UNIVERSITY
OF
JOHANNESBURG

PROGRAM : **BACHELOR OF ENGINEERING TECHNOLOGY**

SUBJECT : **HYDROLOGY B2**

CODE : **HYOCIB2**

DATE : SSA EXAMINATION
January 2020
(SECOND SESSION)

DURATION : (Y-PAPER) 12:30-15:00

WEIGHT : 40:60

FULL MARKS : 100

TOTAL MARKS : 100

EXAMINER : Mr. A. Vessal   SAPSE NO

MODERATOR : Prof . I. Musonda   FILE NO

NUMBER OF PAGES : 4 PAGES

INSTRUCTIONS : CALCULATORS ARE PERMITTED (ONLY ONE PER STUDENT)

REQUIREMENTS : GRAPH PAPER, RULER

INSTRUCTIONS TO STUDENTS:

1. ANSWER ALL QUESTIONS IN PEN NOT IN PENCIL
2. Show all your calculations to get a full mark
3. Return your test sheet and all loose sheets with your answer sheet to the examiner

QUESTION 1

A record of precipitation from a recording gauge for a storm for 1 hrs period is shown in the following table. Determine the gauge intensity.

time(minutes)	Gage Rainfall(mm)	Gage Intensity(mm/hr)
0	0	
20	12.5	
40	18	
60	27.5	

[8]

QUESTION 2

A large drainage basin can be divided into 4 sub basin. The areas of sub basin are 52km^2, 77 km^2. 36 km ^2 and 69 km^2.The average precipitation (mm)   each are 124,114,127.99, respectively. Determine the average annual precipitation in cm for the whole drainage are.

[10]

QUESTION 3

A one hr UH for a watershed is given in the following table Determine the stream flow that would result from rainfall event for this watershed. The rainfall in a 3hr storm in increment of 1.5 hr are 21 and 27 mm. The Phi index is 0.5cm/hr. The base flow is 5 m^3/s.

time ,hr	Unit Hydrograph ,m^3/s
0	0
1.5	10
3	26
4.5	55
6	89
7.5	67
9	45
10.5	20
12	0

[26]

QUESTION 4

The following flood data are obtained from Wolf river.
1. Determine the 10 years flood using Log Pearson type III.
2. Compute the recurrence interval for 2001 flood (3873m^3/s) using log Normal distribution.
The K values are in annexure 1.

[16]

QUESTION 4

Route the inflow hydrograph for the following table through a river reach for x=.2and k=8hr.

Time ,hr	I (m^3/s)	O(m^3/s)
0	12	7
3	20	
6	39	
9	67	
12	84	
15	56	
18	45	

21	34	
24	20	
27	8	

C1= $(0.5 \times \Delta t - Kx)/K - Kx + .5\Delta t$

C2 $(0.5 \times \Delta t + Kx)/(K - Kx + .5\Delta t)$

C3 $(K - Kx - .5\Delta)t/(K - Kx + .5\Delta t)$

O2= $C1*I2 + C2*I1 + C3*O1$

[24]

QUESTION 5

Determine the volume of total reservoir storage for the following data.

Stage (H)m	area(hectare)	Δ storage(m^3)	Total storage (m^3)
0	0		
2	1.1		
4	3		
6	6.9		
8	12.55		

[16]

[TOTAL : 100]