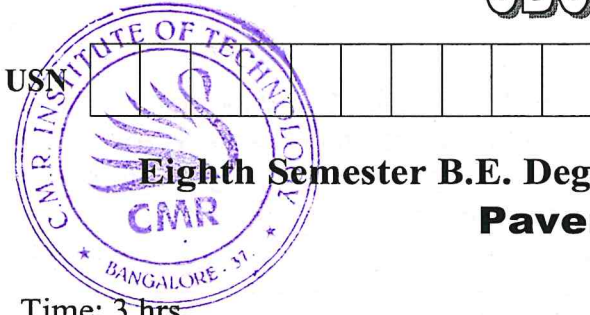


# CBCS SCHEME

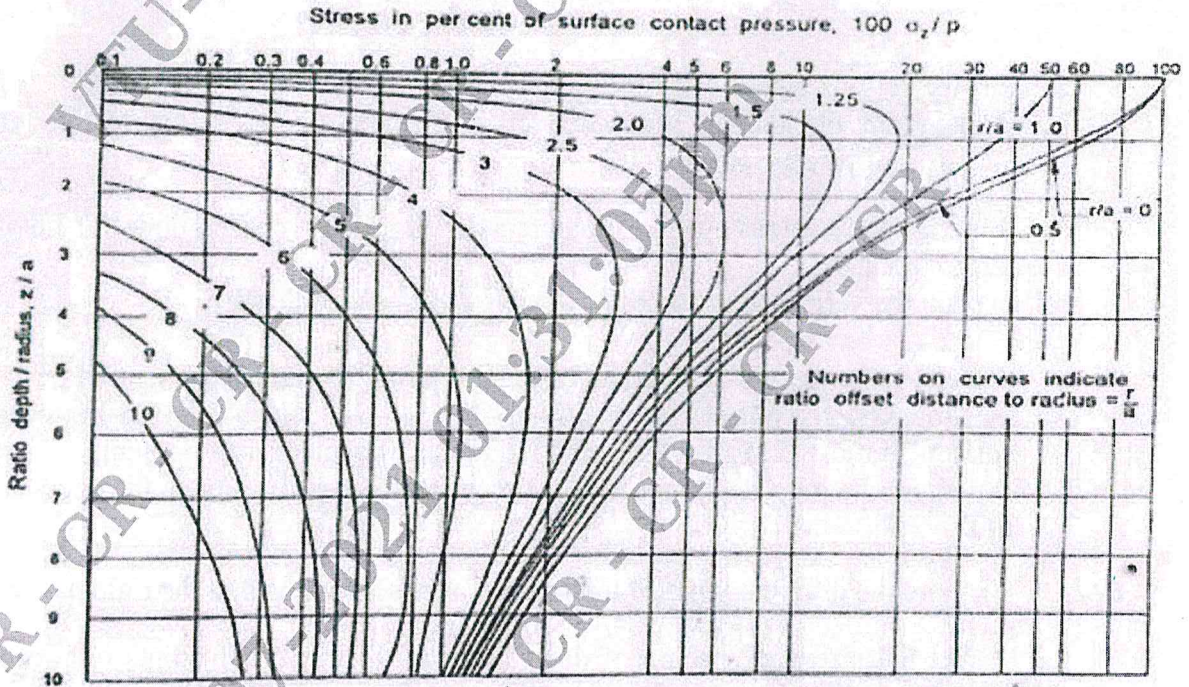
15CV833



Max. Marks: 80

**Note: Answer any FIVE full questions.**

1.
  - a. Compare the properties of flexible and rigid pavement. (08 Marks)
  - b. Describe the functions of Granular sub base, base and wearing course in the pavement structure. (08 Marks)
  
