UNIVERSITY OF PETROLEUM & ENERGY STUDIES
DEHRADUN
End Term Examination –May, 2018

Name of the Program/course: B.Tech Civil Engg.   Semester –   6th
Subject Name : Water Resources Engg.   **Max. Marks   : 100**
Subject Code : CEEG321   **Duration   : 3 Hrs**
This question paper has two page(s).
Note:- Attempt all questions from section A and B. Attempt any two questions from Section C.
Khosla's Chart & Graph paper will be supplied to the students.

Section A

1. A catchment has an area equal to 10 km^2 and a runoff coefficient of 0.8. A 40 mm rainfall is recorded, evenly over the catchment area. How much runoff volume can be expected out of the catchment from this rainfall?   5(CO1)
2   What are the different types of irrigation systems adopted in Israel, Dubai, Haryana, Rajsthan and Uttrakhand.   5(CO3)
3   How will you estimate duty and delta? Derive an equation for the estimation for a given base period?   5(CO3)
4   What are the functions of Divide wall, Fish Ladder, Under sluice, Silt excluder and Silt ejector.
                                                                           5(CO5)

Section B

5   Annual precipitation values at a place having 70 years of rainfall record can be tabulated as follows:

| Range (cm)	No. of years
<60.0	6
60-79.9	6
80-99.9	22
100-119.9	25
120-139.9	8
>140.0	3

Calculate the probability of having:
(a) An annual rainfall equal to or larger than 120 cm
(b) Two successive years in which the annual rainfall is equal to or larger than 140 cm and
(c)   An annual rainfall less than 60 cm.   (3+3+4)   (CO1)

6   Explain in brief Lacey's Regime theory. What are the regime's conditions? Explain the term true regime and permanent regime.   (2+4+4)   (CO4)

7   Design a concrete lined trapezoidal channel to carry a discharge of 100 cumec with a velocity not exceeding 2m/sec. Bed slope = 1/2500, side slopes = 1.5H:1V, n= 0.014.   10 (CO4)

8   A field of 4 hectares has an average root zone depth of 1.0m, a filed capacity of 18% and permanent wilting percentage of 10%(both by weight). Assume that it is desirable to irrigate when 60% of available moisture has been extracted. The field is irrigated by a sprinkler system which delivers 300 m^3/hour over a period of 12 hours. What is the water application efficiency? Assume density of soil is 1400kg/m^3.   10 (CO3)

Section C

9   The accompanying figure shows the profile of a weir. The various levels shown in figure are in meters. Determine the uplift pressures at the key points and the exit gradient and find whether the section provided is safe against piping if it is founded on fine sand with permissible and the exit gradient and find whether the section provided is safe against piping if it is founded on the fine sand with permissible exit gradient of 1/6. (Slope correction for 1:8 is 2%)   20 (CO5)
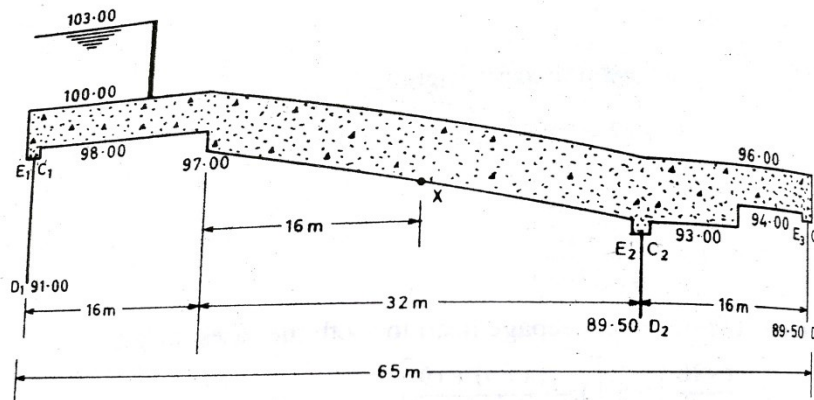
Or

Design crest wall, cistern, impervious floor by Khosla's Theory for unflumed glacis non meter Fall for the following Data

Full supply Discharge	:	$\dfrac{u/s}{d/s}$ = 20 cumecs
Full supply Level	:	$\dfrac{u/s}{d/s} = \dfrac{215.40\,m}{214.40\,m}$
Full supply Depth	:	$\dfrac{u/s}{d/s} = \dfrac{2m}{2m}$
Bed Width	:	$\dfrac{u/s}{d/s} = \dfrac{20\,m}{20\,m}$
Bed Level	:	$\dfrac{u/s}{d/s} = \dfrac{213.40\,m}{212.40\,m}$
Drop	:	1.0m

Safe exit gradient may be taken as 1/5.

10   Ordinate of a 4 h Unit hydrograph are given. Using this derive the ordinates of a 2h unit hydrograph for the given catchment.

Time(h)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinate of 4-h UH	0	20	80	130	150	130	90	52	27	15	5	0

20 (CO2)