Find the answers to the following questions using:
SECTION 815 – JOINTS**

29. Joints are composed of:
- a. Metalwork plates
 - b. Metalwork extrusions
 - c. Concrete nosing on both sides of the joint opening
 - d. Joints can be composed of any of the materials listed above.
30. Measurement of joints and seals will be per _____.
- a. Linear foot
 - b. Linear yard
 - c. Square foot
 - d. Square yard

Find the answers to the following questions using:

SECTION 816 – BRIDGE DRAINAGE SYSTEMS

31. Pipe hangers, scuppers and drain grates shall be steel conforming to ASTM A709, Grade 36, galvanized after fabrication in accordance with _____ .
- a. Section 805
 - b. Section 811
 - c. Section 701
 - d. Section 1013
32. When working with bridge deck drainage systems, provide the _____ at least 30 calendar day advance written notice of the beginning of work at the mill or shop so that inspection may be provided.
- a. DOTD Project Engineer
 - b. The Contractor
 - c. DOTD Fabrication Engineer
 - d. DOTD Bridge Engineer

Find the answers to the following questions using:

SECTION 817 – TEMPORARY WORKS

33. In the event of a named hurricane or tropical storm forecasted to enter the temporary work area _____, or in the event of an evacuation order in the temporary work area, remove and re-install the containment system, equipment, and materials.
- a. Within 96 hours
 - b. Within 24 hours
 - c. Within 48 hours
 - d. Within 72 hours

34. Payment for Construction Access Bridges is by:
- a. Square foot
 - b. Lump Sum
 - c. Linear foot
 - d. Determined by the contract unit price

Find the answers to the following questions using:

SECTION 818 – MARINE PIER PROTECTION

35. Using Table 818-1, which method would be used to test abrasion?
- a. ASTM D638
 - b. ASTM D4060
 - c. ASTM D746
 - d. ASTM D543
36. A copy of the test report showing the results of the physical and mechanical test for plastic composite marine timber is listed in:
- a. Table 818-3
 - b. Table 818-1
 - c. Table 818-2
 - d. None of the above

Find the answers to the following questions using:

SECTION 820 – MOVEABLE BRIDGES

37. Balance blocks on moveable bridges are defined as concrete blocks that can be added or removed from a counterweight to adjust the counterbalance of a movable span, usually weighing approximately _____ .
- a. 75 pounds
 - b. 60 pounds
 - c. 80 pounds
 - d. 90 pounds
38. When working with moveable spans, all _____ shall be in accordance with the United States Coast Guard (USCG) permit or negotiated agreement with the USCG.
- a. Trunnion bearings
 - b. Bridge operations
 - c. Pivot Girder
 - d. All of the above

Find the answers to the following questions using:

SECTION 821 – MECHANICAL SYSTEMS

39. Mechanical system submittals shall comply with _____ .
- a. Section 105.02.2
 - b. Section 820.06
 - c. Section 801.05
 - d. All of the above

40. Hydraulic pumps shall be fixed displacement, pressure and flow compensated, rated for continuous duty at _____ minimum, and shall have SAE four bolt flange ports with FKM O-ring seals.
- a. 1,700 psi
 - b. 3,000 psi
 - c. 6,300 psi
 - d. 2,800 psi

Find the answers to the following questions using:

SECTION 822 – ELECTRICAL SYSTEMS

41. When working with cut sheet submittal procedures, submittals will be stamped “Accepted in accordance with LSSRB 105.02”, initialed and dated by the reviewer, and distributed electronically by _____ .
- a. The Contractor
 - b. The Department
 - c. The Project Engineer
 - d. None of the above
42. High Mast Electric Poles will be measured _____ furnished and installed, which will include the pole, luminaire ring, lowering assembly, drive assembly, grounding, wiring, electrical connections, fuses, mounting hardware, and grout.
- a. Per each pole
 - b. Per linear foot
 - c. Per lump sum basis
 - d. None of the above

Find the answers to the following questions using:

SECTION 823 – FACILITIES

43. When considering the architectural requirements for DOTD facilities; _____ shall be hollow metal, insulated, and of extra heavy-duty Grade III flush construction.
- a. Aluminum doors
 - b. Louvers
 - c. Steel doors
 - d. None of the above
44. Payment for a repaired or rehabilitated DOTD bridge machinery house will be made by:
- a. Square foot
 - b. Estimated weight
 - c. Lump sum
 - d. Number of materials used

