ARASHTRA AGRICULTURAL UNIVERSITIES EXAMINATION BOARD, PUNE
SEMESTER END EXAMINATION
B.Tech. (Agril. Engg.)

ster : **VI (New)**	**Term : II**	**Academic Year : 2013-14**	
se No. : IDE 366	**Title : Minor Irrigation and Command Area Development**		
its : 3 (2+1)			
& Date : Saturday, 26.04.2014	**Time :** 09.00 to 12.00	**Total Marks : 80**	

Note : 1. Solve **ANY EIGHT** questions from **SECTION "A".**
2. All questions from **SECTION "B"** are compulsory.
3. All questions carry equal marks.
4. Draw neat diagrams wherever necessary.

SECTION "A"

a) Give main functions of head regulator and cross regulator.
b) Design a lined channel to carry a discharge of 15 cumecs. The available and accepted country slope is 1 in 9000. Assume side slopes as 1.25 H: 1V and good brick work in lining having roughness coefficient as 0.015.

2 a) Explain the term hydraulic jump with the help of an neat sketch.
b) The head regulator of a canal has 3 openings each 3 m wide. The water is flowing between the upper and lower gates. The vertical opening of the gate is 1.0 m .The head on the regulator is 0.45 m (afflux). If the upstream water level rises by 0.20 m, find how much the upper gates must be lowered to maintain the canal discharge unaltered?

.3 a) Write in brief about comparison between Kennedy's and Lacey's theory.
b) If wheat requires about 7.5 cm of water after every 28 days and the base period for wheat is 140 days, find out the value of delta for wheat.

).4 a) Enlist different types of canal falls and explain in brief Baffles fall.
b) Design a regime channel for a discharge of 50 cumecs and silt factor 1.1, using Lacey's theory.

).5 a) Enlist different types of cross drainage works.
b) The gross commanded area for a distributory is 6000 hectares, 80 per cent of which is culturable is irrigable. The intensity of irrigation for *rabi* season is 50 per cent and that for *kharif* season is 25 per cent. If the average duty at the head of the distributory is 2000/ cumec for *rabi* season and 900 hectares/cumec for *kharif* season, find out the discharge required at the head of the distributory from average the demand considerations.

Q.6 An unlined canal giving a seepage loss of 3.3 cumecs per million sq. metres of wetted area is proposed to be lined with 10 cm thick cement concrete lining, which costs Rs. 180.00 per 10 sq.m. Given the following data, work out the economics of lining and benefit cost ratio. (i) Annual revenue per cumecs of water from all crops = Rs.3.5 lakhs, (ii) Discharge in the channel = 83.5 cumecs, (iii) Area of the channel = 40.8 sq. m., (iv) Wetted perimeter of the channel = 18.8 mtrs, (v) Wetted perimeter of the lining = 18.5 mtrs, (vi) Annual maintenance cost of unlined channel per 10 sq.m. = Rs.1.0 and (vii) Assume seepage loss in lined channel at 0.01 cumecs per million sq.m of wetted perimeter.

(P.T.O.)

Q.7 a) Derive the relation between duty of water and delta of crop.

b) Design a pipe outlet if,

(i) Full supply discharge at the head of water course = 90 lps,

(ii) FSL in distributory =205 m,

(iii) FSL in water course = 204 m,

(iv) Cd= 0.62. Assume other data, if necessary.

Q.8 a) Enlist different canal regulation works. Explain in brief about canal outlets.

b) Write in brief about curves in channels.

Q.9 a) Write in brief about mechanics of sediment transport. Derive the equation for unit tractive force.

b) Differentiate between weir and barrage.

Q.10 Write short notes on (Any four).

1) Lane's weighted creep theory
2) Gravity and non-gravity weirs
3) Alignment of the canal
4) Fish ladder
5) Maintenance of irrigation canal

SECTION "B"

Q.11 State True or False.

1) For rigid modules, the sensitivity is zero.
2) Cross drainage works are avoided in watershed canal.
3) The duty of water at the head of the minor is always more than that at the head of watercourse.
4) Lining reduces the channel capacity.
5) Regime theory is applicable to channels under final regime.
6) A siphon aqueduct is constructed for passing drain water below canal water.
7) If the major part or the entire ponding of water is achieved by a raised crest and a small part or nil part of it is achieved by the shutters, then the barrier is known as weir.
8) An antinodes are found in wind blown sands.

Q.12 Fill in the blanks.

1) In the study of mechanics of sediment transport soil is assumes to be _____.
2) For a trapezoidal channel, the index is _____.
3) _____ is the ratio of mean supply discharge to the full capacity discharge.
4) Generally _____ equation is used for calculating velocity in Kennedy's theory.
5) Silt excluder are those works which are constructed on the bed of the _____.
6) Duty at the head of water course is called as _____.
7) The canal, which is aligned along any natural watershed is called as _____.
8) Fully supply coefficient is also called _____.

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