EDITAL PPGT Nº 02/2022 - SELEÇÃO DE CANDIDATOS ÀS VAGAS DO PROGRAMA DE PÓS-GRADUAÇÃO EM TRANSPORTES PARA O CURSO DE MESTRADO ACADÊMICO COM INGRESSO NO SEGUNDO PERÍODO LETIVO DE 2022

PROVA DE MÚLTIPLA ESCOLHA

Leia com atenção as instruções abaixo:

1. A prova terá duração de **2 (duas) horas**, já incluído o tempo de preenchimento da folha de resposta.

2. Será eliminado o candidato que, durante a realização das provas, for surpreendido portando: aparelhos eletrônicos, tais como *wearable tech*, máquinas calculadoras, agendas eletrônicas e(ou) similares, telefones celulares, *smartphones*, *tablets*, *ipods*®, gravadores, *pen drive*, mp3 *player* e(ou) similar, relógio de qualquer espécie, alarmes, chaves com alarme ou com qualquer outro componente eletrônico, fones de ouvido e(ou) qualquer transmissor, gravador e(ou) receptor de dados, imagens, vídeos e mensagens etc.; óculos escuros, protetor auricular, lápis, lapiseira/grafite, marca-texto e(ou) borracha; quaisquer acessórios de chapelaria, tais como chapéu, boné, gorro etc.; qualquer recipiente ou embalagem que não seja fabricado com material transparente, tais como garrafa de água, suco, refrigerante e embalagem de alimentos (biscoitos, barras de cereais, chocolate, balas etc.); livros, dicionário, notas ou impressos que não forem expressamente permitidos.

3. Não será permitida a interferência e/ou a participação de outras pessoas, salvo em caso de candidato que tenha solicitado condição especial, em função de deficiência que impossibilite a realização da prova pelo próprio candidato.

4. Durante a realização da prova, o candidato não deverá se comunicar com outros candidatos nem se levantar sem a autorização do responsável pela aplicação da prova.

5. A folha de resposta deve ser preenchida com caneta em tinta azul ou preta.

6. O candidato somente poderá deixar a sala de prova após **30 (trinta) minutos** do início da avaliação.

7. O candidato somente poderá levar o caderno de questões no decurso dos últimos **15 (quinze) minutos** anteriores ao horário determinado para o término da prova. Caso o candidato opte por deixar a sala de prova antes deste horário, o caderno de questões deverá ser entregue juntamente com a folha de resposta.

8. A desobediência de qualquer uma das determinações constantes nas instruções acima e no edital implicará na eliminação do candidato.

Identificação do Candidato
Inscrição:
Nome completo:
Assinatura:

QUESTÃO 1

Considering Marksel *et al.* (2016) and Table 1 below, which of the following variables were statistically significant at the 10% significance level in their regression model?

Table 1: Hypotheses testing results - H1 – H7, logistic regression

Variables	Model Coeff.	Wald	Exp(β)
Nationality	-0.913*	3.387	0.401
Gender	0.946*	3.690	2.575
Age	-0.737	1.366	0.478
Frequency of cruising	1.420*	3.020	4.137
Frequency of visits to the destination	1.911*	3.145	6.761
Experiences	0.270	0.251	1.310
Time spent in the hinterland	0.100	0.363	1.105
Model			
Constant	-3.878*	5.191	0.021
χ^2	16.220*		
% correct classifications	81.3		
R^2 (Nagelkerke)	0.184		

Notes: *p < 0.10

a) Age and gender.
b) Age and nationality.
c) Age and frequency of the cruise.
d) Gender and nationality.
e) None of the items above.

QUESTÃO 2

In the paper *"Engineering condition assessment of cycling infrastructure: Cyclists' perceptions of satisfaction and comfort"* (Calvey et al., 2015), the authors measured the correlation between some variables, as described below:

"The correlation between the two sets of data for the three runs was calculated using the Pearson correlation coefficient. For the three routes presented in Fig. 3, the Pearson correlation coefficient for volunteer response and vibration logger feedback is 0.516, 0.772, and 0.390 respectively, which is significant for all three (p < 0.001 for a two-tailed test).".

According to the text, these correlations are:

a) Moderate for route three.
b) Positive strong for all three routes.
c) Negative strong for all three routes.
d) Strong for route two and weak for route three.
e) Moderate for all three routes.

QUESTÃO 3

The text below (Park and Saccomanno, 2006) covers ecologic fallacy.

"*In social science, when the unit of analysis is the group rather than the individual, the study is called an ecologic study. Inappropriate conclusions regarding the relationships at the individual level based on ecologic data is frequently referred to as ''ecologic fallacy'' (Langbein and Lichtman, 1978). Hauer (2005) described that the key concern in ecologic studies is that what seems true for the group (i.e. the aggregate) may not be true for the individual in the group. The presence of summary measures in aggregated data introduces a major source of uncertainty in ecologic inference. This problem corresponds to 'the information lost due to Aggregation' and is one of the key sources of controversy in ecologic studies (Greenland, 2001).*".

It can be concluded that ecologic fallacy corresponds to the phenomenon:

a) The results at the aggregate and disaggregate levels are the same.
b) What appears to be true for the aggregate level (group) may not be true for the disaggregated level (individual).
c) Aggregate model results are more reliable than the disaggregated model.
d) Disaggregated model results are more reliable than the aggregate model.
e) None of the above.

QUESTÃO 4

Considering Marksel *et al.* (2016) and Table 1 below, which of the following regression models was used?