Find the answers to the following questions using:

SECTION 829 – INSTRUMENTATION AND EVALUATION

45. When the Bridge Instrumentation and Evaluation Plan is not provided, submit to _____ for review a “Bridge Instrumentation and Evaluation Plan” in accordance with 801.05.
- a. The Project Engineer
 - b. The Bridge Engineer
 - c. The Contractor
 - d. The Department

46. Instrumental Assistance will be measured per _____ .
- a. Item specified by the contract
 - b. Lump Sum
 - c. All equipment, materials, labor, and time necessary
 - d. All of the above

Find the answers to the following questions using:

SECTION 830 – REPAIR AND REHABILITATION

47. For structural concrete patching materials, curing shrinkage should be tested by using:
- a. ASTM C882
 - b. ASTM C109
 - c. ASTM C39
 - d. ASTM C157
48. Structural Concrete Patching will be measured by _____ of patched materials placed.
- a. Per item specified by the contract
 - b. Lump Sum
 - c. The square foot
 - d. All of the above

<p style="text-align: center;">PART IX PORTLAND CEMENT CONCRETE</p>

Part IX of the specifications deals with the Portland Cement Concrete mixture. This part includes specifications for equipment, storing, handling, mixing materials, and transporting concrete.

901	Portland Cement Concrete	This section contains the general specifications and requirements needed for the methods and equipment for handling and storing materials, mixing, transporting, and placing concrete.
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PART IX QUESTIONS

Find the answers to the following questions using:

SECTION 901 – PORTLAND CEMENT CONCRETE

1. All structural class concrete, except minor structure class concrete, requires permeability testing by surface resistivity in accordance with _____ .
 - a. 901.08.2
 - b. DOTD TR 233
 - c. Table 901-3
 - d. DOTD TR 428

2. _____ requirements shall be as specified in the latest edition of the Department's publications entitled *Application of Quality Assurance Specifications for Portland Cement Concrete Pavement and Structures* or *Application of Quality Assurance Specifications for Precast-Prestressed Concrete Plants*.
 - a. Quality assurance
 - b. The Department's
 - c. Quality control
 - d. The Materials Lab

3. Use cement, fly ash, ground granulated blast-furnace slag, and microsilica (silica fume) certified by _____ in accordance with current Department procedures.
 - a. The Project Engineer
 - b. The Contractor
 - c. The District Lab Engineer
 - d. The Manufacturer

4. Do not mix brands, mills, types, grades, or classes unless authorized by the DOTD Materials Engineer Administrator. The engineer may waive this requirement in case of plant breakdown during production to allow concrete, conforming to the requirements of _____, furnished from another plant to finish a placement in progress.
 - a. Section 901
 - b. Section 1001
 - c. Section 1003
 - d. Section 815

5. _____ so that no detrimental degradation, contamination or segregation of aggregates results.
 - a. Control aggregates
 - b. Provide positive separation
 - c. Stockpile aggregates
 - d. Cementitious aggregates

6. Perform sampling and testing in accordance with the Department's _____.
 - a. *Materials Safety Data Sheet*
 - b. *Materials and Testing Quality Control Handbook*
 - c. *Materials Sampling Manual and Testing Procedures Manual*
 - d. *Materials Quality Assurance Manual*

7. Proportion aggregates for pavement _____ mixes in accordance with 1003.08.3.
- a. Type B
 - b. Type E
 - c. Type D
 - d. Both a and c
8. _____ may waive trial mixes, in writing, for previously accepted mix designs. Waiver of trial mixes does not release the contractor from the responsibility of producing concrete that meets the minimum requirements of the specifications.
- a. The Project Engineer
 - b. The District Laboratory Engineer
 - c. The Contractor
 - d. The Department
9. What mixture substitution can be used for Pavement Type E?
- a. No Substitute
 - b. M
 - c. B
 - d. MASS(A1)
10. Type of cement and composition of concrete shall be in accordance with the requirements of _____ .
- a. Plan specifications
 - b. Section 901
 - c. Table 901-3
 - d. Both b and c

