

KATHMANDU UNIVERSITY
End Semester Examination
May/June, 2022

Marks Scored:

Level : B.E.

Year : II

Course : CIEG 206

Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"

[20Q. × 0.5 = 10 marks]

Encircle the most appropriate answer.

- The Universal soil loss equation for the estimation of soil loss from agricultural land is
 - $E = K*LS*C*P$
 - $E = LS*C*P$
 - $E = R*K*LS*C*P$
 - $E = R*K*LS*C$
- Albedo is associated with which process of radiation?
 - Conduction
 - Convection
 - Reflection
 - Emission
- Evapotranspiration losses consists of transpiration from plants and evaporation from
 - Leaves of the plants
 - Stems and leaves of the plant
 - Ground surface only
 - Ground surface and plants
- The slope- area method is extensively used in
 - Development of rating curve
 - Estimation of flood discharge based on high- water marks
 - Cases where shifting control exist
 - Cases where back water effect is present
- The time of translation of the flow from the most remote point of drainage basin to its outlet is equal to that of
 - Overland flow
 - Lag time
 - Rainfall duration
 - Time of concentration
- The rational method used for the computation of the runoff from a watershed gives
 - Runoff volume
 - Discharge rate of channel
 - Runoff rate
 - Peak runoff rate
- The base flow is the difference between
 - The total runoff and direct runoff
 - The total runoff and delayed surface runoff
 - The prompt sub surface runoff and delayed sub surface runoff
 - The total runoff and the total prompt runoff
- A structure is designed for T years flood. It has an estimated useful life period of N years. Then the probability that it will not fail during the life period is
 - $(1 - 1/T)$
 - $(1 - 1/T)^N$
 - $(1 - 1/T)^T$
 - $1 - (1 - 1/T)^N$
- The performance of well is measured by
 - Specific capacity
 - Specific yield
 - Storage coefficient
 - Permeability coefficient

10. Atmospheric moisture reaching the earth's surface as rain, hail, sleet or snow is called
 a. Precipitation b. Through flow c. Percolation d. Interception
11. The flow-mass curve is graphical representation of
 a. Cumulative rainfall and time
 b. Discharge and percentage probability of flow being equal or exceeded
 c. Cumulative discharge volume and time in chronological order
 d. Discharge and time in chronological order
12. The stream which does not have any base flow contribution is called
 a. Perennial stream b. Intermittent stream
 c. Ephemeral stream d. Snow-fed stream
13. The radius of influence is
 a. Radius of the main well
 b. Distance from the wall of main well to the point of zero draw down
 c. Distance from the center of main well to the point of zero drawdown
 d. Radius of observation well r_1 and r_2
14. If the intensity of rainfall is more than the infiltration capacity of soil, then the infiltration rate will be
 a. Equal to rate of rainfall b. Equal to infiltration capacity
 c. More than rate of rainfall d. More than infiltration
15. The unit hydrograph due to a storm may be obtained by dividing the ordinates of the direct runoff hydrograph by
 a. Direct runoff volume b. Period of storm
 c. Total rainfall d. Ground water runoff
16. Calibration of current meter for use in channel flow measurement is done in a
 a. Wind tunnel b. Water tunnel c. Towing tank d. Flume
17. The lag time of the basin is the time interval between
 a. The centroid of the rainfall diagram and the peak of hydrograph
 b. The beginning and end of direct runoff
 c. The beginning and end of effective rainfall
 d. The inflection points on the rising and recession limbs of the hydrograph
18. A catchment is made of 60% area with runoff coefficient 0.4 and remaining 40% area with runoff coefficient 0.6. What is the weighted runoff coefficient to be used in rational formula?
 a. 0.6 b. 0.24 c. 0.5 d. 0.48
19. Which of the following has the highest infiltration capacity?
 a. Forest land b. Grazed pasture
 c. Concrete pavement d. Rock outcrop
20. Turbidity in lakes and slow moving rivers are typically due to
 a. Suspended load b. Wash load
 c. Bed load d. Boulders

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F.M. : 40

SECTION "B"

Attempt *ALL* questions.

Make suitable assumptions wherever needed. The figures in the parenthesis indicate the marks allocated for the question.

1. Explain water budget equation and its application in hydrological study. [3]
2. Write short notes on (*ANY THREE*): [3× 2= 6]
 - a. Hydrologic and hydraulic routing
 - b. Penman's equation
 - c. Rating curve
 - d. Horizontal axis and vertical axis current meter
3. Compute the discharge through a river with following data: [4]

Distance from right bank (m)	Depth (m)	Velocity at 0.6d
0	-	-
1.5	0.5	0.3
3	0.9	0.45
4.5	1.1	0.52
6	0.8	0.31
7.5	0.6	0.25
9	-	-

4. The mass curve of a rainfall of duration 100 min. is given below [3]

Time from start of rainfall (min)	0	20	40	60	80	100
Cumulative rainfall (cm)	0	0.5	1.2	2.6	3.3	3.5

If the catchment had an initial loss of 0.6cm and ϕ -index of 0.6cm/hr. calculate the total surface runoff from the catchment.

5. What are the various methods of average depth calculation of rainfall? Explain in brief. Which method would you suggest for application in Nepal? Why? [1+2+1]
6. What are the assumptions of unit hydrograph? Explain its application in flood estimation. [2+2]
7. Define sediment yield. What are the factors affecting sediment yield? [1+2]
8. A 20 cm well completely penetrates an unconfined aquifer of saturated depth 40m. After a long period of pumping at a steady rate of 500 lpm, the drawdown in two observation wells 25 and 50m from the pumping well were found to be 3.5 and 2.0m respectively. Determine the transmissivity of the aquifer. What is the drawdown at the pumping well? [2+1]

9. Flood frequency records on a river have been collected for 17 years starting from 1990 to 2006 and the peak values of the flood observed during these 17 years are given below

Year	Peak discharge (m ³ /s)	Year	Peak discharge (m ³ /s)
1990	300	1999	540
1991	440	2000	430
1992	600	2001	370
1993	350	2002	420
1994	290	2003	900
1995	480	2004	400
1996	390	2005	360
1997	330	2006	510
1998	670		

Estimate the 100 year flood by Gumbel's method.

[6]

10. What are the causes of sedimentation in reservoir? Describe in brief the practices of sediment management in Hydropower? [1.5+2.5]