Table 1: Hypotheses testing results - H1 – H7, logistic regression

Variables	Model Coeff.	Wald	Exp(β)
Nationality	-0.913*	3.387	0.401
Gender	0.946*	3.690	2.575
Age	-0.737	1.366	0.478
Frequency of cruising	1.420*	3.020	4.137
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Model			
Constant	-3.878*	5.191	0.021
χ^2	16.220*		
% correct classifications	81.3		
R^2 (Nagelkerke)	0.184		

Notes: $^{*}p < 0.10$

a) Linear regression model.
b) Spurious regression model.
c) ARIMA model.
d) Logistic regression model.
e) None of the above.

QUESTÃO 5

Considering the collision prediction models described in Costa *et al.* (2015), which of the following alternatives is FALSE?

a) The purpose of prediction models is to find connections between crashes and the main characteristics of the road environment and to quantify the predicted number of crashes.
b) Crash data consist of nonnegative integers, to which regressions models for count data are appropriate to develop crash prediction models.
c) The difference between Generalized Linear Models (GLM) and Generalized Estimating Equation Models (GEE) refers to the statistical distribution: GLMs use the negative binomial distribution and GEEs use the normal distribution.
d) Both Generalized Linear Models (GLM) and Generalized Estimating Equation Models (GEE) have been successfully used in crash prediction models.
e) In most of the published literature related to collision prediction models, the authors used variables from two sets of factors: (1) exposure factors and (2) factors associated with the road itself and with the road environment.

QUESTÃO 6

In Pitombeira Neto et al. (2017), the authors distinguish between the reconstruction and the estimation of OD matrices, as follows:

"*In the literature, a distinction is made between reconstruction and estimation, as pointed out by Spiess (1987), Lo et al. (1996), Hazelton (2001), Timms (2001) and Carvalho (2014). We define as reconstruction of the OD matrix the attempt to recover the "exact" OD matrix which produced an observed vector of link volumes in a given time period. On the other hand, we refer to estimation of the OD matrix when we intend to estimate the parameters of a statistical model which describes a "population" of OD matrices. Statistical models assume that OD matrices are random variables, with a particular realization in a given time period, from which we can compute mean OD flows, variances and higher moments which may be valuable*.".

This difference is:

a) The reconstruction method recovers the OD matrix accurately in a given period of time.
b) The reconstruction method imputes unknown values in the OD matrix.
c) The estimation method recovers the OD matrix accurately at any time period given that the time is invariable.
d) The estimation method estimates the parameters of a statistical model that describes the behavior of OD matrices.
e) None of the above.

QUESTÃO 7

The text below is from Park and Saccomanno (2006):

"*The significant difference between the above aggregate and disaggregate models is the coefficient of determination (R^2). The R^2 term reflects the ability of the expression to explain variation in V85 as obtained for the 18 test sections. The aggregate approach suggests the model explains 63.8% of the variation in the speed data, while the disaggregate approach suggests the explanation is actually 27.5%, a result which is clearly lacking statistical merit. The results obtained for the two models was not entirely unexpected since the variance in speed in the aggregate model is significantly lower than the variance estimated on a per vehicle basis in the disaggregate model, and this confirms the ''loss of information'' that results from aggregation (Greenland, 2001). The inflated R^2 value for the aggregate model is simply an illusion produced by ecologic fallacy. This suggests that we should not use the aggregate model (Model 1) to estimate the individual vehicle speed differentials along a highway section. The fact that expressions such as Model 1 are used to assign and justify the V85 values assigned to highways with different geometric features (such as, Radius, K-factor, etc.) is cause for concern*.".

According to this text, it can be said that:

a) The aggregate model has a better real fit and therefore should be used.
b) Ecologic fallacy produced a high R^2 value for the aggregate model, thus creating the impression that the model outperformed the disaggregated model.
c) The better fit for the aggregate model was not expected.
d) Disaggregated models tend to lose information due to data aggregation.
e) All of the above are correct.

QUESTÃO 8

The text below is from *"Metodologia para planejamento de um de sistema cicloviário":*

"*4.3. Etapa 3: Qualificação dos segmentos de caminhos mínimos:*
Nesta etapa, calcula-se o índice de adequação de cada segmento de via (IAS) que compõe os caminhos mínimos, que compreende: Medição e quantificação dos indicadores; Cálculo do índice de adequação (IAS). Conforme já mencionado neste trabalho, alguns indicadores foram escolhidos para compor o IAS dos segmentos. A seguir, apresenta-se a forma de quantificação destes indicadores para cálculo do IAS.
4.3.1. Quantificação dos indicadores
Os indicadores propostos foram: largura efetiva da via, estacionamento na via, volume médio de tráfego, velocidade máxima na via e aclive. Visando obter um índice de qualificação numa escala de 0 a 3, já utilizado por Monteiro (2011), propõe-se aplicar um processo de normalização análogo ao proposto por Eastman & Jiang (1996), em que o valor resultante do indicador esteja entre 0 e 3. Nesta escala, se o valor apurado para o segmento estiver entre 0 e 1, quanto ao indicador ou índice, é ruim. Acima de 1 até 2, o segmento apresenta uma situação boa. Quando o resultado apresentar um valor superior a 2, tem-se uma situação muito boa.".

In "*Step 3: Qualification of minimum path segments*", which indicators are proposed?

a) Road parking, average traffic volume, maximum speed, and uphill.
b) Average traffic volume, maximum speed, and uphill.
c) Effective road width, road parking, and average traffic volume.
d) Effective road width, road parking, average traffic volume, maximum speed, and uphill.
e) None of the above.

QUESTÃO 9

The text below is from the book *"Gestão logística do transporte de cargas"*:

"*São consideradas atividades principais dessa cadeia o transporte, a manutenção de estoques processamento de pedidos, e como atividades secundárias a armazenagem, o manuseio de materiais, a embalagem de proteção, a obtenção, a programação de produtos e a manutenção de informações. Esse processo é de suma importância para a economia e para as empresas que tem como objetivo ofertar níveis de serviços eficientes e eficazes.*".

