Birzeit University - Faculty of Engineering
Department of Civil Engineering
Transportation Engineering - ENCE 431

Instructors: Dr. Faisal Awadallah Spring 2021

Final Exam (Part 2 out 65%) online

Copy the pledge below in red and sign your name below it in the first page of the answer sheet

I PLEDGE NOT to use any help from anyone and not to communicate about the exam through any form or media

Question 1: (30 marks) – No groups for this question, entire class one group

Given an airport with one precision instrument runway. The ends of the runway centerline have the following coordinates (N: 15000', E: 15000') and (N: 24000', E: 11000'). The airport-established elevation is 760' above msl.

Determine the maximum height of a structure at a proposed construction site with the following coordinates (N: 9000', E: 6000', Z: 730' above msl) according to the FAA imaginary surfaces standards

Note: all coordinates in feet

Question 2: (10 marks)

Group A: Digit 5 and 6 from the left of students numbers 00 - 24 inclusive (e.g., 1171219)
Table below provides the expected average number of aircrafts arrival per day for four categories of aircrafts with expected mean time gate occupancy for each category; estimate the number of required gates according to European traffic.

Aircraft category	Average number of aircraft arrivals per hour	Mean time gate occupancy in minutes
A	15	45
B	20	55
C	12	65
C	8	75

Group B: Digit 5 and 6 from the left of students numbers 25 - 49 inclusive (e.g., 1171349)
Table below provides the expected average number of aircrafts arrival per day for four category of aircrafts with expected mean time gate occupancy for each category; estimate the number of required gates according to European traffic.

Aircraft category	Average number of aircraft arrivals per hour	Mean time gate occupancy in minutes
A	20	45
B	22	55
C	18	65
C	10	75

Group C: Digit 5 and 6 from the left of students numbers 50 - 74 inclusive (e.g., 1171609)
Table below provides the expected average number of aircrafts arrival per day for four category of aircrafts with expected mean time gate occupancy for each category; estimate the number of required gates according to European traffic.

Aircraft category	Average number of aircraft arrivals per hour	Mean time gate occupancy in minutes
A	5	45
B	10	55
C	27	65
C	15	75

Group D: Digit 5 and 6 from the left of students numbers 75 - 99 inclusive (e.g., 1171879)
Table below provides the expected average number of aircrafts arrival per day for four category of aircrafts with expected mean time gate occupancy for each category; estimate the number of required gates according to European traffic.

Aircraft category	Average number of aircraft arrivals per hour	Mean time gate occupancy in minutes
A	3	45
B	17	55
C	20	65
C	25	75

Question 3: (20 marks)

Group A: Digit 5 and 6 from the left of students numbers 10 - 40 inclusive (e.g., 1171**11**9**)**

Given a design B757 aircraft for runway length requirement (similar to table 18.1 & 18.2). The airport is at an elevation of 1000 meters and normal maximum temperature of the hottest month of the year is 32 degrees. Maximum operational take-off weight is 95000kg, and maximum operational landing weight is 175,000lb. Determine the required runway length assuming the difference between the highest and lowest points on the runway centerline is 9.5 meters.

Group B: Digit 5 and 6 from the left of students numbers 41 - 74 inclusive (e.g., 1171**41**9**)**

Given a design B757 aircraft for runway length requirement (similar to table 18.1 & 18.2). The airport is at an elevation of 1500 meters and normal maximum temperature of the hottest month of the year is 32 degrees. Maximum operational take-off weight is 100,000kg, and maximum operational landing weight is 180,000lb. Determine the required runway length assuming the difference between the highest and lowest points on the runway centerline is 7.5 meters.

Group C: Digit 5 and 6 from the left of students numbers 75 - 99 and 00-09 inclusive (e.g., 1171**09**9**)**

Given a design B757 aircraft for runway length requirement (similar to table 18.1 & 18.2). The airport is at an elevation of 1000 meters and normal maximum temperature of the hottest month of the year is 28 degrees. Maximum operational take-off weight is 95000kg, and maximum operational landing weight is 195000lb. Determine the required runway length assuming the difference between the highest and lowest points on the runway centerline is 4.5 meters.

Question 4: (5 marks)

Group A: Last two digits of students numbers 00 - 19 inclusive (e.g., 11712**19)**

Given the fetch of 10km, wind velocity 10km/h and mean water depth of 6 meters at an inland lake, determine the maximum wave height

Group B: Last two digits of students numbers 20 - 39 inclusive (e.g., 11712**20)**

Given the fetch of 30km, wind velocity 20km/h and mean water depth of 6 meters at an inland lake, determine the maximum wave height

Group C: Last two digits of students numbers 40 - 59 inclusive (e.g., 11712**55)**

Given the fetch of 25km, wind velocity 40km/h and mean water depth of 6 meters at an inland lake, determine the maximum wave height

Group D: Last two digits of students numbers 60 - 79 inclusive (e.g., 11712**69)**

Given the fetch of 32km, wind velocity 52km/h and mean water depth of 6 meters at an inland lake, determine the maximum wave height

Group E: Last two digits of students numbers 80 - 99 inclusive (e.g., 11712**90)**

Given the fetch of 21km, wind velocity 80km/h and mean water depth of 6 meters at an inland lake, determine the maximum wave height