Menoufiya University
Faculty of Engineering Shebin El-Kom
Civil Eng. Department

Date of Exam: 07 June 2017

Minufiya University

Subject: Planning Water & Sanitation
Code: **CVE 525**
Year: Graduate Diploma
Time Allowed: 3 hours
Total Marks: 100

Answer all the following Questions (assume any missing data)

Marks

Question (1)

[30]

(a) Mention five different methods for prediction of future population ………........... *(5)*

(b) The following table shows the population in millions of a country during the years 1910 – 2010, in ten years intervals. ……….. … … … … … … … … … … … … … … ……..… … … … … … …*(25)*

Year	1910	1920	1930	1940	1950	1960	1970	1980	1990	2000	2010
Pop.	24.5	31.8	40.4	51.2	62.9	78.2	93.6	107.7	125.8	134.9	155.8

1) Find the equation of the least square parabola fitting the data.

2) Estimate the population in 2040 & 2060

Knowing that :

$$\Sigma Y = aN + b\Sigma X + c\Sigma X^2$$
$$\Sigma XY = a\Sigma X + b\Sigma X^2 + c\Sigma X^3$$
$$\Sigma X^2Y = a\Sigma X^2 + b\Sigma X^3 + c\Sigma X^4$$

Question (2)

[30]

Given the network shown in Fig. 1, the inflow at A, and outflows at C, D and E. Using Hardy Cross method, find the flows in the individual pipes comprising the network (only two trials are required)... … … … … … … …… … … … … … … … … … … … … … … …… … … ….*(30)*
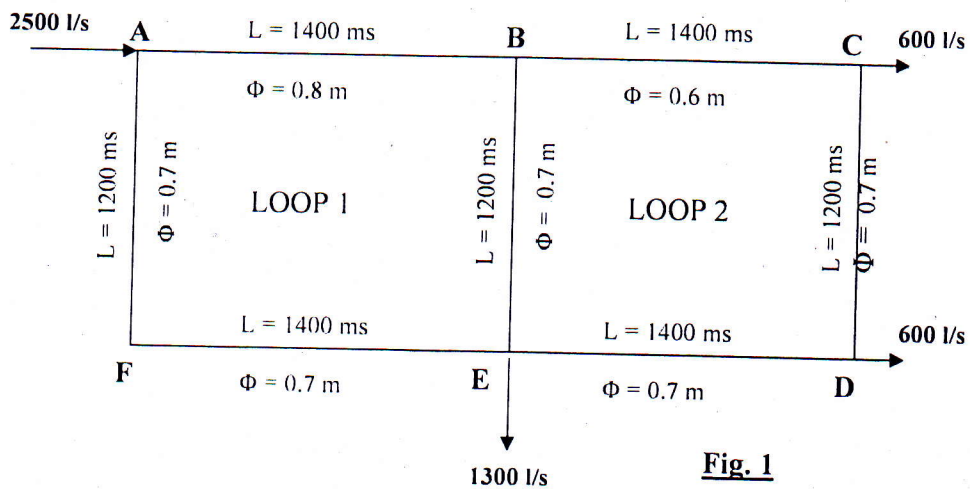

Fig. 1

Question (3)

[20]

(b) Discuss the properties of good disinfectant and the factors affecting disinfection process efficiency ………………………………………………………………................ (10)

(c) Differentiate Nitrification from denitrification … … … … … … … … … … … … …(10)

Question (4)

[20]

a) Draw Oxygen Sag Curve showing all components and parameters. …………….... (10).

b) Wastewater discharges to a river resulting initial BOD = 13.0 mg/L and DO = 7.0 mg/L. Calculate the critical time and location downstream for minimum DO? ….............. (10)

Knowing that:

- Deoxygenation constant = 0.19 /day

- Average flow speed = 3.0 m/min.

- Average river depth = 3.5 m

- Saturated DO = 8.7 mg/L

- Neglect temperature correction.

Use the following formulas:

$$K_2 = \frac{3.9 \, V^{1/2}}{H^{3/2}}$$

$$t_c = \frac{1}{K_2 - K_1} \ln \left\{ \frac{K_2}{K_1} \left(1 - \frac{D_o (K_2 - K_1)}{K_1 L_o} \right) \right\}$$

End of Exam - Good luck

Question Number	\multicolumn{4}{c	}{}		\multicolumn{3}{c	}{This exam measures the following ILOs}			\multicolumn{3}{c	}{}	
Question Number	Q1-a	Q3-a	Q3-b	Q4-a		Q1-b	Q2	Q4-b			Q1-b	Q2	Q4-b	
Skills	a1-1	a1-1	a1-2	a1-2		b2-1	b2-1	b2-1			c1-1	c1-1	c1-1	
	\multicolumn{4}{l	}{Knowledge &Understanding Skills}		\multicolumn{3}{c	}{Intellectual Skills}				\multicolumn{3}{c	}{Professional Skills}		

Hazen-Williams Formula C = 100

Q (l/sec)

S (cm/100m)

v = 200 cm/sec
v = 150 cm/sec
v = 100 cm/sec
v = 75 cm/sec
v = 60 cm/sec
v = 50 cm/sec
v = 25 cm/sec

1000
800
600
500
400
300
250
200
150
100