11. _____ are allowed to determine the moisture content of aggregates for batch adjustment, provided the accuracy is within 0.5 percent of the results obtained by the Certified Concrete Technician in accordance with DOTD TR 106 and confirmed by the engineer.
- a. Various instruments
 - b. Moisture probes
 - c. Weigh hoppers
 - d. Batch tickets
12. When using a truck mixer for complete mixing, mix each batch at designated mixing speed until uniformity is achieved, but not less than _____ .
- a. 70 revolutions
 - b. 50 revolutions
 - c. 20 - 30 revolutions
 - d. 10 revolutions
13. Do not place concrete when the internal temperature of the concrete is _____ nor on frozen subgrade or into forms that are below 32°F.
- a. Below 55°F
 - b. Below 40°F
 - c. Below 32°F
 - d. Below 45°F

14. For mass concrete-cement/cementitious combination, use Type II portland cement. Replace portland cement with fly ash at 20 percent to 50 percent by weight or replace with slag cement at 50 percent to 70 percent by weight or a ternary mix meeting specification requirements. Certify that the cementitious combination generates a heat of hydration of not more than 70 calories/gram at _____ as determined by ASTM C186 or ASTM C1702.
- a. 8 days
 - b. 14 days
 - c. 21 days
 - d. 7 days
15. What is the percent of contract unit price for cast-in-place structural concrete Class A3 & MASS (A3) between 8500 – 8800?
- a. 50 or remove and replace
 - b. 90
 - c. 98
 - d. 100

PART X MATERIALS

Part X of the specifications covers the requirements for almost all materials used for construction. This part of the specifications gives Approved Material List numbers, which list sources for materials as well as which types of a certain material are allowed on DOTD projects. Testing references are found in this section.

1001	Portland Cement and Cementitious Materials	This section contains physical and chemical requirements for Portland cement, Types I(B) and I(C), Portland-pozzolan cement, masonry cement and Portland blast-furnace slag cement.
1002	Asphalt Cement, Emulsions, and Additives	This section contains specifications for asphalt materials, emulsions, and additives.
1003	Aggregates	This section contains specifications for the aggregate used in paving mixtures, embankments, base courses, granular and bedding material.
1004	Landscaping Materials	This section contains specifications for fertilizer, agricultural lime, seeding, mulch, and water management gel.
1005	Joint Materials for Pavements and Structures	This section contains specifications for materials used to make and seal joints in various types of pavements and structures.
1006	Thermoplastic Pipe	This section contains specifications for pipe materials, pipe construction, joints, and gasket materials.
1007	Metal Pipe	This section contains specifications for different types of metal pipe, pipe arches, joints, bands, and gaskets.

1008	Paints	This section contains specifications for the paint, compounds, and vehicle composition used on structures.
1009	Reinforcing Steel, Strand, and Wire Rope	This section contains specifications for reinforcing steel, strand, wire rope, and hardware.
1010	Fence and Guard Rail	This section contains specifications for different types of fences and guard rails used for construction projects.
1011	Concrete Curing Materials, Admixtures, and Special Finishes	This section contains specifications for materials used to cure concrete, admixtures used to affect the properties of the concrete, and special finishes used on concrete.
1012	Vacant	This section is vacant at this time.
1013	Metals	This section contains specifications for metals used in all aspects of bridge construction and other construction uses, and the testing that has been conducted on the metals to be used.
1014	Timber, Timber Connectors, and Preservatives	This section contains specifications for timber and lumber used in construction as well as preservatives used for treatment.
1015	Signs and Pavement Markings	This section contains specifications for materials used to construct signs and for permanent and temporary pavement markings used during construction and on the finished roadways.
1016	Concrete Pipe and Precast Reinforced Concrete Drainage Units	This section contains specifications for materials and construction of concrete pipe and precast box culverts, manhole sections, catch basins, junction boxes, and safety ends.
1017	Epoxy Resin Systems	This section contains specifications for the materials requirements for epoxy resin systems used for the bonding of various construction materials to harder surfaces.

1018	Miscellaneous Materials	This section contains specifications for miscellaneous items including chemicals, manhole frames, electrical conductors and barricade warning lights, and others not specifically covered in another section.
1019	Geotextile Fabrics and Geocomposite Systems	This section contains specifications for geotextile fabric and geocomposite systems.
1020	Traffic Signals	This section contains specifications for the parts that make-up traffic signals, beacon sections, and pedestrian signal section installations.

