B.Tech. (Agril. Engg.)

Semester	: VI (Old)	Term : II	Academic Year :	2017-18
Course No.	: IDE 366	Title :	Minor Irrigation and Command Area Development	
Credits	: 3 (2+1)			
Day & Date	: Wednesday, 25.04.2018	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"

Q.1   a) Discuss in detail canal alignment.

b) Explain weir and barrage with neat sketches.

Q.2   a) Describe different classes of canal modules.

b) Design an irrigation outlet for the following data:

FSQ of outlet = 50 lit/sec

FSL in distributary on u/s side of outlet = 200.00 m

FSL in water course on d/s side of outlet = 199.92 m

FSD in distributary on u/s side of outlet = 1.05 m

Q.3   a) Classify the cross drainage works and explain in details the superpassage with neat sketch.

b) Define duty and delta. Explain the duty at various places.

Q.4   a) What are the distributory head regulators and cross regulators? Give their main functions.

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.

Q.5   a) Derive the relationship between sensitivity and flexibility.

b) Describe hydraulic jump and its usefulness in the design of irrigation structures.

Q.6   a) Enlist types of canal falls. Explain proper location of canal fall.

b) Give details of Warabandi water distribution method.

Q.7   a) Explain in details the Lanes weighted creep theory for seepage flow.

b) Design a lined triangular channel to carry a discharge of 15 cumecs. The available and accepted country slope is 1 in 9000. Assume that the side slopes of the channel be 1 ¼ H : 1 V and the value of Manning's rugosity coefficient be 0.015 for good brick work.

Q.8   Design an irrigation channel to carry 40 cumecs of discharge, with B/D i.e. base width to depth ratio as 2.5. The critical velocity ratio is 1.0. Assume a suitable value of Kutter's regosity coefficient and use Kennedy's method.

(P.T.O.)

Q.9   a) The gross commanded area for a distributary is 6000 ha, 80% of which is culturable irrigable. The intensity of irrigation for *Rabi* season is 50% and that for *Kharif* season is 25%. If the average duty at the head of the distributary is 2000 ha/cumec for *Rabi* season and 900 ha/cumec for *Kharif* season, find out the discharge required at the head of the distributary from average demand considerations.

b) Define the bed load and suspended load.

Q.10   Write short notes.

a) Advantages of canal lining   b) Canal breaches

SECTION "B"

Q.11   Fill in the blanks.

1) The percentage of culturable commanded area proposed to be irrigated seasonally is called _____.

2) Gibb's module is a common example of _____ outlet.

3) The ratio of the mean supply discharge to the full capacity discharge is called_____.

4) The soil is moistened with water, so as to help in sowing of the crops, is known as _____.

5) The first watering which is given to a crop when the crop is a few centimeters high, is called _____.

6) The duty of water at the head of the minor is always _____than that at the head of watercourse.

7) The duty for a crop is 864 ha/cumec on the field and the base period of this crop is 120 days then delta for crop is _____cm.

8) The discharge depends upon the difference of head between the distributory and the water course in case of _____ modules.

Q.12   State True or False.

1) A contour canal irrigates only on one side.

2) Lacey stated all the channels to be in a state of regime provided they did not slit or scour.

3) Artificial channels can never be in 'true regime'.

4) As per Bligh's creep theory, the horizontal creep is less effective in reducing uplift than the vertical creep.

5) The ratio of number of days the canal has actually to run, to the number of days of base period is called capacity factor.

6) An outlet is known to be hyper-proportional if its flexibility is less than unity.

7) The rise in the maximum flood level upstream of the weir, caused due to the construction of the weir across the river, is called Pond Level.

8) For incoming Froude number = 1 to 1.7, the water surface shows undulations and the jump is called undular jump.

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