Which one the following are NOT considered logistic activities:

a) Transportation and stock maintenance.
b) Storage and processing orders.
c) Production and level of logistic services.

d) Inventory maintenance and protective packing.
e) None of the above.

QUESTÃO 10
From Table 1 below (Rode and Floater, 2014), it can be said that:

Table 1
Share of green transport modes and carbon emissions per capita per cities

Cities	Share (%) of public transport, walking and cycling	CO_2 emissions (kg per capita per year)
Hong Kong	84%	378kg
Tokyo	68%	818kg
Berlin	61%	774kg
Paris	54%	950kg
London	50%	1,050kg
Madrid	49%	1,050kg
Montreal	26%	1,930kg
Houston	5%	5,690kg

Source: Kenworthy and Laube 2001

a) Montreal has greater CO2 emissions (per capita) than Paris and has a greater share of public transport, walking and cycling.
b) Paris has the lowest CO2 emissions (per capita) and the greatest share of public transport, walking and cycling.
c) Houston has greater CO2 emissions (per capita) than Paris and has a greater share of public transport, walking and cycling.
d) London has the highest CO2 emissions (per capita) and the greatest share of public transport, walking and cycling.
e) Honk Kong has the lowest CO2 emissions (per capita) and the greatest share of public transport, walking and cycling.

QUESTÃO 11
The extract below is from the paper "*Transport Futures: Thinking the Unthinkable.*"

"*It has also proved very difficult to convey the message about the immediacy and the need for substantial actions. Both the timing and scale of the climate change imperative has been underestimated, and there is still a strong belief in technological solutions to what are essentially social problems. Scenarios are successful in getting people to think about the longer-term issues and the consequences of taking (or not taking) actions, and many of the key actors are prepared to take an active role in thinking about the 'desirable' future city. Understanding the city (the 3'V's in Section 4) in 2030 or 2050 is an important step, but the pathways together with the nature and scale of actions needed are more problematical, particularly when important decisions need to be made now. Transport investment has to be much more supportive of*

city design than it has in the recent past.".

Therefore, it can be said about scenarios:

a) They are important for analyzing recent implemented measures to solve transport problems.
b) They are supporting techniques to be used only in emergency situations.
c) They are essential to assist in formulating public policies as they analyze the future transportation perspectives.
d) They are essential for assessing the success of implemented measures.
e) None of the above.

QUESTÃO 12

The text below is from the paper *"Desenho automático de mapas octalineares de rede de transporte público utilizando algoritmo genético"*:

"*Uma das etapas de maior importância no desenvolvimento de um algoritmo genético é escolher como codificar o cromossomo de cada indivíduo (Melanie, 1999). Os indivíduos de uma população são a unidade fundamental de um algoritmo genético. Eles são representados por cromossomos e identificam as possíveis soluções do problema. Neste estudo, um indivíduo é uma linha no formato octalinear. Devido à natureza geométrica do problema, a maneira mais intuitiva de codificar um cromossomo é utilizar as coordenadas cartesianas dos pontos de parada que compõem a linha. Porém, para facilitar as outras operações envolvidas no algoritmo genético, ao invés de utilizar as coordenadas cartesianas dos pontos, utilizou-se da coordenada polar relativa.*".

Based on this text, the authors used which kind of coordinates:

a) Asymmetric bipolar representations.
b) Relative Cartesian coordinates.
c) UTM coordinates.
d) Relative polar coordinates.
e) None of the above.

QUESTÃO 13

The text below is from the manuscript "*Engineering condition assessment of cycling infrastructure: Cyclists' perceptions of satisfaction and comfort*" (Calvey et al., 2015):

"*The questionnaire surveys had a dual purpose. Firstly, to find which issues cyclists perceive to be the most important when they are using a cycling path. Secondly, to identify, through factor analysis, which (if any) latent variables satisfaction is associated with. The questionnaire asked participants to categorize their cycling ability and how often they cycled. Volunteers were identified and selected through an email and university campus poster campaign. The questionnaire shows respondents twenty-four factors and asks them on a scale of one to five 'When cycling on an off-road cycle path, how important are the following factors to you?'. Generally, the questions cover most variables that may influence people's perception of satisfaction but focus on infrastructure. The factors were selected following the identification of issues raised in historical literature. The Likert rating scale was, 5 – extremely important; 4 – very important; 3 – somewhat important; 2- not very important; and 1 – not at all important. A diverse range of respondents (75) completed the questionnaire from varying backgrounds and cycling abilities.*".

The Likert rating scale, composed by 5 levels, is used to assess the quality of the infrastructure of off-road cycle paths. According to the authors, the order of these 5 levels is:

a) 1 - extremely important; 2 - very important; 3 – somewhat important; 4 - not very important; 5 – not at all important.
b) 5 - very important; 4 - important; 3 - neutral; 2 - not very important; 1 – not at all important.
c) 1 - very important; 2 - important; 3 - neutral; 4 - not very important; 5 – not at all important.
d) 5 - terrible; 4 - bad; 3 - neutral; 2 - good; 1 - great.
e) 5 - extremely important; 4 - very important; 3 - somewhat important; 2 - not very important; 1 – not at all important.

QUESTÃO 14

The text below is from the manuscript *"Statistical models for the estimation of the origin-destination matrix from traffic counts"*:

"*In the following subsections, we present statistical models whose parameters are estimated by maximum likelihood (section 3.1), the method of moments (section 3.2) and Bayesian inference (section 3.3). The models in these sections assume that the distribution probability of the OD matrices does not vary in time, and are thus termed static models. In section 3.4 we describe dynamic models, which allow the probability distribution of OD matrices to vary over time.*".