PART X QUESTIONS

Find the answers to the following questions using:

SECTION 1001 – PORTLAND CEMENT AND CEMENTITIOUS MATERIALS

1. Type IP may contain up to _____ by weight of fly ash or up to 30 percent by weight of bottom ash, provided that the bottom ash is interground with the cement clinker.
 - a. 0.60 percent
 - b. 50 percent
 - c. 0.75 percent
 - d. 30 percent

2. When working with mortar cement, comply with _____ .
 - a. ASTM C270
 - b. ASTM C1329
 - c. ASTM C91
 - d. ASTM C1714

Find the answers to the following questions using:

SECTION 1002 – ASPHALT CEMENT, EMULSIONS, AND ADDITIVES

3. Asphalt materials shall:
 - a. Be uniform in character
 - b. Be free from water
 - c. Not foam when heated to 350°F (177°C)
 - d. All of the above

4. AASHTO T 315 is the test procedure used to determine _____ .
- a. Dynamic Shear
 - b. Mass Loss
 - c. Softening Point
 - d. Flash Point

Find the answers to the following questions using:

SECTION 1003 – AGGREGATES

5. Which test method will be used to test for specific gravity and absorption of coarse aggregate for asphalt mixtures?
- a. DOTD TR 119
 - b. AASHTO T 84
 - c. AASHTO T 85
 - d. DOTD TR 112
6. Reclaimed asphalt pavement (RAP) shall be approved _____ .
- a. At the time of removal from the roadway
 - b. In stockpiles
 - c. After it is in the mixture
 - d. Both a and b

Find the answers to the following questions using:

SECTION 1004 – LANDSCAPING MATERIALS

7. What is the minimum percent of pure live seed in Crimson Clover seeds?
 - a. 81
 - b. 78
 - c. 80
 - d. 83

8. For source approval, the minimum allowable vegetative density of fiber mulch products shall be _____ for clay soils and 60 percent for sandy soils when evaluated in accordance with the Texas Transportation Institute (TTI) Field Performance Testing Procedure of Selected Erosion Control Products.
 - a. 30 percent
 - b. 60 percent
 - c. 70 percent
 - d. 55 percent

Find the answers to the following questions using:

SECTION 1005 – JOINT MATERIALS FOR PAVEMENTS AND STRUCTURES

9. Hot Poured Rubberized Asphalt Type will comply with _____ .
 - a. ASTM D5249, Type I
 - b. ASTM D7174, Type I
 - c. ASTM D6690, Type II
 - d. AASHTO M 153, Type IV

10. When working with Polyurethane Sealants, test method _____ should be used when checking its artificial weathering.
- a. ASTM D5893
 - b. ASTM D1149
 - c. ASTM C679
 - d. ASTM D5329

Find the answers to the following questions using:

SECTION 1006 – THERMOPLASTIC PIPE

11. Polyvinyl Chloride Pipe (PVCP) and gasket materials shall comply with _____ .
- a. ASTM M 278
 - b. ASTM D3034, SDR 35
 - c. ASTM F 793
 - d. Both a and b
12. When using corrugated polyethylene pipe single wall (CPEPDW) as plastic underdrain pipe, the pipe and joint system shall comply with _____ .
- a. AASHTO M 252
 - b. ASTM D3350
 - c. AASHTO M 294
 - d. AASHTO M 278

Find the answers to the following questions using:

SECTION 1007 – METAL PIPE

13. For helical pipe, no coil splices at pipe manufacturing plants will be allowed for pipe _____ .
- a. 10 inches in diameter or less
 - b. 24 inches in diameter or less
 - c. 30 inches in diameter or less
 - d. 48 inches in diameter or less
14. For corrugated aluminum pipe and pipe arch, a minimum of two approved lifting lugs shall be provided on pipe larger than 30 inches diameter, pipe arch larger than 30 inches equivalent diameter, and any diameter of pipe or pipe arch longer than _____ .
- a. 10 feet
 - b. 20 feet
 - c. 30 feet
 - d. 40 feet

Find the answers to the following questions using:

SECTION 1008 – PAINTS

15. When working with asphaltic varnish, solids content shall not be less than _____ by weight (mass) when tested in accordance with ASTM D2369.
- a. 30 percent
 - b. 40 percent
 - c. 60 percent
 - d. 45 percent

16. What test method is appropriate to test the pigment content in zinc paint?
- a. ASTM D1475
 - b. ASTM D1640
 - c. ASTM D2698
 - d. ASTM D2369

Find the answers to the following questions using:

