



Civil and Environmental Engineering (Dept.)
Transportation Infrastructure and Territory (Group)
BIT – Barcelona Innovative Transportation
BarcelonaTech

Transportation Planning and Management on the Territory

MEng in Civil Engineering

Course 2018-2019, quarter Q2 (May 22, 2019)

Quiz2 (Cases 1-9)

PERMUTATION A

TIME: 30 MIN.

Student: _____.

ID/Passport = _____.

Signature:

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MULTIPLE CHOICE. **PLEASE WRITE THE ANSWER HERE (BOXES BELOW).**

CORRECT ANSWER = 10/3 points. BLANK ANSWER = 0 points. **WRONG ANSWER = -5/6 POINTS.**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

16	17	18	19	20	21	22	23	24	25	26	27	28	29	30



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1. The annual traffic of BCN airport was 50,172,457 pax in 2018, with an average inter-annual growth = 6.1%. When do we reach capacity?

A= June 2020	B= May 2022	C= July 2023	D= The bottleneck is the runway
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2. How many freedoms of the air?

A= 5	B= 6	C= 7	D= 9
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3. Why the new terminal T1 of BCN airport is a good example of successful planning?

A=	They respected the humid zones and tried to minimize the noise, functional and efficient construction several times cheaper per million pax than the new airport of Madrid (T4).
B=	Neat building architecture with the shape of a sword, a lot of glass, many shops, and automatic sorting and transportation system for baggage.
C=	Collaboration of Aena civil servants with private consultants, although the architect is the same (Ricardo Bofill), they learned from the mistakes of the old terminal T2 (inaugurated for the Olympics in 1992).
D=	Facilitation of interdisciplinary collaboration, PPP, service oriented, resources (time, money and qualification: engineers + MBA) and rehearsal.

4. The Railway General Plan (*Plan General de Ferrocarriles 1980-1991*) chose the option of:

A=	Maintaining the existing situation.
B=	Fostering the commuter rail network (metropolitan transport).
C=	Implementing High Speed Rail.
D=	Traffic boosting through a selective treatment of the network with clear priorities.

5. What's the main feature of the "*Plan estratégico de infraestructuras y transporte (PEIT) (2004-2020)*"?:

A.	Determining criteria and rules of intervention.
B.	Promoting the value and responsible management of natural resources.
C.	Implementing coordinated action plans in the cities.
D.	Contributing to a balanced economic development as a tool to overcome the crisis.

6. The passenger record in public transportation modes in Barcelona was not exceeded in three decades due to the increase in automobile park. What is that three decade period?

A= 1950-1980	B= 1965-1995	C= 1975-2005	D= 1988-2018
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7. According to the studies made by the City of Barcelona, what is the Net Present Value of linking the two tramway lines along the Diagonal Avenue **with an electric bus**? (Values in millions of Euros, and considering a discount rate = 3%)
- | | | | | | | | |
|----|--------|----|-------|----|------|----|-------|
| A= | -180.9 | B= | -91.1 | C= | 15.8 | D= | 158.5 |
|----|--------|----|-------|----|------|----|-------|
8. What was the real reason for TMB to study the reintroduction of tramways in 1987 after they disappeared in 1971 (in Barcelona)?
- | | |
|----|--|
| A= | Unlike the old tramways, modern tramways are segregated from traffic. |
| B= | Some municipalities of “Baix Llobregat” area requested metro. |
| C= | Modern tramways are really nice: silent, smooth, fast and reliable. |
| D= | Political “pulse” between region (Generalitat) vs AMB (Metropolitan Area). |
9. Bill Garrison used to say that developing and developed countries have similar evolution conceptually, and they only differ in time and slope of the “S-shaped” development curve...
- | | |
|----|--|
| A. | Right, it’s a matter of time lag. |
| B. | Wrong, developing countries do not need to make the same mistakes that developed countries made. |
| C. | Right, but besides time lag, it is important to think globally and act locally. |
| D. | Wrong, there are specific cultural and territorial issues. |
10. Typical transportation modes of developing countries that we hardly see in Europe:
- | | |
|----|---|
| A. | Bicycles, hijacking and ridesharing. |
| B. | Tuk-tuk, rickshaw and moto-taxi. |
| C. | Rickshaw, cableway and moto-taxis. |
| D. | Animal pulled carts, human-pulled carts and bicycles. |
11. In Barcelona we had **slums** too... An important one was at the beach, from 1875 to 1966 called:
- | | | | | | | | |
|----|-----------|----|----------|----|------------|----|--------|
| A= | Somontano | B= | Monegros | C= | Somorostro | D= | Bierzo |
|----|-----------|----|----------|----|------------|----|--------|
12. What’s the REAL revolution in urban transportation?
- | | | | | | | | |
|----|----------|----|------------|----|-----------|----|--------|
| A= | Electric | B= | Autonomous | C= | Connected | D= | Shared |
|----|----------|----|------------|----|-----------|----|--------|
13. What city of Canada subsidizes an “Uber-bus” (Uberpool)?
- | | | | | | | | |
|----|---------|----|----------|----|--------|----|---------|
| A= | Toronto | B= | Innisfil | C= | Quebec | D= | Calgary |
|----|---------|----|----------|----|--------|----|---------|