The authors describe statistical models whose parameters are estimated at least by:

a) Maximum likelihood and generalized estimating equation.
b) Generalized method of moments and Bayesian inference.
c) Maximum likelihood and the method of moments.
d) Ordinary least squares and maximum likelihood.
e) None of the above.

QUESTÃO 15

The text below is from the manuscript *"Desenho automático de mapas octalineares de rede de transporte público utilizando algoritmo genético"*:

"*As semelhanças permitiram estabelecer certas regras, listadas a seguir, as quais representam as convenções e características estéticas desejáveis e que são importantes para o desenvolvimento do trabalho: Regra 1: Manter linhas e paradas incorporadas no mapa evitando causar alguma confusão mental na percepção dos usuários; Regra 2: Restringir todos os segmentos às quatro orientações octalineares, horizontal, vertical, as diagonais de 45° e 135°. Apesar de restringir o grau de cada vértice a oito, esta regra mantém o mapa claro e legível; Regra 3: Assegurar-se que as paradas adjacentes e não-adjacentes mantenham uma distância mínima. Isso também mantém a legibilidade do mapa; Regra 4: Evitar ao máximo mudanças de direção no desenho de uma linha, especialmente em paradas que representam as interseções. Se isso não puder ser evitado, dê preferência a ângulos obtusos ao invés de ângulos agudos. Esta regra ajuda os passageiros a acompanharem a linha de transporte no mapa com os olhos; Regra 5: Preservar ao máximo a posição relativa dos pontos de paradas e interesse. Apesar das paradas não representarem obrigatoriamente a sua posição geográfica real, devem manter um posicionamento coerente no mapa. Uma parada localizada ao norte de outras paradas não deve ser desenhada no mapa parecendo estar ao sul delas. Isso evita os passageiros de se confundirem quando comparam o mapa da rede com um mapa geográfico; Regra 6: Manter o valor da soma do comprimento de todas as arestas pequeno. Essa regra, junto com a Regra 3, mantém a distância entre paradas adjacentes uniformes. Como consequência, as regiões mais densas ganham espaço de regiões mais vazias; Regra 7: Cada linha deve ser representada por uma cor única, e cada aresta deve possuir a cor referente a linha a qual pertence. Se uma aresta pertence a k linhas, então k cópias da aresta devem ser desenhadas (logo o*

grafo é multiaresta). A ordem dessas k arestas deve manter consistência com a ordem de suas arestas adjacentes. As cores ajudam os usuários a acompanharem uma linha com os olhos; Regra 8: Rotular as paradas com os seus nomes e evitar que um rótulo não se sobreponha ao outro ou mesmo outras partes do mapa. Preferencialmente, todos os rótulos entre duas interseções devem ser escritos em um mesmo lado da linha.".

How many rules represent both the conventions and the aesthetic and desirable characteristics to produce an octalinear map?

a) 8 rules.
b) 7 rules.
c) 4 rules.
d) 12 rules.
e) None of the above.

QUESTÃO 16

Table 6 (Cardoso and Campos, 2016) shows the Segment Adequacy Index. According to this table, the index varies in the range:

Tabela 6. Classificação dos trechos analisados

Índice de Adequação do Trecho	Descrição da classificação do trecho analisado
0,00 a 1,00	Segmento ruim cuja utilização dentro do sistema cicloviário não é aconselhada. Trecho necessita de grandes intervenções e modificações.
1,01 a 2,00	Segmento bom cujo uso dentro do sistema cicloviário é aconselhado, podendo ser realizadas intervenções nos indicadores que tiveram uma avaliação baixa.
2,01 a 3,00	Segmento ótimo cuja utilização dentro do sistema cicloviário é plenamente aconselhada. Precisa de pequeníssimas ou nenhuma intervenção nos indicadores que tiveram um menor resultado

a) 0.0 to 4.0.
b) 0.0 to 1.0.
c) 2.01 to 3.0.
d) 1.01 to 2.0.
e) 0.0 to 3.0.

QUESTÃO 17

The text below is from the manuscript *"Desenho automático de mapas octalineares de rede de transporte público utilizando algoritmo genético"*:

"*O mapa octalinear, conhecido também como "mapa do metrô", é uma ferramenta informativa dos sistemas de transportes públicos. Entretanto, na atualidade, sua produção é feita manualmente. Assim, o tempo utilizado e os custos de produção são altos, principalmente no caso de redes de transporte por ônibus devido à sua complexidade e à dinâmica de suas mudanças. Nesse contexto, o objetivo deste trabalho é desenvolver uma solução para o desenho automático desse tipo de mapa utilizando algoritmos para grafos e algoritmo genético. Dados da rede pública de transporte de Brasília foram adotados para testar a técnica desenvolvida.*".

Therefore, an octalinear map is:

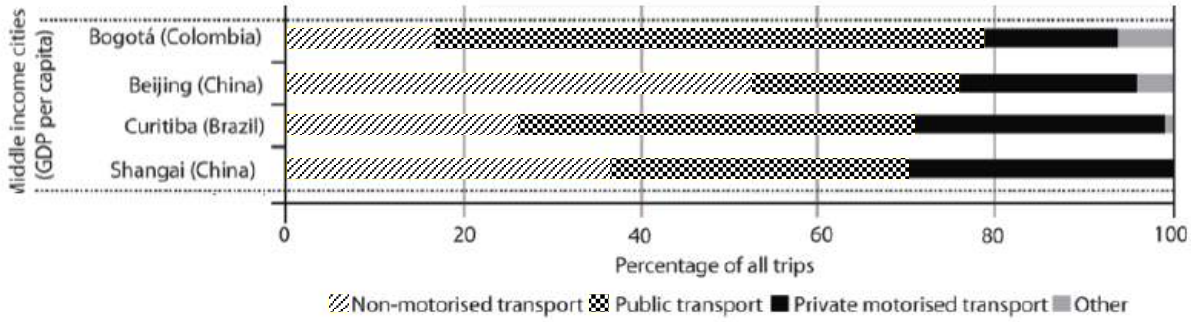
a) A technique used to represent public transit networks.
b) A 3D simplification of the transportation network, where unnecessary information is omitted.

c) A tool that assists users of metro-rail systems to move with efficiency and quality.
d) A technique of straightening curves in all four octalinear orientations (i.e., vertical, horizontal, and the two diagonals).
e) None of the above.

