BACHELOR OF CIVIL ENGINEERING EXAMINATION 2017
(Second Year, Second Semester)

IRRIGATION ENGINEERING

Time: Three Hours

	Full Marks: 100
	Part I: 60 Marks
	Part II: 40 Marks

Use a separate Answer-Script for each part

Question No.		PART I (60 Marks)	Marks
		*Answer any **THREE** questions from this PART. Assume suitable values for the parameters if not supplied*	
1	(a)	Define the concept of regime channel. Discuss Kennedy's theory and Lacey's theory regarding regime channel.	1+3x2=7
	(b)	Find out normal water depth and velocity in a canal carrying a discharge of 15 cumecs and having bed width 5.0 m. Assume Manning's n=0.0225, Bed slope=0.0015 and side slope 1:1.	8
	(c)	Design a channel with side slope 1:1 to carry 12 cumecs at a slope 0.0016. Maximum permissible velocity in channel is 1.5m/sec. Assume Manning's n=0.025	5
2	(a)	What is the importance of rivers and necessities of controlling them?	4
	(b)	Write down the classification and sub-classification of rivers on the basis of topography. Explain them in brief.	3+7=10
	(c)	Write down the classification of rivers on the basis of flood hydrographs, also the classification of Indian rivers. Explain them in brief.	2+4=6
3	(a)	Discuss the causes of meandering. What are the governing variables of meandering process?	2+3=5
	(b)	What may the reason behind formation of oxbow lake? Explain briefly with neat sketch.	6
	(c)	What is the objective of river training works?	5
	(d)	Note down the classification of river training work? Explain briefly.	1+3=4
4	(a)	Design a canal to carry a discharge of 30 cumecs having sediment load concentration 40 ppm by weight. The average grain size of the bed material is 0.25mm. Assume the cross-section of the canal is trapezoidal with side slope 0.5(H): 1(V).	12
	(b)	Define the balancing depth for excavating a channel. Why the balancing depth calculation is necessary?	1+1=2
	(c)	Calculate the balancing depth for a channel section having a bed width 20 m and side slopes of 1(H):1(V) in cutting and 1.5(H):1(V) in filling. The bank embankments are kept 3.0 m higher than the ground level (berm level) and crest width of banks is kept as 2.0 m.	6

B.E. CIVIL ENGINEERING SECOND YEAR SECOND SEMESTER EXAM 2017
(~~1st~~/2nd Semester/~~Repeat/Supplementary /Spl. Supplementary /Old/Annual/Bi-Annual~~)
SUBJECT: IRRIGATION ENGINEERING
(Name in full)
PAPER xxxx

Time: ~~Two hours~~/ Three hours/~~Four hours/Six hours~~   Full Marks ~~30~~/100

(~~45~~/40 marks for this part)

Use a separate Answer-Script for each part

1. Maintain neatness. Assume reasonable data if it is not supplied.
2. _Answer question number 1 and any ONE question from the rest._
3. All drawings-must be drawn by pencil. Do not retain mobile phone during examination.
4. No code etc. will be needed to answer the questions of this part

No. of Question	Part -I/II	Marks

(1)(a)	Why curves should be avoided in the alignment of canal as far as possible? If unavoidable, then what measures should be taken to provide a curve in canal?	4
	Or	
	Define : (a) G.C.A. and (b) C.C.A.	2+2=4
(b)	Briefly explain the advantages of lined channel in comparison with earthen channel.	6
(c)	Between the drip irrigation method & sprinkler irrigation method, which one will be preferred by you & why?	5
	Or	
	For what reasons Sprinkler method of Irrigation and Drip Irrigation method are not being adopted widely in our Country?	5
(d)	What is meant by surface & sub surface irrigation? How flow irrigation differs from lift irrigation?	2+2+3=7
(e)	Distinguish between Perennial and Flood Irrigation.	3

(2)(a)	An unlined canal giving a seepage loss of 3.5 cumecs per million square metres of wetted area is proposed to be lined with 12cm thick cement concrete lining, which costs Rs.170/- per 15 square metres. Given the following data work out the economics of lining & cost benefit ratio: (i) Life of lining: 50 years (ii) Annual revenue per cumec of water from all crops Rs.3.33 lakhs. (iii) Discharge in the channel: 87 cumecs (iv) Area of the channel: 40.5 m² (v) Wetted perimeter of the channel: 17.3m (vi) Wetted perimeter of the lining: 17.1 m (vii) Annual maintenance cost of unlined channel: Rs. 1.0/per 10 m². (viii) Seepage loss in lined canals; 0.04 cumec per million m² wetted area (ix) Percentage savings of annual maintenance charges in lined canals, out of annual maintenance charges for unlined canal: 36% (x) Rate of interest: 7.5%	8
(b)	Explain the ways through which irrigation canals can be aligned.	7

(3)(a)	The cultivable commanded area for a distributory is 15000 hectors. The intensity of irrigation for Rabi (wheat) is 40% and for Khanif (rice) is 15%. The total water requirment of the two crops are 37·5 cm. and 120 cm. and their periods of growth are 160 days and 140 days respectively. Determine (a) the outlet discharge from average demand considerartions, (b) the peak demand discharge, assuming that the Kor water depth of two crops are 13·5 cm and 19 em and their Kor periods are 4 weeks and 2 weeks respectively.	8
(b)	What are the consisting parts of the network of canal system to achieve the proper distribution of water in to the fields?	2
(c)	Deduce a relationship among duty, delta and base period.	5

End of the Question