



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2013/2014**

COURSE NAME : HYDROLOGY
COURSE CODE : DAC 20902
PROGRAMME : 2 DAA
EXAMINATION DATE : JUNE 2014
DURATION : 2 HOURS
INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS
FROM SIX (6) QUESTIONS

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

Q1 (a) List **five (5)** components in hydrological cycle.

(5 marks)

(b) Explain the contributions of civil engineers in hydrology field.

(5 marks)

(c) Data collection from a reservoir in a week which the level dropped by 30 cm, inflow was $2 \times 10^5 \text{ m}^3/\text{day}$, average seepage loss was 1.2 cm, total precipitation was 0.11 m, total evaporation was 6.6 mm. Determine the outflow from the reservoir with area 1100 hectare.

(15 marks)

Q2 (a) List **five (5)** parameters in measurement of precipitation.

(5 marks)

(b) Explain about precipitation lifting mechanisms.

(5 marks)

(c) Stations A, B C, D, E, F, G, H and J are the gauge stations in Table **Q2(c)**. Rain gauge at station A was out of operation. Calculate the rainfall depth at station A with coordinates (0,0) using the quadrant method .

Table Q2(c)

Station	Precipitation (mm)	Coordinate (X,Y)
B	40	(3,3)
C	42	(3,5)
D	50	(4,-1)
E	52	(4,-3)
F	45	(-5,-2)
G	47	(-4,-4)
H	53	(-3,1)
J	55	(-2,6)

(15 marks)

Q3 (a) Describe about infiltration index. (5 marks)

(b) Explain about factors affecting infiltration process. (5 marks)

(c) An initial infiltration rate was 4.0 cm/hr in 8 hours of rainfall. Given that constant infiltration rate, f_c is 0.3 cm/hr and decay constant rate, k value is 0.33 hr^{-1} . Determine as below:

- (i) Infiltration at 4 hours
- (ii) Total infiltration within first 6 hours
- (iii) Total infiltration between 3 to 8 hours

(15 marks)

Q4 (a) Describe about catchment area. (5 marks)

(b) Explain about land cover and use that effects catchment area. (5 marks)

(c) Determine the discharge at the river as shown in Table 4(c) by using mean section method.

Table 4(c)

Vertical Section	Section Width (m)	Depth (m)	Mean Velocity (m/s)
0	0	0	0
1	4.1	3.9	2.1
2	2.9	5.0	2.4
3	4.5	7.4	2.9
4	5.2	4.8	2.3
5	4.0	3.6	1.9
6	4.8	0	0

(15 marks)

- Q5** (a) Describe the drainage characteristics that affect hydrograph shape. (5 marks)
- (b) Explain the procedures to determine unit hydrograph. (5 marks)
- (c) Table **Q5(c)**, shows the total flow versus time for a catchment area of 5.5 km^2 . Determine the unit hydrograph for the catchment.

Table Q5(c)

Time (hour)	Total Flow (m^3/s)
1	2.78
2	2.88
3	6.33
4	14.60
5	16.70
6	13.10
7	9.45
8	6.05
9	4.35
10	3.05
11	3.00
12	2.90
13	2.80
14	2.78

(15 marks)

- Q6** (a) Define about hydrologic routing. (5 marks)
- (b) Explain the concept of pulse method in reservoir routing. (5 marks)

- (c) A soil sample volume 60 cm^3 was displaced 35.5 cm^3 of water when poured into a graduated cylinder. Determine the void ratio of the sand.

(5 marks)

- (d) A soil sample occupies 0.142 ft^3 , dry weight is 17.2 lb and specific gravity of soil solids is 2.70. Determine as below:

- (i) Bulk density of soil
- (ii) Porosity of soil

(10 marks)

- END OF QUESTION -