QUESTÃO 18

Rode and Floater (2014) compared the Mobility Behaviour for several cities, as shown in Fig. 12 below. For the city of Curitiba (Brazil), it can be said that:

Figure 12
Modal shares of selected cities



Source: LSE Cities 2014 adjusted from UN Habitat 2013

a) The sum of Public and Non-motorised Trips is lower than Private motorized transport.
b) The sum of Public and Non-motorised Trips is greater than Private motorized transport.
c) The sum of Public and Non-motorised Trips is the same as Private motorized transport.
d) Private motorized transport trips are greater than the other modes' share.
e) The sum of Private motorized transport and Non-motorised Trips is lower than the Public transport share.

QUESTÃO 19

The text below is from the manuscript "*Speed factors on two-lane rural highways in free-flow conditions*" and it covers the relationship between the number of crashes and vehicles' speed:

"*The relationship between speed and crashes has been studied with no irrefutable link. There is ongoing discussion as to which factor - the mean speed or the speed dispersion - has an impact on safety. Either opinion is defendable. An increase in mean speed increases the crash severity, while an increase in speed variability increases the frequency of interactions between vehicles. Studies have shown that an increase in the deviation between a motorist's speed and the average speed of traffic is related to a greater chance of involvement in a crash. Garber and Gadiraju (3) found that crash rates from different highway types increased with an increase in the speed variance and that an increase in mean speeds is not necessarily related to an increase in accident rates. They also found that speeds increased with better geometric conditions, regardless of the speed limit. Collins et al. (4) found low speed dispersion on horizontal curves with radii values of less than 328 ft (100 m), and that as the radii increased, the range of speed dispersion also increased. The speed dispersion decreased with increasing pavement width in segments where the speed limit exceeded the design speed or where design inconsistencies were present.*".

The authors discuss which factor – mean speed or speed dispersion– has an impact on safety. This

relationship would be:

a) An increase in mean speed and speed dispersion increases crash severity.
b) An increase in speed dispersion does not influence crash occurrence.
c) An increase in mean speed only increases the number of crashes, but not crash severity.
d) An increase in speed dispersion increases the frequency of interaction between vehicles, and an increase in mean speed increases crash severity.
e) An increase in mean speed increases the frequency of interaction between vehicles, and an increase in speed dispersion increases crash severity.

QUESTÃO 20

Following the text below (Costa *et al.,* 2015), the development of crash prediction models requires special attention to make sure that the results and their interpretations are accurate, EXCEPT:

"*The development of the prediction models has distinct purposes, such as: to research the connections between the crashes and the main characteristics of the road environment (Fitzpatrick et al.,2008); and to elaborate a quantitative prediction of road crashes (Vogt and Bared, 1998). It requires special attention in order to make sure that the results and their interpretations are accurate, namely regarding: (i) the specification of functional relations; (ii) the choice of explanatory variables and the type of model; (iii) the interpretation of the found relations causes; (iv) the fit assessment; (v) the performance assessment of the estimation model; and (vi) the assessment of potential causes of errors.*".

a) The specification of functional relations.
b) The choice of explanatory variables and the type of model.
c) The geometric consistency of the road.
d) The interpretation of the found relations causes.
e) The performance assessment of the estimation model.

QUESTÃO 21

The text below is from the manuscript "*Transport Futures: Thinking the Unthinkable"*:

"*Forecasting approaches: These are most similar to conventional forecasting, but take a longer term perspective of the future that investigates both probable futures and possible futures. They are most useful for situations where substantial external change is not expected and where there is some expectation that current trends will continue into the future. This means that the time horizon is likely to be short, up to about 10 years. These can also be viewed as projective scenarios and have been associated with the 'American Tradition', where within a relatively turbulent environment a cautious 'no regrets' strategy is taken. The central actors have limited powers, the actions of many players need to be considered (Becker, 1997, p. 88) and there are many competing and vocal interest groups.*
Exploratory approaches: These have been the most widely used form of scenarios and they typically take two dimensions of change within which four scenarios are constructed, usually within a two by two matrix. Here, there needs to be a clear focus in the scenarios and the futures are likely to be both possible and plausible, but the main aim is to be challenging and to trigger new thinking. They tend to be trend breaking and the futures described follow different logics, so that varied futures can be shaped.
Backcasting approaches: These approaches have been used to look at preferred futures over the longer term and are again designed to be trend breaking in their thinking. They are often combined with exploratory approaches, as they take a more normative view of desirable futures, and then examine the means by which those futures can be reached. This is the central part of the backcasting process, namely the pathway from where we might want to be back to the present. This includes timelines for critical decisions in terms of implementation of change and other key issues. This could be described as the 'Swedish

Tradition' as this is where most development and use of the approach has taken place. Much greater emphasis is put on visioning the future and the use of expert and other groups so that discussion, feedback and participation all take place.".

The statements below summarize the types of scenarios described in the paper:

I. Forecasting approaches are more useful for situations where substantial external change is not expected and where current trends are expected to continue into the future.
II. Exploratory approaches have been widely used and they typically take two dimensions of change within which four scenarios are constructed, usually within a two by two matrix.
III. Backcasting approaches are often combined with exploratory approaches as they take a normative view of desirable futures and they examine the means by which those futures can be reached.

