7. (*a*) Briefly outline the concepts of superpave. 5

(*b*) Outline the specifications of materials to be used in concrete for paving work as per IRC. 5

8. Write short notes on any *two* : 5 × 2

(*i*) Optimum binder content in bituminous mix

(*ii*) Road making aggregates in India

(*iii*) Liquid bituminous materials for paving work.

NOV, 2015

(Set-L)

M.Tech-1st
Pavement Materials

Full Marks : 70

Time : 3 hours

Q. No. 1 is compulsory and answer any **five** from the rest

The figures in the right-hand margin indicate marks

1. Answer the following questions : 2 × 10

(*a*) What is Group Index ?

(*b*) What do you mean by modulus of subgrade reaction ?

(*c*) State the characteristics of expansive soil under moisture variation.

(*d*) What are the possible mix structures for binary aggregates ?

(*e*) What is meant by combined flakiness and elongation index ?

(*f*) What is role of certain percentage of air void in the bituminous mix ?

(*g*) Differentiate between hydrophobic and hydrophilic aggregates.

(*h*) What is the main advantage of cutbacks over emulsion ?

(*i*) What is the prime role of filter in bituminous mix ?

(*j*) What is the minimum flexural strength of concrete for CC slab as per mix design ?

2. (*a*) State the functions of subgrade. Give a brief specifications of soil including unit weight and compaction requirements of soil in subgrade. 5

(*b*) Briefly discuss the unified and I.S. soil classification systems. 5

3. (*a*) List out the factors which control the strength characteristics of soil. Describe the procedure for CBR test in laboratory. 5

(*b*) Discuss briefly the various properties of road aggregates. 5

4. (*a*) What are the methods of designing aggregate gradation ? Discuss Rothfutch's method in detail. 5

(*b*) State the requirements of paving bitumen as per IS : 73. What are the advantages of modified binder over VG bitumen ? 5

5. (*a*) What do you mean by rheology ? Explain the creep and relaxation behaviours of standard solid model with sketches and equations. 5

(*b*) What are the indirect tests to give an idea of viscosity of binder ? Discuss the relationships between viscosity, penetration and temperature with equations and graphs. 5

6. (*a*) Discuss the mechanical properties of bituminous mix. 5

(*b*) Discuss fatigue performance of bituminous mix along with the concept of cumulative fatigue damage. 5