

**Daffodil International University**

BSc. In Civil Engineering

Midterm Examination, Fall - 2024

Course Code: CE 341

Course Title: Water Supply Engineering

Section: BN1, BN2

Level-Term: L3-T1

Teacher's Initial: MHZ

Full Marks: 25

Date: 02-Oct-2024

Time: 1.5 Hours

*Note: There are 5 questions. Answer all. [Right side figures indicate full marks]*

- 1/ ✓ Estimate the future population for the year 2045 of a city with the following data. [5]  
Calculate the future demand if per capita water demand is taken as 120 lpcd.

Year	1990	2000	2010	2020
Population	120,000	145,000	180,000	225,000

[Course Learning Outcome: CO1

Cognitive Level: C5

Time: 18 min]

- 2/ ✓ A 0.2 m diameter tubewell produces 40,000 m<sup>3</sup>/d from an unconfined aquifer. The [5]  
static depth of water in the well is 42 m. An observation well at a distance of 120 m  
shows water level at 44.5 m. Calculate the coefficient of permeability.

[Course Learning Outcome: CO3

Cognitive Level: C4

Time: 18 min]

- 3/ ✓ A strainer with a diameter of 50 mm and length of 6 m is installed in an aquifer. The [5]  
strainer have slot # 20 having an open area of 35%. If the entrance velocity of water  
from the aquifer to strainer is around 0.01 m/sec, what is the yield of the well?

[Course Learning Outcome: CO3

Cognitive Level: C4

Time: 18 min]

- 4/ ✓ The results of sieve analysis test carried out on a 250 gm sample of underground [6]  
aquifer proposed to be tapped for installation of a tubewell, are given in the table  
below:

Size of the sieve in mm	Wt. of material retained In gm	% of material retained	Cumulative % retained	% finer
(1)	(2)	(3)	(4)	(5)
2.360 (#8)	0			
1.180 (#16)	2			
0.600 (#30)	15			
0.300 (#50)	170			
0.150 (#100)	30			
0.075 (#200)	20			
pan	13			
Total =	250			

216.25

Determine the slot size ( $D_{50}$ ) of the tubewell.

[Course Learning Outcome: CO2

Cognitive Level: C3

Time: 21 min]

5. Determine the number and size of the intake gates for a flow of 200 MLD. [4]

[Course Learning Outcome: CO2

Cognitive Level: C3

Time: 15 min]

Required Formulae: (symbols have their usual meaning)

$$Q = \frac{\pi K (y_2^2 - y_1^2)}{\log_e \left( \frac{x_2}{x_1} \right)} ; \quad Q = \frac{2\pi K m (y_2 - y_1)}{\log_e \left( \frac{x_2}{x_1} \right)} ; \quad Q = \pi D L p v_e ; \quad P_f = P_p (1 + r)^n$$