SECTION 1009 – REINFORCING STEEL, STRAND, AND WIRE ROPE

17. For billet steel, deformed and plain bars shall comply with _____ and shall be from the Approved Materials List.
- a. ASTM A 185
 - b. ASTM A 615
 - c. ASTM A 617
 - d. ASTM A 284
18. When working with wire rope, what classification of wire rope should be used for deck lashing, running ropes, mooring lines, spring lays, and tiller or hand control ropes?
- a. Type I
 - b. Type II
 - c. Type III (Marine)
 - d. Type IV (Special)

Find the answers to the following questions using:

SECTION 1010 – FENCE AND GUARD RAIL

19. For woven wire, Design No. 939-6-14 1/2 shall be grade:
- a. 60
 - b. 125
 - c. 75
 - d. 100
20. For metal fasteners for steel posts, galvanized coating shall be not less than _____ per square foot when tested in accordance with ASTM A90.
- a. 0.35 ounce
 - b. 0.65 ounce
 - c. 0.45 ounce
 - d. 0.20 ounce

Find the answers to the following questions using:

SECTION 1011 – CONCRETE CURING MATERIALS, ADMIXTURES, AND SPECIAL FINISHES

21. Liquid membrane-forming compounds shall comply with _____ and shall be from the Approved Materials List.
- a. AASHTO M 182
 - b. ASTM C309
 - c. ASTM C171
 - d. DOTD TR 224

22. Concrete admixtures shall be tested by analytical infrared (IR) spectroscopy in accordance with _____ .
- a. DOTD TR 643
 - b. DOTD TR 224
 - c. DOTD TR 610
 - d. DOTD TR 524

Find the answers to the following questions using:

SECTION 1013 – METALS

23. For structural steel, obtain all applicable physical and chemical tests and furnish the Construction Section with five copies of the Certificate of Analysis (mill test reports) together with a _____ .
- a. Longitudinal Charpy V-Notch
 - b. Fabricator's Material Statement
 - c. Certificate of Compliance
 - d. Both b and c
24. Stainless steel tubing for hydraulic lines shall be seamless austenitic stainless steel and shall comply with _____ .
- a. ASTM A 269
 - b. ASTM A 105
 - c. ASTM A 153
 - d. ASTM A 106

Find the answers to the following questions using:

SECTION 1014 – TIMBER, TIMBER CONNECTORS, AND PRESERVATIVES

25. Timber posts and braces shall be free from _____ .
- a. Decayed wood
 - b. Rot
 - c. Red heart
 - d. All of the above
26. When working with timber connectors, what is the inside diameter of a split ring timber connector with a nominal ring size of 4 inches?
- a. 2.56 inches
 - b. 4.08 inches
 - c. 6.12 inches
 - d. 8.35 inches

Find the answers to the following questions using:

SECTION 1015 – SIGNS AND PAVEMENT MARKINGS

27. Structural steel for posts, stringers, framing and miscellaneous steel shall comply with _____ .
- a. AASHTO M 270, Grade 36
 - b. ASTM M 270, Grade 23
 - c. AASHTO M 501, Grade 48
 - d. ASTM M 101, Grade 24

28. When using preformed plastic tape, what is the level of retroreflectivity needed for a specific luminance of 250 white and 175 yellow?
- a. Retroreflectivity Level I
 - b. Retroreflectivity Level II
 - c. Retroreflectivity Level III
 - d. Retroreflectivity Level IV

Find the answers to the following questions using:

SECTION 1016 – CONCRETE PIPE AND PRECAST REINFORCED CONCRETE DRAINAGE UNITS

29. All shop drawings for concrete pipe and precast drainage units must be approved by _____ before fabrication can begin.
- a. The Construction Engineer
 - b. The Materials Engineer
 - c. The DOTD Hydraulics Engineer
 - d. The Project Engineer
30. Concrete three-sided structures shall comply with _____ .
- a. ASTM C1577
 - b. ASTM C1504
 - c. ASTM C506
 - d. ASTM C923

Find the answers to the following questions using:

SECTION 1017 – EPOXY RESIN SYSTEMS

31. Use _____ epoxy for use in bonding skid-resistant materials to hardened concrete, and as a binder in epoxy mortars or epoxy concretes used on traffic-bearing surfaces (or surfaces subject to thermal or mechanical movements).
- a. Type I
 - b. Type II
 - c. Type III
 - d. Type V
32. _____ epoxy resin is used in temperatures between 40°F and 65°F (4°C and 18°C) for Type VI and VII applications.
- a. Class C
 - b. Class D
 - c. Class E
 - d. Class F