In relation to the statements above:

a) All statements are correct.
b) Only statement I is correct.
c) Only statements II and III are correct.
d) Only statements I and II are correct.
e) None of the statements is correct.

QUESTÃO 22

The text below is from Pitombeira Neto *et al.* (2017):

"*In transportation planning, one of the first steps is to estimate travel demand. Generally, demand is measured in terms of trip flows between zones in a geographic region. The final product of the estimation process is a so-called origin-destination matrix (OD matrix, for short), whose entries correspond to the number of trips between pairs of zones in a reference time period. Traditionally, OD matrices have been estimated through direct methods, such as home-based surveys, road-side interviews and license plate automatic recognition. These methods collect sample data on the number of trips performed daily, their origins and their destinations. Such data can be compiled and several statistics may be computed, such as the mean, standard deviation and confidence intervals. However, these direct methods require large samples to achieve a target statistical significance, which may be technically or economically infeasible (Cascetta, 2009).*".

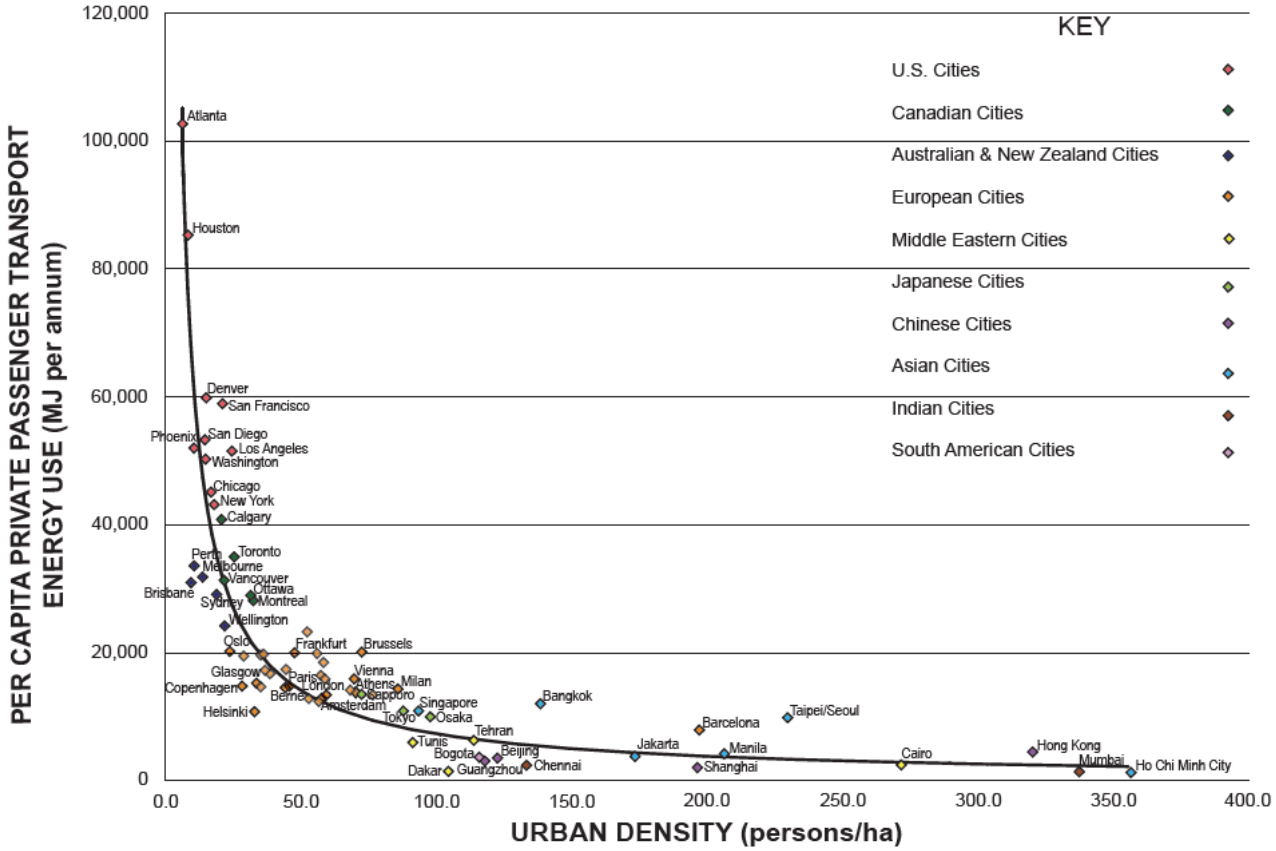
According to the authors, OD matrices have been estimated through direct methods, such as:

a) Home-based surveys.
b) Road-side interviews.
c) License plate automatic recognition.
d) All of the above.
e) None of the above.

QUESTÃO 23

Fig. 3 (Rode and Floater, 2014) shows a correlation between population density and annual gasoline consumption.

Figure 3
Population density and transport energy use per capita for selected cities



Source: Newman and Kenworthy 2015

That correlation is:

a) Perfect Positive.
b) Zero Correlation.
c) Strong Positive.
d) Weak.
e) Strong Negative.

QUESTÃO 24
The text below is from the book *"Gestão logística do transporte de cargas"*:

"*Baseando-se principalmente em Ortúzar e Willunsen (1994) é possível identificar algumas variáveis que podem influenciar o estabelecimento do preço do frete das quais se destacam:*
Distância percorrida; custos operacionais; possibilidade de carga de retorno; carga e descarga; sazonalidade da demanda por transporte; especificidade da carga transportada e do veículo utilizado; perdas e avarias; vias utilizadas; pedágios e fiscalização; prazo de entrega; aspectos geográficos.".

Which of the following factors is NOT considered to determine the freight rate?

a) Distance traveled.
b) Region climate.
c) Possibility of return load.
d) Delivery time.
e) Geographical aspects.

