



N.B.: Attempt all question & assume any missing data

Question (1)

(15 mark)

Write notes on:

1. The concept of superpave technique ?
2. Compare between traditional grading systems and superpave technique showing the advantages of super pave compared to traditional techniques.
3. List the applications of asphalt reinforcement (geotextiles)
4. Define wam foam and draw schematics of the typical mix process conditions
5. What is meant by asphalt aging - modified asphalt
6. Show using sketch the relationship between "PSI" and age of pavement in both cases of maintenance and no maintenance done

Question (2)

(15 mark)

Complete the following sentence:-

1. Short term aging is simulated in lap. using.....test while safety in mix plants is simulated using..... test by finding.....temperature.
2. IRI is defined as.....while PSI is defined as.....
3. Pumping and handling of asphalt mix in superpave technique is simulated in lap using..... test.
4. for an asphalt of PG 64-22 the best temperature for conducting Rutting test is.....while in fatigue equals.....andfor thermal cracks.
5. Pen 60-70 means that.....
6. is a longitudinal displacement of a localized area of the pavement surface . It is generally caused by braking or accelerating
7. -..... test is used to simulate..... and distresses in superpave while..... and are used to simulate thermal cracks.

Question (3)

(15 mark)

Put (true) or (false) sign correcting the wrong ones:

1. Traditional tests of Asphalt grading predict accurately distresses compared to superpave
2. Distresses are the reason for lower values of PSI
3. Penetration test gives overview about asphalt temperature susceptibility.
4. RTFO is used to simulate long term aging.
5. Fatigue cracks occur due to compressive stresses in the bound layers.
6. Using Wam Foam increases the energy consumption by 30 %
7. Modified asphalt is a type of asphalt which is liquid at temperature of 25 degree Celsius.
8. Rutting is a temperature related distress.
9. Thermal cracking is A pattern of cracks that divides the pavement into approximately rectangular pieces .
10. Superpave technique is performance related technique for asphalt grading.
11. Geotextiles are used to provide increased resistance to Reflective cracking.

Question (4)

(10 mark)

1. Show the benefits of using RAP in mix design.
2. What is WMA and what are its benefits compared to the HMA.
3. State the three techniques used to obtain a WMA.
4. Calculate how much a contractor can save in LE/ton of mix, by introducing a 25% RAP into a mix if the mix design showed that the asphalt content is 6% by weight of total mix and the analysis of the RAP showed that it contains 5% asphalt. The material prices are shown in the following table.

Material	Price (LE/ton)
Aggregate	150
Asphalt	3500
RAP	180

مع تعیناتی

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