Find the answers to the following questions using:

SECTION 1018 – MISCELLANEOUS MATERIALS

33. Test method _____ is used in determining joint types for metal pipe.
- a. AASHTO M 278
 - b. AASHTO F794
 - c. ASTM D3034
 - d. AASHTO M36

34. Barricade warning lights shall be from the _____ , and comply with the MUTCD.
- a. Material certification
 - b. Approved Materials List
 - c. ASTM A 123
 - d. OPL 36

Find the answers to the following questions using:

SECTION 1019 – GEOTEXTILE FABRICS AND GEOCOMPOSITE SYSTEMS

35. The geotextile fabric shall be composed of at least _____ by weight of polyolefins, polyesters, or polyamides.
- a. 65 percent
 - b. 75 percent
 - c. 55 percent
 - d. 85 percent
36. Test method _____ is used on geotextile fabrics to determine Permittivity.
- a. ASTM D 4491
 - b. ASTM D 4533
 - c. ASTM D 4833
 - d. ASTM D 4632

Find the answers to the following questions using:

SECTION 1020 – TRAFFIC SIGNALS

37. Traffic signal housing and accessories shall be _____ and shall be equipped with a door of similar material.
- a. Geotextile fabric
 - b. High strength aluminum alloy
 - c. Portland cement concrete
 - d. Galvanized steel
38. The VDS _____ is an electronic unit that converts the video image provided by the cameras, generates vehicle detection for defined zones and collects vehicular data as specified.
- a. Lens
 - b. Bus Interface Unit (BIU)
 - c. Video Detection Camera
 - d. Processor

**APPENDIX A:
ANSWER KEY**

**Answers to the Introduction to the
Standard Specifications for Roads
and Bridges Questions**

PART I: GENERAL PROVISIONS

- | | |
|---------------------|----------------------|
| 1. d (101.03; ¶51) | 10. b (105.04; ¶2) |
| 2. a (101.02) | 11. c (106.04; ¶3) |
| 3. c (102.02; ¶4) | 12. c (106.07; ¶1) |
| 4. d (102.07; ¶4) | 13. c (107.01; ¶3) |
| 5. b (103.01; ¶1) | 14. a (Table 107-1) |
| 6. d (103.05; ¶1) | 15. b (108.10; ¶1) |
| 7. c (104.02.4; ¶2) | 16. d (108.12; ¶2) |
| 8. a (104.04; ¶1) | 17. b (109.03; ¶3) |
| 9. d (105.02.2; ¶1) | 18. a (109.06.1; ¶1) |

PART II: EARTHWORK

- | | |
|-----------------------|---------------------|
| 1. b (201.03; ¶1) | 5. d (203.01; ¶1) |
| 2. a (201.04; ¶2) | 6. c (203.06.3; ¶1) |
| 3. d (202.02; ¶1) | 7. b (204.01; ¶3) |
| 4. d (202.05.1.2; ¶1) | 8. d (204.02.1; ¶1) |

PART III: BASE COURSES

- | | |
|-----------------------|------------------------|
| 1. c (301.02.1; ¶1) | 9. b (305.04.1.2; ¶1) |
| 2. a (301.13; ¶1) | 10. b (Table 305-2) |
| 3. d (302.02.1; ¶3) | 11. d (306.01; ¶2) |
| 4. d (302.05.1.1; ¶1) | 12. c (306.02; ¶1) |
| 5. c (303.03; ¶3) | 13. b (307.02.2; ¶1) |
| 6. a (303.04; ¶4) | 14. a (307.05; ¶1) |
| 7. a (304.10.3; ¶1) | 15. a (309.02.1.2; ¶1) |
| 8. d (Table 304-2) | 16. d (309.06; ¶1) |

PART IV: SURFACE COURSES

1. a (401.04.1; ¶2)
2. a (401.06; ¶1)
3. c (402.04.1; ¶2)
4. b (402.06; ¶2)

