

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

(Regulation 2009)

Seventh Semester

CIVIL ENGINEERING

CEE207: Pavement Engineering

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. In Burmister two-layer system, the top layer of pavement represents the.....
 - a) Surfacing
 - b) Surfacing & base
 - c) Base & sub-base
 - d) All the above
2. method is used for inspecting the pavement surface for various types of damage
 - a) visual rating
 - b) PSI
 - c) roughness measurements
 - d) Benkel beam method
3. The measurement of permanent deformation, riding quality and extent of cracking & patches is known as.....
 - a) visual rating
 - b) PSI
 - c) roughness measurements
 - d) Benkel beam method
4. The higher the GI value, the soil strength is.....
 - a) a) Higher
 - b) Poorer
 - c) Neutral
 - d) None of the above
5. In a concrete road, the concrete slab itself acts as asurface
 - a) base
 - b) sub-base
 - c) wearing
 - d) all the above
6. In rigid pavements the load carrying capacity is mainly due to.....
 - a) Rigidity
 - b) Modulus of elasticity
 - c) Both (a) & (b)
 - d) None of the above
7. In the routine repairs it includes
 - a) patching
 - b) painting of steel
 - c) renewal of surface
 - d) pot holes
8. In Benkel beam method the load on a dual wheel can be range from
 - a) 2.7-4.1T
 - b) 2.5-4.1T
 - c) 2.7-4.3T
 - d) 2.5-4.3T

9. method is used for inspecting the pavement surface for various types of damage.
 - a) visual rating
 - b) PSI
 - c) roughness measurements
 - d) Benkel beam method
10. The pavement performance can be obtained by monitoring its.....
 - a) Cracks
 - b) Roughness
 - c) Undulations
 - d) Skid resistance

PART B (10 x 2 = 20 Marks)

11. What is meant by Rigid pavement?
12. What are the types of pavement.
13. What are the factors affecting for design of rigid pavement.
14. What is meant by roughness measurements.
15. The CBR value of subgrade soil is 5%, calculate total thickness of a pavement using design formula developed by US crops of Engineers. Assume 4100 kg wheel load or medium light traffic of 200 commercial vehicles per day for design, tyre pressure = 6 kg/cm^2
16. What is meant by ravelling and due to what reason it taking place.
17. What is meant by pot holes and undulations..
18. Define patches and undulations?
19. What are the various field control tests for stabilization?
20. Give the factors affecting the choice of stabilization technique

PART C (5 x 14 = 70 Marks)

21. a) (i) Explain the pavement layers in flexible and rigid pavement. (7)
(ii) List the factors affecting design performance of pavements. (7)
(OR)
b) (i) What are the various functions and desirable characteristics of pavements? (7)
(ii) Explain any three methods to assess the subgrade strength. (7)
22. a) (i) i) Discuss the vertical stress distribution under the pavement. (7)
(ii) Sketch the structure of a flexible pavement. The analysis of subgrade soil of a proposed highway give the following data: (7)
Passing No.200 in ASTM 15 microne sieve is 60%, Liquid limit 45% and plastic limit 25%, Daily traffic intensity 1000 heavy vehicles per day. List the design procedure for a suitable flexible pavement.
(OR)
b) (i) Explain the CBR and IRC methods of design of flexible pavements. Discuss the advantages and limitations. (8)

(ii) Explain Burmister's two layer and three layer theory (6)

23. a) A three-layer pavement structure consists of 250mm of bituminous layer on 150mm of crushed stone road-base. The subgrade has a CBR of 5. A single wheel load with a tyre pressure of 0.75 MN/m^2 is applied over a circular contact area of 400mm diameter. Calculate the vertical and horizontal stresses and strains on both sides of each interface.

(OR)

b) (i) Calculate the stresses at interior, edge and corner regions, of a concrete pavement using Westergaards stress equation for the following data:
Wheel load=4100 kg, tyre
Modulus of elasticity of concrete= $3.3 \times 10^5 \text{ kg/cm}^2$
Pavement thickness=18cm, Modulus of subgrade reaction= 2.5 kg/cm^3
Diameter of loaded area =25cm, Poisson's ratio of concrete= 0.15 (7)

(ii) Briefly explain IRC method of rigid pavement design. (7)

24. a) (i) Write a note on Pavement Maintenance Management System. (4)

(ii) What are the methods of pavement evaluation? (10)

(OR)

b) Explain (i) Visual rating and PSI (5)

(ii) Ravelling and undulations (4)

(iii) Rigid overlay over rigid pavement (5)

25. a) Write short notes on (i) the uses of geosynthetics in roads (7)

(ii) Stabilization of rural roads (7)

(OR)

b) What are the different soil stabilization methods? Explain any one design mix and construction procedure.
