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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Seventh Semester, B.E. – Civil Engineering

Semester End Examination; Dec. - 2014

Pavement Materials and Construction

Time: 3 hrs

Max. Marks: 100

Note: Answer any FIVE full questions, selecting at least TWO full questions from each part

PART – A

- 1 a. Explain the desirable properties of aggregates used in pavement construction. List the various tests conducted on road aggregates in order to ascertain its suitability. 10
- b. With an illustration, explain the process of aggregate blending to meet specified gradation. 10
- 2 a. What are the desirable properties of bitumen for use as road construction material? List the various tests conducted for verification of the same. 10
- b. State the significance of the RTFO test for characterizing bitumen. How does an RTFO test simulate adverse temperature conditions? 10
- 3 a. What are emulsions and cutbacks? How are they prepared? Explain under what conditions these are used. 10
- b. What are the factors affecting selection of suitable emulsion for pavement construction? State the factors affecting setting and curing of emulsion mixes. 10
- 4 a. Explain the various steps involved in the Marshall method of bituminous mix design for determining the optimum binder content. 10
- b. The bulk specific gravities of coarse aggregate, fine aggregate and fines are found to be 2.55, 2.60 and 2.65 respectively. The specific gravity of bitumen is given as 1.15. For preparation of the Marshall sample, their relative proportions used are 50, 35, 10 and 5% by weight respectively. The mass of sample measured in air is 1250 g, the mass of paraffin coated sample in the air is 1300 g and in water is 700 g. Calculate the bulk specific gravity of the mix, VMA, VA, VFB and the percentage absorbed bitumen. The specific gravity of paraffin is 0.9 and the theoretical maximum specific gravity of the mix, obtained from the vacuum test is 2.441. 10

PART – B

- 5 a. What are the various types of compacting equipments used for highway construction? Mention their specific uses. 10
- b. Discuss the methods of earth excavation for road construction and uses of various equipments for the same. 10

Contd...2

- 6 a. Enumerate the steps in the preparation of subgrade. How the adequacy of compaction in the field evaluated? 10
- b. Define degree of compaction of soil. What is its relevance to field compaction levels? State the effect of hot and cold climates on the degree of compaction. 10
- 7 a. What are the functions of Prime coat, Tack coat and Seal coat in bituminous construction? Mention the specifications of materials used for each. 12
- b. Explain in detail the construction procedure for bituminous concrete with quality control checks. 8
- 8 a. Discuss the advantages and drawbacks of cement concrete pavements for highways. 8
- b. Explain the reasons for providing various types of joints in cement concrete road. 12

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