PART V: ASPHALT PAVEMENTS

- | | |
|-----------------------|----------------------|
| 1. d (501.01.2; ¶3) | 10. a (505.06; ¶1) |
| 2. b (501.02; ¶1) | 11. b (Table 506-1) |
| 3. b (Table 502-1) | 12. b (Table 506-1) |
| 4. d (502.02.3.1; ¶1) | 13. b (507.01; ¶2) |
| 5. c (503.02.2; ¶1) | 14. c (Table 507-3) |
| 6. a (503.02.2; ¶2) | 15. a (509.03; ¶1) |
| 7. b (504.03; ¶1) | 16. c (509.05; ¶4) |
| 8. a (Table 504-1) | 17. d (510.05.2; ¶1) |
| 9. c (505.03; ¶1) | 18. c (510.06.1; ¶2) |

PART VI: RIGID PAVEMENTS

1. c (601.03.1.11; ¶1)
2. c (601.03.9.8; ¶1)
3. b (602.07; ¶4)
4. b (602.11; ¶2)

PART VII: INCIDENTAL CONSTRUCTION

- | | |
|------------------------|----------------------|
| 1. b (701.02) | 21. b (711.02; ¶1) |
| 2. d (701.08.1; ¶4) | 22. d (711.03.3; ¶1) |
| 3. a (702.04.2; ¶1) | 23. b (712.02.3; ¶1) |
| 4. c (702.06; ¶1) | 24. a (712.04; ¶1) |
| 5. b (703.04.1; ¶1) | 25. d (713.04.1; ¶1) |
| 6. c (703.04.2; ¶1) | 26. b (Table 713-1) |
| 7. b (704.02; ¶1) | 27. c (714.02; ¶3) |
| 8. b (704.05; ¶3) | 28. a (714.03; ¶1) |
| 9. d (705.02; ¶2) | 29. a (715.02.1; ¶1) |
| 10. d (705.06.3; ¶2) | 30. c (715.03; ¶1) |
| 11. c (706.03.4; ¶1) | 31. c (716.05; ¶1) |
| 12. a (706.03.5.1; ¶1) | 32. c (716.06; ¶1) |
| 13. b (707.06.1; ¶1) | 33. d (717.03; ¶1) |
| 14. b (707.06.1; ¶2) | 34. a (Table 717-1) |
| 15. b (708.02.2; ¶1) | 35. a (718.02.1; ¶1) |
| 16. d (708.03; ¶1) | 36. a (718.02.1; ¶1) |
| 17. d (709.02; ¶1) | 37. d (719.03.2; ¶1) |
| 18. c (709.02; ¶1) | 38. b (719.09; ¶2) |
| 19. c (710.01; ¶1) | 39. a (720.02.2; ¶1) |
| 20. b (710.04; ¶1) | 40. c (720.06; ¶1) |

PART VII: INCIDENTAL CONSTRUCTION - continued

- | | |
|------------------------|------------------------|
| 41. d (721.03.6; ¶2) | 61. b (732.02.1; ¶1) |
| 42. d (721.04; ¶1) | 62. a (732.03.2; ¶1) |
| 43. b (722.01; ¶2) | 63. b (734.02.1.1; ¶1) |
| 44. a (722.02; ¶2) | 64. d (734.03.3.1; ¶3) |
| 45. c (723.04; ¶1) | 65. d (735.02; ¶1) |
| 46. a (723.05.2; ¶1) | 66. c (735.03; ¶1) |
| 47. b (724.04; ¶3) | 67. d (736.01; ¶2) |
| 48. c (724.05; ¶1) | 68. b (736.02; ¶1) |
| 49. c (725.02; ¶3) | 69. b (737.04.2; ¶1) |
| 50. c (725.03.3; ¶1) | 70. a (Table 737-1) |
| 51. c (726.02; ¶1) | 71. c (738.02; ¶1) |
| 52. d (726.04; ¶1) | 72. b (738.05; ¶1) |
| 53. d (727.01; ¶1) | 73. c (739.01; ¶1) |
| 54. d (727.05; ¶2) | 74. a (739.03; ¶5) |
| 55. b (728.02; ¶1) | 75. d (740.02; ¶4) |
| 56. a (728.03.2; ¶1) | 76. a (740.03; ¶1) |
| 57. d (729.01; ¶4) | |
| 58. d (729.03.1; ¶1) | |
| 59. a (731.01; ¶1) | |
| 60. b (731.03.1.2; ¶1) | |

