namibia university
OF SCIENCE AND TECHNOLOGY

FACULTY OF COMMERCE, HUMAN SCIENCES AND EDUCATION

DEPARTMENT OF MARKETING, LOGISTICS AND SPORT MANAGEMENT

QUALIFICATION: BACHELOR OF TRANSPORT MANAGEMENT	
QUALIFICATION CODE: 07BTRA	**LEVEL:** 6
COURSE: INTELLIGENT TRANSPORT SYSTEMS	**COURSE CODE:** ITT611S
SESSION: JUNE 2024	**PAPER:** THEORY
DURATION: 3 HOURS	**MARKS:** 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
EXAMINERS	Dr. Smart Dumba Ms. Martha Polla Mr. Bony Chicken
MODERATOR:	Dr. Gloria Tshoopara

INSTRUCTIONS
1. Answer **ALL** questions from **Sections A and B**, and any **three (3) questions** from **Section C**
2. Number your answers clearly.
3. The number of marks per each question or part question is given in square brackets [ ]. These should guide you in the content of your answers.
4. This is a **Closed Book Examination.** No books or notes may be consulted during the exam.

THIS QUESTION PAPER CONSISTS OF 5 PAGES (Including this front page)

SECTION A: ANSWER ALL QUESTIONS

Question 1: State whether the following statements are TRUE OR FALSE

1.1 ITS resemble of an interplay between travellers, data centres, roadside infrastructure, and vehicles. [2 marks]

1.2 An ITS architecture ensures system compatibility, shrinkability, interoperability and standardability. [2 marks]

1.3 Intelligent Transport Systems are aimed at improving on safety, maximise on efficiency, environmental preservation and minimize cost. [2 marks]

1.4 Advanced Traveller Information Systems provide travellers with information regarding road conditions and whether conditions only. [2 marks]

1.5 Microwave radar, pneumatic road tubes, piezoelectric sensors and magnetic loops are examples of intrusive data collection tools. [2 marks]

1.6 I.T.S standards are design standards that specify specific products or designs to use. [2 marks]

1.7 The transportation layer of an ITS architecture is superior to the information and institutional layer [2 marks]

1.8 A dead-reckoning system is used to provide back-up vehicle location information to a GPS system, when the GPS signal is unavailable [2 marks]

1.9 Integrated Vehicle Health Monitoring Systems, (IVHMS) facilitates collection and analysis of data concerning operating parameters and damage information of vehicles in static-time. [2 marks]

1.10 Electronic toll collection, congestion pricing and variable parking fees are all examples of Advanced Traffic Management Systems, (ATMS) [2 marks]

Sub Total 20 marks

SECTION B: ANSWER ALL QUESTIONS

Question 2: Select the correct answer, each correct answer carries 2 marks

2.1 Select the **ODD one** out on the following wireless access technologies   [2 marks]

    A. Durability
    B. Total Cost of Ownership
    C. None of these is odd
    D. Bandwidth
    E. Accessibility

2.2 Select the **ODD one** out   [2 marks]

    A. Advanced Traveller Information Systems, (ATIS)
    B. Vehicle to Infrastructure Integration (V2I) and Vehicle to Vehicle (V2V) Integration.
    C. ITS enabled Transportation Marginal Costing Systems, (TMSC)
    D. Advanced Traffic Management Systems, (ATMS)
    E. None of these is ODD

2.3 Data generated by automated passenger counters is utilized for the following, **except**
          [2 marks]
    A. Load planning
    B. Vehicle scheduling
    C. Crew scheduling
    D. Demand forecasting
    E. All these are utilised

2.4 Which of the following **does NOT** represent an advantage of Global Positioning Systems?   [2 marks]

    A. Accurate monitoring of service delivery
    B. Provision of real time data
    C. Accurate object position
    D. Theft recovery
    E. All these are correct

2.5 The following are Travel Demand Management measures (TDM), **except**   [2 marks]

    A. Signal timing optimization
    B. Tele-working
    C. Land use management
    D. Staggered working hours
    E. All of the above are TDM measures

2.6 Which of the following pair of ITS systems represents a **weak** relationship?   [2 marks]

    A. Emergency Management Systems and Advanced Traffic Management Systems
    B. Advanced Traveller Information Systems and Commercial Vehicle Operations
    C. Advanced Public Transport Systems and Information Management Systems
    D. Advanced Public Transport Systems and Advanced Traveller Information Systems
    E. None of these represent a weak relationship

2.7 The following are key benefits of I.T.S in Commercial Vehicle Operations, **except**

[2 marks]

    A. Improved passenger safety
    B. Efficient pedestrian flow
    C. Helps passengers with route choice
    D. Improved passenger convenience
    E. None of these

2.8 Which of these is **NOT part** of the three (3) 'layers' of I.T.S?   [2 marks]

    A. Communication layer
    B. All these are correct
    C. Institutional layer
    D. Transportation layer
    E. Geometric layer

2.9 The following are goals of Advanced Traffic Management Systems, (ATMS), **except**

[2 marks]

    A. Improved safety
    B. Increase operational efficiencies
    C. Increase capacity
    D. Increased axle loading
    E. All these are goals of ATMS

2.10 Multiple field devices will be required for traffic surveillance and motorist information dissemination, and some of the common pieces of equipment are as follows, **except**   [2 marks]

    A. Acoustic detectors
    B. Infrared and microwave
    C. Inductive loop detectors
    D. Gantry technology
    E. All these are correct

Sub total 20 marks

SECTION C: ANSWER ANY THREE (3) QUESTIONS, EACH QUESTION CARRIES 20 MARKS

Question 3

    i.   Differentiate between I.T.S architecture and I.T.S standards   [6 marks]

    ii.   Explain the benefits of I.T.S standards   [6 marks]

    iii.   Identify and discuss key stakeholders to be consulted before I.T.S could be introduced in Windhoek or any other city or town in Namibia.

    [8 marks]

Question 4

Identify key fleet management challenges faced by a typical big commercial freight company and explain how Intelligent Transport Systems in Commercial Vehicle Operations may help deal with these challenges.   [20 marks]

Question 5

    a) Explain the goals of Advanced Traveller Information Systems (ATIS)   [5 marks]

    b) Discuss how the following I.T.S platforms work in providing Advanced Traveller Information
        i.   Variable Messaging Signs (on trip or *en route*) (VMS)   [5 marks]
        ii.   Highway Advisory Radio (HAR)   [5 marks]
        iii.   Car Display System (CDS)   [5 marks]

Question 6

The City of Windhoek Bus Company and the taxi operators in Namibia have been urged to adopt Advanced Public Transport Systems, (APTS) to improve on their performance. Identify the type of APTS that these two can adopt clearly describing the problems to be addressed and how the identified APTS would help alleviate such problems and the possible challenges of implementing the identified APTS.   [20 marks]

Question 7

    i.   Evaluate the applicability of one (1) intrusive and one (1) non-intrusive traffic data collection tools   [10 marks]

    ii.   Examine the limits of sensor technologies in collecting traffic flow data in developing countries such as Namibia   [10 marks]

Sub total 60 marks

TOTAL 100 MARKS
END OF QUESTION PAPER