



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2016/2017**

TERBUKA

COURSE NAME : HYDROLOGY
COURSE CODE : DAC 20902
PROGRAMME CODE : DAA
EXAMINATION DATE : DECEMBER 2016 / JANUARY 2017
DURATION : 2 HOURS
INSTRUCTION : ANSWER **FOUR (4)** QUESTIONS ONLY

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

- Q1** (a) Define hydrologic cycle. (4 marks)
- (b) List **six (6)** components in a complete hydrologic cycle. (6 marks)
- (c) Data collection from a reservoir per week in which the level of water dropped by 33 cm, the water inflow was $2.8 \times 10^5 \text{ m}^3/\text{day}$, the average seepage loss was 1.4 cm, the total precipitation was 0.13 m, the total evaporation was 6.9 mm. Determine the outflow of water from the reservoir which covered an area of 1165 hectare. (15 marks)
- Q2** (a) Explain briefly the characteristics of non recording gauges. (6 marks)
- (b) Explain **two (2)** differences between arithmetic mean method and normal ratio method. (4 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 a coordinate of (0,0) using the quadrant method. (15 marks)
- Q3** (a) Briefly describe infiltration process. (4 marks)
- (b) Explain the characteristics of soil that affects infiltration process. (6 marks)
- (c) Refer to **Table Q3(c)**, a storm produced 6 cm of direct runoff. Estimate the ϕ index. (15 marks)

- Q4** (a) Briefly describe the characteristics of a watershed area. (4 marks)
- (b) Describe **six (6)** factors which affects watershed area. (6 marks)
- (c) Refer **Table Q4(c)**, analyse the intensity duration frequency curves for 10-year and a 5 year frequencies. (15 marks)
- Q5** (a) List **four (4)** functions of unit hydrograph. (4 marks)
- (b) Explain the steps required to determine unit hydrograph. (6 marks)
- (c) Refer **Table Q5(c)**, analyse the unit hydrograph if the time interval taken is an hour between readings. (15 marks)
- Q6** (a) Describe the characteristics of aquifer as a main part in groundwater flow. (4 marks)
- (b) Explain the funtion of discharge point as groundwater outflow channel. (6 marks)
- (c) Refer **Table Q6(c)**, analyse the outflow hydrograph through a river reach for which $x = 0.1$ and $K = 10$ hours. (15 marks)

- END OF QUESTIONS -

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Table Q2(c)

Station	Precipitation (mm)	Coordinate (X,Y)
B	42	(2,2)
C	44	(4,5)
D	52	(2,-1)
E	54	(5,-5)
F	47	(-2,-2)
G	49	(-5,-6)
H	55	(-1,1)
J	57	(-5,4)

Table Q3(c)

Time (hour)	Rainfall Intensity (cm/hour)
1	0.5
2	2.3
3	3.9
4	2.5
5	0.8

Table Q4(c)

Precipitation (mm)			
15 min	30 min	45 min	60 min
1.27	1.27	2.20	1.93
1.05	1.23	3.86	1.88
1.07	3.15	1.65	1.65
2.06	1.18	1.81	2.04
1.11	1.14	1.63	1.54
1.36	1.60	1.59	4.10
1.15	1.09	1.40	1.60
1.31	1.07	1.53	2.15
1.18	1.41	1.46	1.70
1.23	1.30	1.57	1.77

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Table Q5(c)

Time (hour)	Rainfall Excess (mm)	Direct Discharge (m ³ /s)
1	20	20
2	60	140
3	40	400
4		920
5		3560
6		7760
7		6320
8		2240
9		1240
10		680
11		300
12		140

Table Q6(c)

Time (hour)	Inflow (m ³ /s)
6	50
12	150
18	340
24	250
30	200
36	155
42	115
48	90
54	50
60	25

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