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14. **INCREASING** value in stock market of Volkswagen (VW), Tesla, General Motors (GM), and Uber:
- | | | | |
|----|----------------------|--|--|
| A= | VW, GM, Tesla, Uber. | | |
| B= | VW, Tesla, GM, Uber. | | |
| C= | GM, VW, Tesla, Uber. | | |
| D= | GM, Tesla, VW, Uber. | | |
15. Extra cost of the “Autonomous Vehicle” pack that Volvo is planning to put in the market in 2020-21:
- | | | | | | | | |
|----|---------|----|---------|----|---------|----|----------|
| A= | 4,900 € | B= | 6,000 € | C= | 9,000 € | D= | 12,000 € |
|----|---------|----|---------|----|---------|----|----------|
16. There is a bus grid network in a rectangular city of area $D_x D_y$, where horizontal and vertical corridors are spaced at s_y and s_x distance respectively. The probability of performing zero transfers (P_0) is given by one of the following equations, where $n=1$ or 2 depending on the modeling assumptions:
- | | |
|----|---|
| A= | $(D_x s_y + D_y s_x - n s_x s_y) / (D_x D_y)$ |
| B= | $(D_x D_y + D_y D_x - n s_x s_y) / (s_x s_y)$ |
| C= | $(D_x D_y) / (D_x s_y + D_y s_x - n s_x s_y)$ |
| D= | $(n s_x s_y) / (D_x D_y)$ |
17. The number of corridors that constitute the final design of the High Performance Bus Network in Barcelona, to be completed in 2019, is:
- | | | | | | | | |
|----|----|----|----|----|----|----|----|
| A= | 11 | B= | 15 | C= | 28 | D= | 97 |
|----|----|----|----|----|----|----|----|
18. In order to guarantee a competitive user travel time, transfer-based bus networks should be designed with:
- | | | | | | | | |
|----|-----------------|----|------------------|----|--------------|----|--------------------|
| A= | Low frequencies | B= | Low stop spacing | C= | Low headways | D= | Low cruising speed |
|----|-----------------|----|------------------|----|--------------|----|--------------------|
19. In Barcelona, a grid bus network design is $L=900$ km long. An alternative design considers more bus corridors, so that the new length is $L'=1,800$ km. In comparison to the first design, the alternative design...
- | | |
|----|---|
| A= | Has a lower system capacity. |
| B= | Maintains the user travel time at the expenses of reducing the operational cost. |
| C= | Doubles the operating cost and marginally improves the user door-to-door travel time. |
| D= | Doubles the door-to-door travel time and marginally reduces the operating cost. |



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20. What system is associated to linear stacking strategy in a port container terminal?
- | | |
|----|-----------------------------|
| A= | Pure Straddle Carrier. |
| B= | Reachstackers. |
| C= | Rail-mounted Gantry Cranes. |
| D= | Other. |
21. Concerning the port governance, which is the model in the Spanish ports?
- | | | | | | | | |
|----|----------------|----|-------------|----|------------------|----|---------------|
| A= | Private ports. | B= | Tool-ports. | C= | Land-lord ports. | D= | Public ports. |
|----|----------------|----|-------------|----|------------------|----|---------------|
22. In the selection of a container transshipment hub, which of these factors is **less** relevant?
- | | |
|----|--------------------------------------|
| A= | Large hinterland. |
| B= | Large yard for temporary storage. |
| C= | Proximity to a major shipping route. |
| D= | Close to a large city. |
23. In Barcelona Port operate two oriented container terminals: TCB and BEST. What system of handling containers operates in each of the terminals?
- | | |
|----|--------------------------------------|
| A= | Reachstackers and Straddle Carriers. |
| B= | Straddle Carriers and Reachstackers. |
| C= | Straddle Carriers and Gantry Cranes. |
| D= | Reachstackers and Gantry Cranes. |
24. In Spain, the structural condition of a flexible pavement is evaluated through:
- | | |
|----|-------------------------------|
| A= | Splash and spray evaluation. |
| B= | Deflection tests. |
| C= | Roughness measurements. |
| D= | Skid resistance measurements. |
25. Indicate which of these statements is **true** regarding the functional evaluation of a pavement:
- | | |
|----|---|
| A= | ... is usually carried by using plate load tests. |
| B= | ... is focused on safety and comfort. |
| C= | ... can include texture measurements. |
| D= | ... is focused on safety and comfort properties. |
26. Present Serviciability Index (PSI) developed by AASHO Road Test is:



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- | | |
|----|--|
| A= | A composite index based on cracking, patching, rutting and slope variance of the wheelpaths. |
| B= | A composite index based on permeability, visibility, skid resistance and surface texture. |
| C= | A composite index based on skid resistance and rolling resistance. |
| D= | An individual index based on deflections measurements. |

27. The pavement management system used to analyse the case studies, HDM-4:

- | | |
|----|---|
| A= | Uses a probabilistic model for determining the pavement condition rating. |
| B= | Can only be applied to flexible pavements. |
| C= | Cannot be applied to pavements in cold weather regions. |
| D= | Evaluates the evolution of different distress parameters. |

28. The Diagonal referendum is not a good example of participation because:

- | | |
|----|--|
| A. | The participation was very low (only 12% voted). |
| B. | There was not a political conflict. |
| C. | There was not a real need to change the Diagonal layout. |
| D. | The neighbours were against the city Council. |

29. Considering Arnstein's Ladder, there are different levels of participation:

- | | |
|----|--|
| A. | Information is much important than consultation. |
| B. | Delegated power is in the higher levels participation. |
| C. | "Therapy" is in the medium level of the ladder but it's a significant participation. |
| D. | The real participation takes place when citizens are informed but the stakeholders are who decide. |

30. Are you willing to participate answering a short survey conducted by Prof. Antonio Aguado about the relationship between engineering and social issues?

- | | |
|----|--|
| A. | YES! I am willing to spend 15 minutes answering that survey! |
| B. | NO, I hate social issues. |
| C. | NO, I hate engineering. |
| D. | NO, engineering has nothing to do with society. |

CONGRATULATIONS!!!! YOU FINISHED THE QUIZ!!!!
NOW TAKE A BREAK AND IF YOU ANSWERED "A" TO THE LAST QUESTION,
COME BACK TO TAKE THE SHORT SURVEY!