

B.E. CIVIL ENGINEERING EXAMINATION 2025

[4th Year; 1st Semester]

Advanced Pavement Engineering

Total Time: Three Hours

Full Marks 100
(Part I: 50 + Part II: 50)

Use a separate Answer-Script for each part

Part I. (50 Marks)

Answer All (5 × 10 = 50)

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| 1. | Explain the general selection process of different Ground Improvement Methods applicable for Highway Pavements. | CO2 |
| 2. | 'Sheep's Foot Roller' and 'Vibratory Roller' are better for compacting 'Clayey Soil' and 'Sandy Soil', respectively. Justify the statement | CO3 |
| 3. | Explain the reinforcing action of 'Geogrid' and 'Geocell' in distributing the surface load coming from vehicles in to the subgrade. | CO2 |
| 4. | 'Pavement quality can be increased by increasing the quality of its subgrade' – Justify. | CO3 |
| 5. | What is 'Soil Stabilization'? What is the basic difference between 'Cement Stabilization' and 'Lime Stabilization'? | CO2 |
| 6. | What is the significance of 'Standard/Heavy Proctor Test' conducted in laboratory with respect to field application? | CO3 |
| 7. | Define the method 'Pre-Loading with Vertical Drain' with schematic diagram. How is it helpful for any Civil-Construction? | CO2 |
| 8. | What is benching? How is it advantageous in construction and stability for a long slope surface? | CO3 |
| 9. | What are the quality control checks for a fresh pavement construction? | CO3 |
| 10. | Mention the steps involve in constructing a highway pavement on an Embankment. | CO3 |

[Turn over

B.E. CIVIL ENGINEERING FOURTH YEAR FIRST SEMESTER EXAM 2025
ADVANCED PAVEMENT ENGINEERING

Time: 3 Hours

Full Marks: 100
 [50 Marks for each part]

Part II

Use Separate Answer scripts for each Part

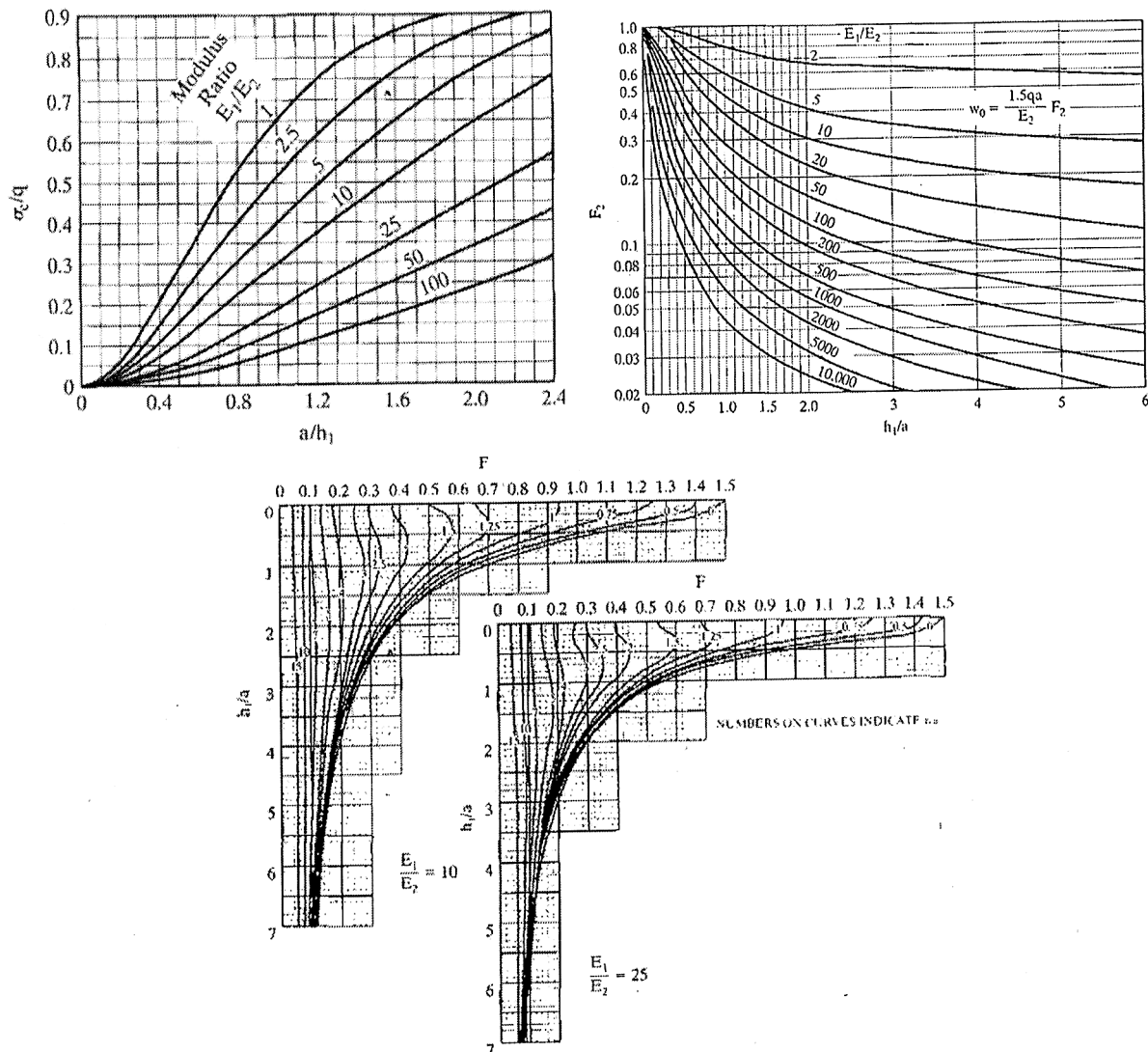
Answer ALL Questions

Answer brief & to the point. Assume standard value for any parameter, if required

Group: I

1. An equivalent circular load having radius 150 mm and uniform pressure 500 kPa is applied on a two-layer pavement system. The sub-grade has elastic modulus 35 MPa and can support a maximum vertical stress of 50 kPa. If the pavement layer has elastic modulus 350 MPa, what is the required thickness of the full-depth pavement? Also determine the surface, interface and intermediate critical deflections for the said pavement structure. Use standard charts as follows –

5+4+4+2



2. Explain the following in terms of multi-layer pavement stability following the provisions as mentioned in the IRC code – 10
- Rutting criteria
 - Fatigue cracking criteria for granular sub-base
 - Reliability effect

Group: II

- Draw neatly schematic structures of flexible and rigid pavement and name the fundamental load transfer mechanism of each. Explain in detail how the subsurface pore water influence in failure mechanism of granular layers. 4+2+4
 - Name the two major types of pavement failure due to distress and classify each of them into five major sub-types. Explain in detail one sub-type of each major type 1+5+4
 - In a Benkelman beam study, why temperature correction is required and how is it computed? Which parameters do influence seasonal correction of Benkelman beam observation? 2+1+2
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