	<p style="text-align: center;">ADAMAS UNIVERSITY END (EVEN) SEMESTER EXAMINATION : MAY 2021 (Academic Session: 2020 – 21)</p>		
Name of the Program:	B.Tech in Civil Engineering	Semester:	VI
Paper Title :	TRANSPORTATION ENGINEERING II	Paper Code:	ECE43108
Maximum Marks :	40	Time duration:	3 Hrs.
Total No of questions:	8	Total No of Pages:	2
(Any other information for the student may be mentioned here)	<ol style="list-style-type: none"> 1. At top sheet, clearly mention Name, Univ. Roll No., Enrolment No., Paper Name & Code, Date of Exam. 2. All parts of a Question should be answered consecutively. Each Answer should start from a fresh page. 3. Assumptions made if any, should be stated clearly at the beginning of your answer. 		

Group A

Answer All the Questions (Attempt all Five) (5 x 1 = 5)

Q. 1.

- (a) What are differences between Bitumen and Tar? (1)
- (b) As per IRC what are the standard axle loads for Single Axle and Tandem Axle? (1)
- (c) What are the desirable properties of a good filler material in Expansion Joint? (1)
- (d) What are the functions of dowel bar in a rigid pavement? (1)
- (e) What is the limitation of the CBR method? (1)

Group B

Answer any Three Questions (3 x 5 = 15)

Q. 2. Differentiate between Flexible Pavement and Rigid Pavement. (5)

Q. 3. Write a short note on 'Viscosity Test of Bitumen'. (5)

Q. 4. Design the length and spacing of tie bars given that the pavement thickness is 20 cm and width of the road is 7 m with one longitudinal joint. The unit weight of concrete is 2400 kg/m³, the coefficient of friction is 1.5, allowable working tensile stress in steel is 1750 kg/cm², and bond stress of deformed bars is 24.6 kg/cm². (5)

Q. 5. Derive an expression for finding frictional stress in a Rigid Pavement. (5)

Group C
Answer any Two Questions (2 x10) = 20

Q. 6. (i) What are the requirements of providing joints in a rigid pavement? (3)

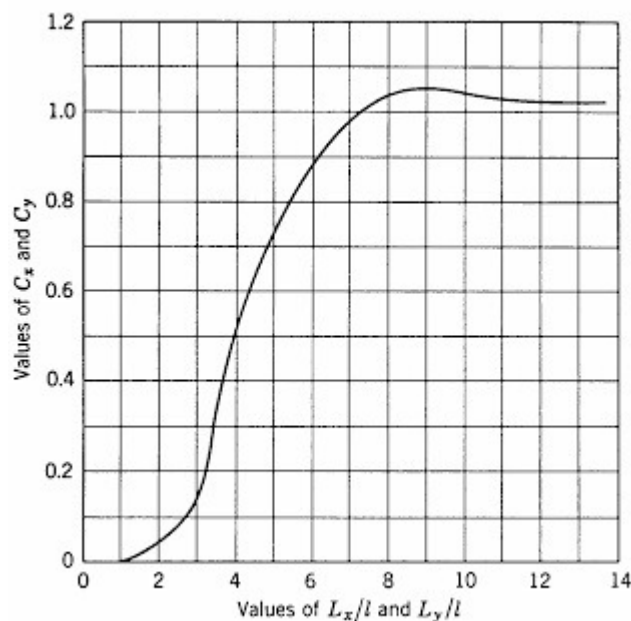
(ii) Design the pavement section by Tri-axial method using the following data:

- Design wheel load = 4 tonnes
 - Radius of contact area = 18 cm
 - Traffic Co-efficient = 1.5
 - Rainfall Co-efficient = 0.9
 - Design deflection = 0.25 cm
 - Modulus of Elasticity of Subgrade = 110 kg/cm^2
 - Modulus of Elasticity of Sub-base Course Material = 450 kg/cm^2
 - Modulus of Elasticity of 7 cm thick bituminous concrete surface course = 1000 kg/cm^2
- (7)

Q. 7. (i) Determine the value of Cumulative number of standard axles for a two lane carriage way with Initial traffic in the year of completion of construction = 400 CVPD (sum of both directions), traffic growth rate is 7% per annum, design life of the pavement = 14 years and vehicle damage factor is equal to 2.4. Also determine the overall pavement thickness if CBR of subgrade soil would be 6%. (6+1)

(ii) Find the Group Index value for the soil sample having Liquid Limit of 40%, Plastic Limit of 20% and soil passing 0.074 mm sieve is 55%. (3)

Q. 8. (i) A concrete slab 7.50 m long, 3.50 m wide and 200 mm thick, is subjected to a temperature differential of 14°C . Assuming that modulus of subgrade reaction = 56.2 MN/m^3 and thermal expansion coefficient of concrete = 10×10^{-6} per $^\circ\text{C}$. Determine the maximum curling stress in the interior, edge and corner of the slab. Take the radius of contact as $a = 150 \text{ mm}$. Assume the other data if necessary. (8)



(ii) What do you mean by Equivalent Single Wheel Load? (2)