

Ref. No.: Ex/CE/5/T/401/2024 (S)

**Name of the Examinations: BACHELOR OF ENGINEERING (CIVIL ENGINEERING)  
FOURTH YEAR FIRST SEMESTER – 2024 (SUPPLEMENTARY)**

**Subject: TRANSPORTATION ENGG. -II      Time: 3 hours      Full Marks: 100**

( 50 Marks for each Part)

Use separate answer script for each Part

**Part -I ( 50 Marks )**

Instructions: Use Separate Answer scripts for each part. Answer any five questions.      5x10 =50

1. Write short notes on the following: (a) Equivalent Single Wheel Load (b) Fatigue failure.
2. Enumerate the different components of the flexible pavement cross-section with a neat diagram. Also, describe the functions and importance of each component. Explain briefly the principle of Burmister's two-layer theory and mention the advantages over the elastic single-layer theory for the analysis of flexible pavements.
3. (a) What do you mean by bitumen grade 10/20? Explain the objectives of asphalt mix design. An asphalt mix with a maximum specific gravity of 2.523 was compacted in the Marshall mold with 75 blows on each side. The bulk specific gravity of the compacted specimen was determined to be 2.392. Calculate the percent air voids in the compacted specimen.  
(b) Explain the desirable properties of aggregate to be used in different types of pavement construction.
4. Using the data given below, calculate the wheel load stresses at (i) interior (ii) edge (iii) corner regions of a cement concrete pavement using Westergaard's stress equations. Also determine the probable location where the crack is likely to develop due to corner loading. Wheel load = 6000 kg, Modulus of elasticity of cement concrete,  $E = 3.0 \times 10^5$  kg/cm<sup>2</sup>, Pavement thickness = 18 cm, Poisson ratio = 0.15, Modulus of subgrade reaction  $K = 6$  Kg/cm<sup>3</sup>, Radius of contact area = 15 cm.
5. (a) Explain contact pressure and tyre pressure.  
(b) What are the various climatic factors that affect the design and performance of pavement? Explain briefly.
6. Write down the basic components of bitumen. What are the importance and significance of ductility, softening and penetration tests of bitumen?

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**BACHELOR OF ENGINEERING (CIVIL ENGINEERING) FOURTH YEAR FIRST  
SEMESTER SUPPLEMENTARY EXAM – 2024**

**Subject: TRANSPORTATION ENGINEERING – II**

**Time: 3 Hours**

**Full Marks: 50**

**Part – II**

**Instructions: Use Separate Answer Scripts for each Part  
Answer all questions**

1. Discuss about the following components of an airport (8)
  - a. Apron
  - b. Taxiway
  - c. Hanger
  - d. Runway
2. Discuss the following terms: (8)
  - a. AADT
  - b. 30<sup>th</sup> Highest Hourly Volume
  - c. Space Mean Speed
  - d. Time Mean Speed
3. Spot speed studies were carried out at a stretch of highway and the combined data are as follows:

Speed range (kmph)	No. of vehicles observed	Speed range (kmph)	No. of vehicles observed	Speed range (kmph)	No. of vehicles observed
0-10	10	30-40	222	60-70	78
10-20	12	40-50	205	70-80	0
20-30	105	50-60	121		

Determine the most preferred speed at which maximum proportion of vehicles travels. (8)

4. The consolidated data collected from speed and delay studies by floating car method on a stretch of urban road of length 2.0 km, running N-S are given below. Determine average Traffic Volume, Journey Speed and running speed of the traffic along either direction? (16)

Trip No.	Direction	Journey Time (min -sec)	Total Stopped Delay (min -sec)	No. of Vehicles Overtaking	No. of Vehicles Overtaken	No. of Vehicles from Opposite Direction
1	N-S	6-10	1-00	4	5	280
2	S-N	5-35	1-05	5	3	268
3	N-S	4-58	0-50	2	7	251
4	S-N	7-15	1-55	6	2	267
5	N-S	6-25	1-06	4	8	294
6	S-N	6-35	1-10	7	3	284

5. Design a 2 phase signal for an intersection where the traffic data are given as below: (10)

Direction	From N	From S	From E	From W
Traffic	200	150	250	420
Saturated Traffic	850	750	1200	1100

Assume All Red Time as 4 seconds. Assume any other data if necessary.