QUESTÃO 25

The Figure is from the paper *"Formação de Preços em Empresa de Transporte Rodoviário de Cargas":*

Quadro 1: Elementos de precificação do transporte

Elementos	Descrição dos elementos
Distância	A distância pode influenciar de forma variável ou invariável, de maneira decrescente, através de taxas proporcionais ou por taxa única.
Volume, tipo de produto e especificidade da carga do veículo	O tamanho do embarque influencia na composição da taxa cobrada. O volume transportado é diretamente proporcional ao rendimento do transportador.
Prazo de entrega	Os espaços disponíveis no carregamento vão sendo preenchidos pela carga a ser transportada, de acordo com uma composição definida para o percurso da origem ao destino. Dessa forma, o atraso na data de entrega influencia diretamente no cômputo do custo do serviço prestado.
Demanda e sazonalidade da demanda	A demanda pode determinar uma taxa de cobrança que não tem relação com os custos do serviço.
Roteiro	A taxa dependerá da quantidade de paradas, de embarques e pela localização do último ponto do roteiro.
Interligação	Quando o transportador não atende a todas as regiões, precisa-se recorrer ao serviço de outro transportador.
Taxas (importação, exportação e frete-valor)	São estabelecidas as taxas especiais nos embarques internos que se originam ou destina-se a pontos no exterior.

Fonte: adaptado de Ballou (2001).

Which of the following elements listed by the authors interfere in the freight rate?

a) Distance and fuel price.
b) Fuel price and delivery time.
c) Type of vehicle load and distance.
d) Delivery time and weather conditions.
e) Weather conditions and type of vehicle load.

QUESTÃO 26

Considering the paper "*Engineering condition assessment of cycling infrastructure: Cyclists' perceptions of satisfaction and comfort*", five latent variables were identified, according to the following text:

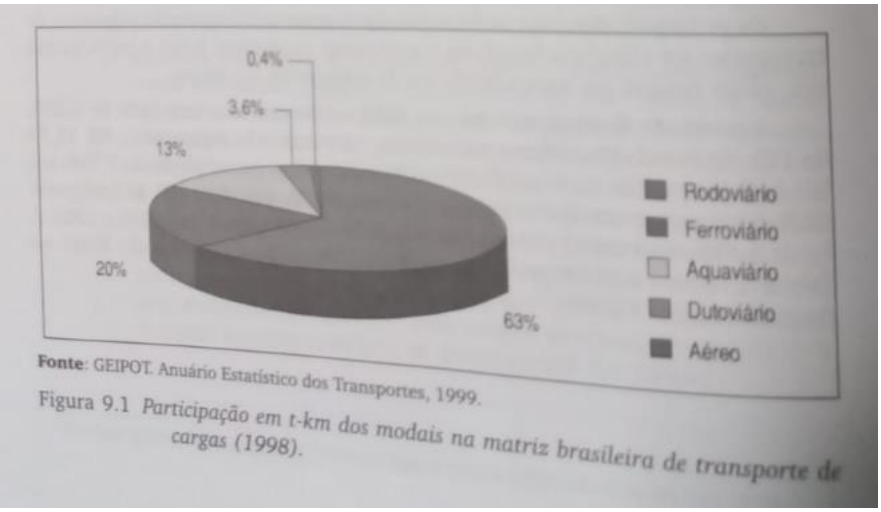
"From the groupings of the five latent variables patterns have emerged. The latent variables can be described as: Maintenance - relating to issues regarding the general maintenance and upkeep of the network; Environment - relating to issues regarding the natural and urban environment; Network - relating to the network as a whole and the physical layout of the city; Design - relating to the physical design of a path and the features therein; Personal satisfaction - relating to subjective cyclist issues; The research intended to define satisfaction terms for cyclists. It is a subjective issue and has been found to link with other subjective issues.".

These latent variables would be:

a) Environment, Personal Satisfaction, Network, Maintenance, Design.
b) Network, Design, Personal Satisfaction, Route, Pavement Comfort.
c) Route, Pavement Comfort, Maintenance, Environment, Network.
d) Design, Maintenance, Environment, Network, Pavement Comfort.
e) Design, Pavement Quality, Maintenance, Environment, Network.

QUESTÃO 27

Figure 9 from the book *"Gestão logística do transporte de cargas"* shows freight transportation modes used in Brazil.



Fonte: GEIPOT. Anuário Estatístico dos Transportes, 1999.

Figura 9.1 *Participação em t-km dos modais na matriz brasileira de transporte de cargas (1998).*

Select the alternative that is NOT flagged in the book as a transportation mode used in Brazil.

a) Waterway.
b) Road.
c) Air transportation.
d) Ocean.
e) Railway.

QUESTÃO 28

Table 1 from the manuscript "*Transport Futures: Thinking the Unthinkable*" compares the Forecasting and Backcasting approaches.

Table 1
Comparing forecasting and backcasting.

Measure	*Forecasting*	*Backcasting*
Philosophy	Justification as the context Causality determinism	Discovery as the context Causality and intentions
Perspective	Dominant trends Likely futures Possible marginal adjustments Focus on adapting to trends	Societal problem in need of a solution Desirable futures Scope of human choice Strategic decisions Retain freedom of action
Approach	Extrapolate trends into future Sensitivity analysis	Define interesting futures Analyse consequences and conditions for these futures to materialise
Methods and techniques	Various econometric models Mathematical algorithms Primarily quantitative	Partial and conditional extrapolations Normative models, system dynamic models, Delphi methods, expert judgement Quantitative and qualitative – mixed methods

Based on Geurs and Van Wee, 2000, 2004; and adapted from Dreborg, 1996. See also Banister, Hickman and Stead (2008) and Åkerman and Höjer (2006).