2.
  - a. A dual wheel load of 100 kN load on each wheel and a contact pressure of  $0.7 \text{ N/mm}^2$  is applied on a homogeneous layer with  $E = 12 \text{ N/mm}^2$ . If the centre to centre distance between the wheels is 600 mm determine the stress at a depth of 0.5 m at 4 points at the centre of dual wheels, at a radial distance of 300, 600 and 900 mm from the centre of the dual wheels. Use deflection chart given in Fig. Q2 (a). (08 Marks)



**Vertical stress distribution chart**

Fig. Q2 (a)

- b. Distinguish between Boussinesq's and Burmister theory. CMRIT LIBRARY (08 Marks)  
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3.
  - a. Explain the relationship between the tyre pressure and contact pressure with a help of a graph. (08 Marks)
  - b. Determine the ESWL at depth of 15 cm, 20 cm and 25 cm if the dual wheel load assembly carries 2044 kg load on each axle, the centre to centre spacing between the wheels is 27 cm and the clear distance between the tyre walls is 11 cm. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg, 42+8 = 50, will be treated as malpractice.

- 4 a. Explain the method of designing the pavement by Kansas and McLeod method. (08 Marks)  
 b. Design the thickness of flexible pavement to be constructed on the subgrade soil with CBR 10%. The commercial vehicle traffic intensity is 700 cvpd, vehicle damage factor is 1.5, rate of growth of commercial traffic is 7.5% and design life of pavement is 15 years. Use IRC 37 : 2001 chart given in Fig. Q4 (b). (08 Marks)

CBR 9% & 10%					
Cumulative Traffic (msa)	Total Pavement Thickness (mm)	PAVEMENT COMPOSITION			
		Bituminous Surfacing		Granular Base (mm)	Granular Sub-base (mm)
		Wearing Course (mm)	Binder Course (mm)		
1	375	20 PC		225	150
2	425	20 PC	50 BM	225	150
3	450	20 PC	50 BM	250	150
5	475	25 SDBC	50 DBM	250	150
10	540	40 BC	50 DBM	250	200

Pavement design catalogue recommended for traffic range 9-10 MSA as per IRC 37:2001

Fig. Q4 (b)

- 5 a. List the various types of flexible pavement failure. (08 Marks)  
 b. Explain the Benkalman beam deflection method of conducting test to design overlay thickness of flexible pavement. (08 Marks)
- 6 a. What are the various types of maintenance work that can be done on flexible pavement surface course? (08 Marks)  
 b. Explain the various approaches of flexible pavement evaluation. (08 Marks)
- 7 a. Calculate the stresses at interior, edge and corner of rigid pavement as per Westergaard's equation. Given : Wheel load = 5100 kg,  $E = 3 \times 10^5 \text{ kg/cm}^2$ , Pavement thickness = 18 cm, Poisson's ratio = 0.15,  $K = 6 \text{ kg/cm}^3$  and radius of contact area = 15 cm. (08 Marks)  
 b. Explain the step by step procedure of designing the rigid pavement thickness as per IRC 58 : 2002. (08 Marks)
- 8 a. What are the different types of temperature stresses involved in the rigid pavement? Explain. (08 Marks)  
 b. Design the size and spacing of dowel bars at the expansion joints of a cement concrete pavement of thickness 25 cm with radius of relative stiffness 80 cm, for a design wheel load of 5000 kg. Assume load capacity of dowel system as 40% of the design wheel load. Joint width is 2 cm, permissible shear and flexural stress in dowel bar are 1000 and 1400  $\text{kg/cm}^2$  respectively and permissible bearing stress in CC is 100  $\text{kg/cm}^2$ . (08 Marks)
- 9 a. Explain the various types of rigid pavement failures. (08 Marks)  
 b. Draw a neat figure representing all the joints involved in the rigid pavement and explain the concept involved in providing the joints. (08 Marks)
- 10 a. Explain the maintenance measures adopted for the rectification of cracks developed in the cement concrete pavements. (08 Marks)  
 b. Write a note on how to maintain the joints in rigid pavements. (08 Marks)