



Question No. (1) [25 marks]

- 1- Compare between the deformation of rigid and flexible pavement?
- 2- What is meant by deformation of pavements? Illustrating the common types of pavement deformation?
- 3- What is meant by permanent deformation of asphalt concrete pavement, illustrate with suitable sketch?
- 4- Explain briefly the main causes of permanent deformation in flexible pavement?

Question No. (2) [25 marks]

- 1- What are the methods of prediction of permanent deformations?
- 2- What are the factors influencing the amount of pavement rutting? Explaining in detail its mechanism?
- 3- Why pavement rutting is a serious safety issue for road users?
- 4- List the additives that can be used to resist the deformation of flexible pavement?

Question No. (3) [25 marks]

- 1- Using suitable sketch to describe the effect of number of load cycling, lateral stress and deviator stress on the performance of permanent deformation of unbound granular materials in triaxial test?
- 2- What are the possible causes which leading to the corrugations and shoving of flexible pavement?
- 3- Mention what do you know about the road depression?
- 4- Explain the term asphalt regulation?

Question No. (4) [25 marks]

- 1- Explain in detail the approaches used in overcoming the permanent deformation of asphalt pavement?
- 2- List the factors influencing the performance quality of the constructed pavement during the following phases:
 - Design and specification phase.
 - Construction phase.
 - Handing over phase.
- 3- What do you know about shakedown approach in analyzing the deformation of unbound granular materials, using suitable sketch?

*With my best wishes
Dr. Ahmed Abu El-Maaty*

This exam measures the following ILOs (Intended Learning Outcomes)

Question No.	ILOs
1	A-1, A-2, B-3, C-2, D-4, D-2
2	A-3, B-4, B-5, C-1, C-2, D-3, D-6
3	B-4, B-5, A-4, D-4, C-1
4	A-2, C-3, B-4, D-5, C-2