Based on this comparison, evaluate the statements:

I. The Forecasting approach and the Backcasting approach have several differences. For example, the former analyzes possible futures, while the second analyzes desirable futures;
II. The Backcasting approach extrapolates trends for the future;
III. The Forecasting approach focuses on adapting trends, and the Backcasting approach focuses on

strategic decisions.

With respect to the previous statements:

a) All statements are correct.
b) Statements I and III are correct.
c) Statements I and II are correct.
d) All statements are wrong.
e) Only statement II is correct.

QUESTÃO 29

Considering the text from Marksel *et al.* (2016), a cruise involves basically four aspects that are inherent of the tourism industry. What are they?

"*Cruising, as addressed in this article, refers to sailing across oceans or sailing along the coasts, following certain travel plans or itineraries (Jankomin et al., 2001). Cruise ship represents all four aspects of the tourism industry: transport, accommodation, attractions and tour desk (CLIA, 2010). As an industry, cruising began to develop in the 70s' of the 20th century. In recent years, the industry was facing exceptional dynamic growth led by North American market demand. Nowadays, the largest cruise industry markets remain North America and Central America, followed by Europe, especially the Mediterranean region, Asia-Pacific and the rest of the world. Slovenia became cruise tourism destination in 2005, when the first cruise ships (18) disembarked at the port of Koper (STO, 2007). The number of cruise passengers in Koper is increasing constantly over the last 10 years and it reached 56.872 in 2015 (Luka Koper, 2016).*".

a) Transport, tour desk, business, and accommodation.
b) Transport, attractions, entertainment, and accommodation.
c) Tour desk, accommodation, attractions, and transport.
d) Attractions, accommodation, transport, and gastronomy.
e) None of the above.

QUESTÃO 30

The text below is from the manuscript "*Transport Futures: Thinking the Unthinkable"*:

"*1. The scenario analysis process works well if it is explicitly participatory, and this should include stakeholders as well as experts. In the past, experts have been the main source of guidance. The participation should occur at many different stages in the process and should include a wide range of views so that a diversity of approaches can be obtained, including some of the more radical options. 2. The expectations from these participants must be realistic, within the appropriate time frames, but they must also allow for the opportunity to break out of conventional thinking. A question here is whether it is better to achieve more modest objectives rather than fail against more ambitious ones, but certainly the strategic policy issues we face demand innovative responses. 3. The visions usually number between 2 and 4, but many studies end up with two more extreme alternatives and some sort of compromise in between. All scenarios need to be distinctive and represent plausible futures, but of course they are unlikely to result in blueprints for any particular future. 4. The label attached to each scenario is important as it needs to be memorable, and perhaps inspirational, and the details of each scenario should also be linked to reality and made relevant and resonant. 5. As part of each scenario, there should be clear milestones and achievable targets so that progress in the direction anticipated can be monitored, and changes made if necessary. 6. Scenarios should not be rigid and inflexible, but they should be adaptable to external and other changes such as innovations (Eriksson and Weber, 2006). 7. There are many different approaches to scenario building and its methodological flexibility is a real strength; many societal problems can be addressed by*

combining suitable elements of the basic approaches outlined here.".

Based on this text, it can be said about the scenarios:

I. Scenarios should be analyzed in terms of participation and involve not only experts in the subject. This should provide different views on the impacts of these scenarios, even the most radical ones.
II. Scenarios should be analyzed only by specialists, and this analysis should be based on technical criteria.
III. Scenarios should be flexible in terms of adapting to innovations and changes.
IV. Scenarios should have well-defined goals, which are possible to be achieved, so that they can be monitored and adjusted if necessary.

With respect to the previous statements:

a) The four statements are correct.
b) Statements II and IV are correct.
c) Statements I and III are correct.
d) All statements are wrong.
e) Only one statement is correct.

FOLHA DE RESPOSTA					
Questão 1	○ A	○ B	○ C	● D	○ E
Questão 2	● A	○ B	○ C	○ D	○ E
Questão 3	○ A	● B	○ C	○ D	○ E
Questão 4	○ A	○ B	○ C	○ D	● E
Questão 5	○ A	○ B	● C	○ D	○ E
Questão 6	● A	○ B	○ C	○ D	○ E
Questão 7	○ A	● B	○ C	○ D	○ E
Questão 8	○ A	○ B	○ C	● D	○ E
Questão 9	○ A	○ B	● C	○ D	○ E
Questão 10	○ A	○ B	○ C	○ D	● E
Questão 11	○ A	○ B	● C	○ D	○ E
Questão 12	○ A	○ B	○ C	● D	○ E
Questão 13	○ A	○ B	○ C	○ D	● E
Questão 14	○ A	○ B	● C	○ D	○ E
Questão 15	● A	○ B	○ C	○ D	○ E
Questão 16	○ A	○ B	○ C	○ D	● E
Questão 17	● A	○ B	○ C	○ D	○ E
Questão 18	○ A	● B	○ C	○ D	○ E
Questão 19	○ A	○ B	○ C	● D	○ E
Questão 20	○ A	○ B	● C	○ D	○ E
Questão 21	● A	○ B	○ C	○ D	○ E
Questão 22	○ A	○ B	○ C	● D	○ E
Questão 23	○ A	○ B	○ C	○ D	● E
Questão 24	○ A	● B	○ C	○ D	○ E
Questão 25	○ A	○ B	● C	○ D	○ E
Questão 26	● A	○ B	○ C	○ D	○ E
Questão 27	○ A	○ B	○ C	● D	○ E
Questão 28	○ A	● B	○ C	○ D	○ E
Questão 29	○ A	○ B	● C	○ D	○ E
Questão 30	○ A	○ B	● C	○ D	○ E

Identificação do Candidato	Nº. de acertos	Nota:
Inscrição:		
Nome completo:		
Assinatura:		