PROGRAM	:	BACHELOR DEGREE *Urban and Regional Planning*
SUBJECT	:	CIVIL ENGINEERING FOR PLANNING
CODE	:	CIPTRB1
DATE	:	NOVEMBER EXAMINATION 2019 16/11/19
DURATION	:	3 HOURS
WEIGHT	:	50: 50
TOTAL MARKS	:	100

ASSESSOR	:	MR. J. OKAFOR
MODERATOR	:	MR. E. MAKONI
NUMBER OF PAGES	:	4 PAGES

INSTRUCTIONS

1. THIS IS NOT AN OPEN BOOK EXAM.
2. READ THE QUESTIONS CAREFULLY.
3. WRITE NEATLY AND LEGIBLY.
4. PLEASE ANSWER ALL QUESTIONS.

Question 1

1.1 Increase in population puts more pressure on resources. Hence, in a proposed development plan, it is predicted that an altogether new residential /light industrial development will consist of the following types of development by the year 2020.

- A central CBD of 8ha
- A commercial area of 4ha
- A light industrial area of 5ha
- A population of 10000 persons at an average density of 30 persons /ha
- Four-day schools occupying 4ha altogether
- A hospital with 60 beds
- Garage occupying 2ha

Using the design guidelines provided with this paper and assuming, that they are applicable to the year 2050:

a. Calculate the average daily water demand of the whole development in m^3/d.
b. Calculate the summer and maximum summer peaks water demand of the whole development in ℓ /s.
Summer and maximum summer peaks factors are **1.5** and **4.5** respectively.
Note; ($1m^3 = 1000$ ℓ $= 1kl$)

1.2 Explain waste disposal type by landfill and list any five-landfill disposal technical considerations during its planning and construction phases.

TOTAL FOR QUESTION 1 – 20 MARKS

Question 2

2.1 Discuss clearly in a sequential order the 7-stages requirement on water treatment before it becomes suitable for delivery to residential settlements.

2.2 Power generation mainly in South Africa is mostly by thermal power and hydro-power plant generation. Briefly explain this practice highlighting the economic contribution as well as challenges on this type electricity production

TOTAL FOR QUESTION 2– 20 MARKS

Question 3

3.1 Clearly discuss in your view why conducting new projects and reviewing existing structures, the local geotechnical investigations becomes a critical pathway.

3.2. Draw and label the full cloverleaf. What can you say about this civil engineering design as a planner?

TOTAL FOR QUESTION 3– 20 MARKS

Question 4

4.1 Discuss briefly traffic impact assessments and why has it become a significant process during planning and development processes? In addition, explain practically how the basic

assessment is done and who is responsible for traffic impact assessment study during most developmental planning application processes.?

4.2 What are the functions of the following three parties involved in water supply chain?
A: (Rand Water), B: (DWAF), C: (Municipalities)

4.3 Briefly give explanation of pile foundation applications on civil structural activities and developments
A: Landfill
B. Incineration
C: Gasification

4.4 Briefly explain these waste disposal types with regards to environmental friendliness.

TOTAL FOR QUESTION 4– 20 MARKS

Question 5

5.1 As a town planner, discuss in detail the general knowledge and relationship of civil engineering for planning and development.

5.2. Explain in detail how these following sewerage treatment methods are carried out:
A: Dilution
B: Conservancy
C: Treatment (Septic tanks and Biological filters).

TOTAL FOR QUESTION 5– 20 MARKS

TOTAL: 100 MARKS

Annexure

DESIGN GUIDELINES FOR WATER SUPPLY

1. GENERAL

1.1 *Definitions*

An *equivalent erf* is a unit that uses 1000ℓ water per day on average. This unit is not related to the size of the erf.

2. DESIGN STANDARDS - PIPES

2.1 *Average daily demand*

Agricultural holdings		
- Undeveloped	:	2,25kℓ/bruto ha/day
- Developed areas already subdivided	:	2,25kℓ/holding/day
- Developed areas not yet subdivided	:	4,5kℓ/holding/day for one possible subdivision 6,75kℓ/holding/day for two possible subdivisions
Residential		
- Density 30 persons/ha	:	400ℓ/person/day = 12kℓ/ha/day
- 60 persons/ha	:	250ℓ/person/day = 15kℓ/ha/day
- 90 persons/ha	:	200ℓ/person/day = 18kℓ/ha/day
Average number of persons per household (houses or flats)	:	3,1 persons/household
Commercial	:	10kℓ/ha/day
Offices FSR = 0,2	:	6kℓ/ha/day
FSR = 0,3	:	9kℓ/ha/day
FSR = 0,4	:	12kℓ/ha/day
CBD General	:	16kℓ/ha/day
Light industrial	:	12,5kℓ/ha/day
General industrial	:	25kℓ/ha/day
Office park	:	10kℓ/ha/day
Water intensive industries	:	As per specific request
Special		
Garage	:	8kℓ/ha
Hospital	:	0,6kℓ/bed
Café	:	4ℓ/m²
Hotel	:	4ℓ/m²
Old age home	:	0,4kℓ/inhabitant
Schools with hostels	:	8kℓ/ha + 150ℓ/inhabitant
Day schools etc.	:	8kℓ/ha

2.2 *Peak factors*

Average peak factor	-	3 x average daily demand
Summer peak	-	1,5 x average daily demand
Maximum summer peak	-	4,5 x average daily demand

2.3 *Fire fighting*

Agricultural holdings	:	No additional requirement above peak flow
All residential areas	:	15ℓ/s at 7m minimum pressure head
All others	:	100ℓ/s at 15m minimum pressure head

Supply pipelines are sized to convey the maximum summer peak and water required for fire fighting.

2.4 *Spacing of fire hydrants*

Agricultural holdings	:	600m max. spacing
All residential areas	:	250m max. spacing
All others	:	180m max. spacing

2.5 *Duration of fire flow*

Agricultural holdings	:	1 hour
Residential	:	2 hours
All others	:	4 hours

The head of the fire department should also be consulted.