PART VIII: STRUCTURES

- | | |
|------------------------|---------------------------|
| 1. a (801.04; ¶1) | 21. b (Table 811-1) |
| 2. b (801.05.3.2; ¶2) | 22. a (811.03; ¶5) |
| 3. c (802.03.2; ¶1) | 23. d (812.03.1; ¶1) |
| 4. a (802.04; ¶4) | 24. c (812.19; ¶1) |
| 5. d (803.03.2; ¶1) | 25. d (813.03.1; ¶2) |
| 6. b (803.05.1; ¶1) | 26. b (813.05; ¶3) |
| 7. b (804.02; ¶1) | 27. a (814.02; ¶2) |
| 8. d (804.04; ¶1) | 28. b (814.03; ¶5) |
| 9. d (805.01; ¶2) | 29. d (815.01; ¶1) |
| 10. a (Table 805-1) | 30. a (815.05; ¶1) |
| 11. d (806.03.3; ¶1) | 31. b (816.02; ¶2) |
| 12. a (806.06; ¶1) | 32. c (816.03.2; ¶2) |
| 13. b (807.04.3.3; ¶1) | 33. d (817.03.2.6.2; ¶15) |
| 14. c (807.08; ¶6) | 34. b (817.05; ¶1) |
| 15. b (808.02; ¶1) | 35. b (Table 818-1) |
| 16. a (808.10; ¶1) | 36. b (818.04.3.3; ¶4) |
| 17. a (809.02.1; ¶6) | 37. c (820.03; ¶2) |
| 18. b (809.02.2.1; ¶1) | 38. b (820.07.8; ¶1) |
| 19. c (810.03; ¶3) | 39. c (821.06.1; ¶2) |
| 20. b (810.07; ¶1) | 40. b (821.07.23; ¶1) |

PART VIII: STRUCTURES – continued

- | | |
|------------------------|----------------------|
| 41. b (822.06.2.1; ¶3) | 45. b (829.03.1; ¶1) |
| 42. a (822.11.6; ¶1) | 46. b (829.05.2; ¶1) |
| 43. c (823.07.8; ¶2) | 47. d (Table 830-1) |
| 44. c (823.11; ¶3) | 48. c (830.05.8; ¶1) |

PART IX: PORTLAND CEMENT CONCRETE

- | | |
|---------------------|------------------------|
| 1. b (901.01; ¶4) | 9. a (Table 901-2) |
| 2. a (901.01; ¶9) | 10. d (901.08; ¶1) |
| 3. d (901.02; ¶2) | 11. b (901.09.1.3; ¶1) |
| 4. a (901.03; ¶2) | 12. a (901.10.2; ¶2) |
| 5. c (901.04; ¶1) | 13. d (901.11.1; ¶1) |
| 6. c (901.05; ¶1) | 14. d (901.12.3.1; ¶1) |
| 7. d (901.06.1; ¶3) | 15. b (Table 901-4) |
| 8. b (901.06.1; ¶7) | |

PART X: MATERIALS

- | | |
|-----------------------|-------------------------|
| 1. d (1001.02; ¶2) | 20. d (1010.05; ¶1) |
| 2. b (1001.03; ¶1) | 21. b (1011.01.1; ¶1) |
| 3. d (1002.01; ¶1) | 22. c (1011.02.3; ¶1) |
| 4. a (Table 1002-3) | 23. d (1013.01; ¶2) |
| 5. c (Table 1003-1) | 24. a (1013.20; ¶1) |
| 6. d (1003.06.5; ¶1) | 25. d (1014.02.3; ¶1) |
| 7. b (Table 1004-1) | 26. b (Table 1014-1) |
| 8. c (1004.04.2; ¶1) | 27. a (1015.02.1.1; ¶1) |
| 9. c (1005.02.1; ¶1) | 28. b (Table 1015-8) |
| 10. a (Table 1005-1) | 29. d (1016.01; ¶1) |
| 11. d (1006.02; ¶1) | 30. b (1016.05; ¶1) |
| 12. a (1006.05; ¶2) | 31. c (1017.02.2.1; ¶3) |
| 13. c (1007.01; ¶5) | 32. b (1017.02.2.3; ¶5) |
| 14. c (1007.05; ¶4) | 33. d (Table 1018-1) |
| 15. b (1008.03.4; ¶1) | 34. b (1018.13.1; ¶1) |
| 16. c (Table 1008-1) | 35. d (1019.01.1; ¶1) |
| 17. b (1009.01; ¶1) | 36. a (Table 1019-1) |
| 18. c (Table 1009-1) | 37. b (1020.01.7.2; ¶1) |
| 19. b (1010.02; ¶1) | 38. d (1020.02.2.2; ¶1) |