Ref. No. ***Ex/CE/T/312/2017(OLD)(S)***

BACHELOR OF CIVIL ENGINEERING EXAMINATION 2017

(Third Year, First Semester; Old, Supplementary)

IRRIGATION ENGINEERING
(OLD)

Time: Three Hours | Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of questions		Part I	Marks
		*Answer **ANY TWO** questions from this part.* *Assume suitable values for the parameters if not supplied.*	
1	(a)	Draw neat sketches and discuss about the canal bed formation at different conditions of canal flow	12
	(b)	Find out the normal water depth and velocity in a channel carrying a discharge of 15.5 cumecs and having bed width 5.0m. Assume Manning's n=0.0220, Bed slope = 0.0015, and Side slope 1.5 (H): 1(V).	8
	(c)	Prove that the shear stress required to move a grain, on the bank is less than the shear stress required to move the grain on bed.	5
2	(a)	Define the balancing depth for excavating a channel. Why the balancing depth calculation is necessary?	2+3
	(b)	Calculate the balancing depth for a channel section having a bed width 15 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.	7
	(c)	What is the utility of providing a berm and back berm on either side of canal?	7
	(d)	Define (i) 'Regime Channel', (ii) 'Initial Regime' and (iii) 'True Regime'.	3x2
3	(a)	Draw neat sketch to show a typical cross-section of an irrigation canal.	3
	(b)	Derive the expression for estimation of 'Average Unit Tractive Force' acts on channel bed. Also show the distribution of 'Tractive Force' generated in a trapezoidal channel section.	3+1
	(c)	Write short note on: (i) Aggrading rivers; (ii) Flashy river; (iii) Himalayan rivers	3x2
	(d)	What is meandering of rivers? What are the governing variables of river meandering process?	2+2
	(e)	Define 'Cutoff' of a river. How the 'Cutoff' develops?	1+4
	(f)	What are the objectives of river training works?	3

B. Civil Engg. 3rd YEAR 1st SEMESTER 2017

(1st /~~2nd~~ Semester/~~Repeat~~/Supplementary /~~Spl. Supplementary /Old/Annual/Bi-Annual~~)

SUBJECT: Irrigation Engineering (Old)

(Name in full)

PAPER ××××

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

(~~15~~/50 marks for each part)

Use a separate Answer-Script for each part

No. of Question — Part -~~I~~/II — Marks

- ~~*Do not retain mobile phone (even in switched off condition, too) to avoid RA*~~
- *Maintain neatness.*
- *Assume reasonable data if it is not supplied.*
- *Question no.1is mandatory*
- *Answer any other three questions alongwith question no.1*
- ~~All drawings must be drawn by pencil~~
- No code etc. will be needed to answer the questions of this part

(1)(a)	Briefly explain the advantages of lined channel in comparison with earthen channel.	6
(b)	Define "Duty" and "Delta" and derive their relationship.	6
(c)	When are the conventionally official dates of start & end of rabi & kharif season?	2
(2)(a)	Discuss 'check flooding' method of application of irrigation water to the field with the help of a neat sketch.	5
(b)	Explain the ways through which irrigation canals can be aligned.	7
(3)(a)	What is meant by surface & sub surface irrigation? How flow irrigation differs from lift irrigation?	2+2+3=7
(b)	Between the drip irrigation method & sprinkler irrigation method, which one will be preferred by you & why?	5
(4)(a)	Distinguish between Perennial and Flood Irrigation.	4
(b)	Just give the names of different types of canal linings.	3
(c)	What are meant by optimum utilization of water?	3
(d)	What is meant by-'consumptive use of water' for a crop?	2
(5)(a)	An unlined canal giving a seepage loss of 3.0 cumecs per million square metres of wetted area is proposed to be lined with 10cm thick cement concrete lining, which costs Rs.250/- per 10 m^2. Using following data, work out the economics of lining & benefit cost ratio: (i) Life of lining: 50 years (ii) Annual revenue per cumec of water from all crops Rs.3.4 lakhs. (iii) Discharge in the channel: 85 cumecs (iv) Area of the channel: 42m^2 (v) Wetted perimeter of the channel: 18.3m (vi) Wetted perimeter of the lining: 18.1 m (vii) Annual maintenance cost of unlined channel: Rs. 1.0/per 10 m^2. (viii) Seepage loss in lined canals; 0.04 cumec per million m^2 wetted area (ix) Percentage savings of annual maintenance charges in lined canals, out of annual maintenance charges for unlined canal: 37% (x) Rate of interest:6.5%	8
(5)(b)	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

End of the Question