Field Technician Certification Program

Practice Problems

1. A core sample of a 19-mm NMAS mix has a bulk density of 139.2 lbs. per cubic foot (pcf), a maximum theoretical density of 150.5 pcf, and 6% asphalt content. What is approximately the density (or percent compaction) of the core?

2. How many pounds (lbs.) are in Equivalent Single Axle Load (ESAL)?

3. While paving a non-expressway, the IRI reading in accordance with PTM No. 428 for the first lot was 42 inches/mile. In accordance with Section 404, what should be the ride quality incentive payment for that lot?

4. The contractor placed 3162 tons of material on the first day. The contractor then placed 2650 tons on the second day. The contractor was delayed for one day but resumed paving on the fourth day and placed another 2952 tons to finish the project. The contractor took a complete combination of loose box samples and core samples from each sublot. Using Table D, the last lot on the fourth day contained how many tons and had how many sublots?

5. The contractor placed 3606 tons of RPS material on the first day. The contractor was delayed for one day but resumed paving on the third day and placed another 2354 tons to finish the project. The contractor got a full combination of loose box samples and core samples. The final lot on the third day contained how many tons and had how many sublots?

6. You are paving the first 12-foot lane on the paving project. Using the following numbers from PTM 1 to determine density acceptance sample locations, what is the location of the 3rd (third) core sample? The sublots are 2400 feet in length.

Core #	Random Number	
	X	Y
1	0.82	0.12 L
2	0.14	0.94 L
3	0.50	0.58 R
4	0.93	0.03 L
5	0.43	0.92 R

7. While performing PTM 751 for pattern segregation on a standard mix, you find that the average diameter of the circle covered by the material in the segregated area is 6.0 inches. What would be the average macrotexture depth in inches?

8. A SuperPave project with a single JMF for two SR's at an intersection has a paving quantity of 480 tons. For density cores, what will be the lot and sublot sizes?

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9. CNTT with a water/asphalt ratio of 33% / 67% (it means 33 percent is water and 67 percent is asphalt) is being applied at a rate of 0.09 gallons per square yard on a milled asphalt surface. Which of the following conditions now apply (See Spec Section 460)?

10. A contractor placed 260 gallons of a cationic emulsion tack coat with a water/asphalt ratio of 33%/67% (that means 33% is water and 67% is asphalt) on 2100 feet of a milled roadway. The width covered by the distributor was 13 feet. What will be the asphalt residue rate, in gallons/sq.yd.? (Hint: first determine the total area, in square yard, using the width and the length.)

11. Cationic non-tacking tack (CNTT) is applied as tack coat with an asphalt/water ratio of 69%/31% (that means 31% is water and 69% is asphalt.) This tack is being applied at a rate of 0.065 gallons per square yard. What amount of uniform asphalt residue is left in place once emulsion sets?

12. The plant plans to provide 300 tons per hour of the required HMA. A 7-hour paving day is scheduled. Average truck capacity is 20 tons. The truck load delivery cycle is 80 minutes (that means it takes 80 minutes for the truck to travel from the plant to the job site and return to the plant.) What is the minimum number of trucks needed to supply the project for continuous paving with no interruption?

13. A paver, traveling at 25 feet per minute, is placing a 2-inch lift of 9.5 mm wearing course. The yield is 110 lbs. /sq. yd. per inch of mat thickness. The mat is placed at a 12-ft wide lane with a 3-foot monolithic shoulder. What is the minimum tons per hour required for non-stop paving?

14. The project calls for placing a 2-inch lift of a Superpave asphalt surface course of 9.5mm mix, using a PG64 –22 binder, 3 to <10 million ESALS. You stick your ruler into the mat immediately behind the paver, prior to rolling, to check the thickness. Approximately, how thick should the uncompacted mat be?

15. A truck arrives at the job site with 18 tons of asphalt. You are placing a 9.5 mm mix at 2.0 (two) inches thick for a 12-foot wide lane. Approximately, how many feet down the road will that truckload of material reach, assuming that the yield is 115 lb. /in. /sq. yd.?

16. A 3,000 VPM (Vibrations per Minute) roller produces 12 impacts per foot (IPF). The roller must be traveling at what speed?

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ANSWERS

1. 92.5 %
2. 18,000
3. $600
4. 1264 tons with 3 sublots
5. 3460 tons with 7 sublots
6. 1200 feet from the beginning of the sublot and 6.8 feet from the right edge of the lane
7. 0.043
8. One 480-ton lot, with 3 sublots of 160 tons each
9. The residue on the mat is 0.06 gal/sq. yd. and is within specification.
10. 0.057
11. 0.045 gallons/sq. yd.
12. 21
13. 275 tones per hour
14. 2 1/2 inches
15. 117 feet
16. 250 feet per minute