

Code No: 07A80106

**R07****Set No. 2**

IV B.Tech II Semester Examinations, April/May 2012  
PAVEMENT ANALYSIS AND DESIGN  
Civil Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
All Questions carry equal marks

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1. Explain the stress computations in single layer, two layer and multi layer elastic theories. [16]
2. What are the different approaches in Flexible Pavement Design? Bring out salient features of each approach. [16]
3. What is meant by overlay? Explain the necessity of overlays? What kind of general procedure is adopted for preliminary evaluation of highway condition? [16]
4. Estimate the thickness of cement concrete pavement using the method suggested by IRC (old method) and take the following data: modulus of elasticity of concrete =  $3 \times 10^5$  kg/cm<sup>2</sup>, modulus of rupture of concrete = 45 kg/cm<sup>2</sup>, Poisson's ratio of concrete = 0.15, modulus of sub-grade reaction = 6.5 kg/cm<sup>3</sup>, design wheel load = 5100kg and radius of contact area = 16cm. [16]
5. (a) What are the various combinations of stresses considered in concrete slab design?  
(b) Write the significance of Modulus of subgrade reaction & radius of relative stiffness. [16]
6. List out the factors that are considered for Design of pavement. Explain the terms EAL & ESWL and how they are employed in pavement analysis and Design. [16]
7. (a) Explain the construction procedure of embankments.  
(b) Describe the significance of soil compaction at sub-grade level. [8+8]
8. Describe Marshal Method of mix design with neat sketches. Highlight the following: stability, density, volume of voids, flow, voids filled with bitumen etc. [16]

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**R07****Set No. 4**

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**PAVEMENT ANALYSIS AND DESIGN**  
**Civil Engineering**

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
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1. What are the different types of pavements commonly used in India? Briefly explain the features of each of them. [16]
2. Describe the procedure for patch repair works in:
  - (a) WBM pavement
  - (b) Bituminous pavement
  - (c) Earthen roads. [16]
3. (a) What are the different types of stresses that are to be considered in flexible pavement design?  
(b) Explain the brief concepts of layered system in flexible pavements. [8+8]
4. Explain briefly the principle and the steps involved in CBR method of pavement design using cumulative standard axels, recommended by IRC. Discuss the assumptions, advantages and limitations of this method. [16]
5. A plate load test is carried out on soil sub grade soil using a 300 mm radius rigid plate. A load of 5 tonnes resulted in a deflection of 1.20mm. Find out the elastic modulus of the soil if the Poissons ratio is 0.4. [16]
6. Discuss Westergaard's concept of temperature stresses in concrete pavements. Find the spacing between contraction joints for a 3.75 m slab width having a thickness of 25 cm for Reinforced cement concrete slab. Take allowable tensile stress values in concrete and steel are 0.80 and 1400 kg/cm<sup>2</sup>, coefficient of friction is 1.50. [16]
7. Explain different types of stresses which occur in Rigid pavements. Explain clearly how this stresses are developed and their relative significance in the design and performance of the pavements. [16]
8. (a) List out and explain briefly about the compaction equipment.  
(b) What are the two important field control tests used for adequate quality control? [8+8]

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**R07****Set No. 1**

**IV B.Tech II Semester Examinations, April/May 2012**  
**PAVEMENT ANALYSIS AND DESIGN**  
**Civil Engineering**

**Time: 3 hours****Max Marks: 80**

**Answer any FIVE Questions**  
**All Questions carry equal marks**

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1. (a) Discuss the step by step procedure for design of flexible pavement by FRC method for a National Highway in Rajasthan bringing out the salient features of design.  
(b) Briefly explain AASHO method of flexible pavement design. [8+8]
2. Explain various soil classification systems in use in the field of highway engineering. Describe the Unified soil classification system and show the plasticity chart. [16]
3. What are the different stresses the rigid pavements are subjected to? Discuss. [16]
4. Explain the principle used of Benkelman beam test. Write a descriptive note on pavement evaluation and maintenance. [16]
5. What are the factors governing pavement design? How do you design the traffic for finding of cumulative number of repetitions of axles for the design period? [16]
6. (a) Briefly comment on the types of pavements bringing out their behaviour with respect to loads.  
(b) What are the principles in the design of the pavement? [8+8]
7. Describe the major objectives of compaction and the effect of inadequate compaction. List out the advantages and applications of various compacting equipment for construction of sub-grade and embankment. [16]
8. Mention with sketches, the principle and assumptions in three-layer elastic theory for the determination critical stresses and strains in flexible pavements. [16]

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**R07****Set No. 3**

**IV B.Tech II Semester Examinations, April/May 2012**  
**PAVEMENT ANALYSIS AND DESIGN**  
**Civil Engineering**

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
 All Questions carry equal marks

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1. (a) Explain about the stresses induced due to wheel loads. What is the worst position of a wheel load on a rigid pavement, which may lead to failure? [16]  
 (b) Give an account of temperature stress in pavement. [16]
2. Explain the step by step procedure in design of flexible pavement using IRC method. Discuss its limitations. [16]
3. (a) Explain, under what circumstances the embankments are constructed? [8+8]  
 (b) What are the design elements in highway embankment? [8+8]
4. What is the significance of temperature stresses in rigid pavement design? Describe various recommended temperature differences suggested by IRC based on the concept of Zones. [16]
5. (a) Discuss about Environmental issues & traffic factors in pavement design. [8+8]  
 (b) What are the different issues to be considered in assessing the wheel load? Present their configurations and conversion approaches in pavement design. [8+8]
6. Explain the concept of Mix design of Bitumen and aggregate. What are the desirable properties of bituminous mixes? [16]
7. How do you measure the efficiency of Highway system in general? What are the various advantages with proper maintenance? [16]
8. Calculate the interface reflection under the load for the following pavement conditions [16]  
 Wheel load = 70.686 T  
 Tyre pressure = 100 kg/cm<sup>2</sup>  
 Thickness of the pavement = 45 cm  
 Pavement modulus =  $7.5 \times 10^6$  kg/cm<sup>2</sup>  
 Subgrade modulus =  $3 \times 10^5$  kg/cm<sup>2</sup>.  
 Assume any data if required.

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