(Please write your Exam Roll No.) Exam Roll No. .

END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH] NOVEMBER –DECEMBER 2018

Paper Code: ETCE-403 **Subject: Irrigation Engineering**

Time : 3 Hours **Maximum Marks :75**

Note: Attempt all questions as directed. Internal choice is indicated.

Q1 Attempt **any five** of the following **(5x5=25)**

(a) Define duty and delta, and derive their relationship. What are the factors on which duty depends?

(b) Explain briefly Khosla's exit gradient concept.

(c) What are outlets? What is meant by the term 'Setting of the outlet"?

(d) Derive the equation of the term "flexibility" and "proportionality" as applied to modules. Derive equations for them.

(e) Briefly explain Chaturvedi's Method for design of transitions.

(f) What are the objectives of River Training and what are types of river training?

Q2 (a) After how many days water shall be supplied to a field in order to ensure sufficient irrigation of the given crop if: field capacity of the soil is 30% permanent wilting point=14%, dry density of soil is 1.3gm/cc, effective depth of root zone is 75cm and daily consumptive use of water for the given crop is 15 mm. **(5)**

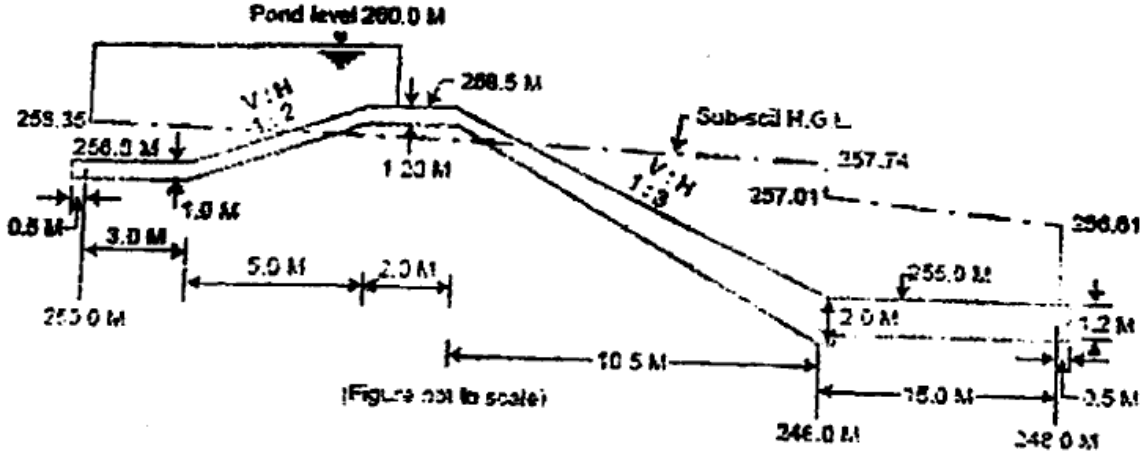
(b) What are the different types of canal outlets? Explain the performance criteria for canal outlets. **(7.5)**

OR

(a) The culturable commanded area of a watercourse is 1400 hectares. Intensities of rice and wheat are 10% and 35%, respectively. The duties for the crops at the head of the discharge required at the head of the watercourse. **(5)**

(b) What are the causes and effects of water logging? Briefly list the remedial measures for water logging. **(7.5)**

Q3 (a) Using Khosla's method, obtain the residual seepage pressures at the 'key' points for the weir profile shown in Figure. Also calculate the value of the exit gradient. Consider the case of no flow at pond level. **(7.5)**



(b) What are the functions of a distributary head regulator and a cross regulator? **(5)**

P.T.O.

OR

(a) Discuss the various types of falls with neat sketches. Also discuss the suitability of each type. **(7.5)**

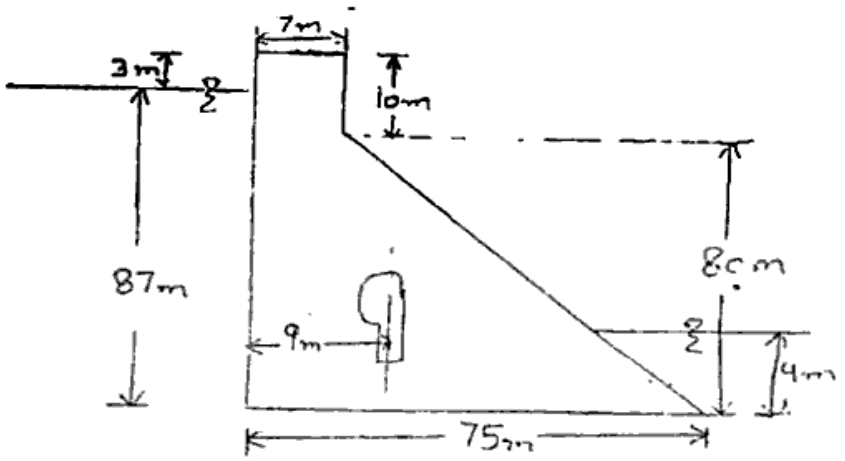
(b) What are the roughening measures for energy dissipation? Explain with neat sketches. **(5)**

Q4 Discuss with neat sketches, the three different types of aqueducts which can possibly be constructed depending upon the size of the drainage to be passed below the canal. Also discuss the factors governing the choice of any of these three types of aqueducts. **(12.5)**

OR

How would you estimate the afflux and the uplift pressure on the roof of the barrel of a siphon aqueduct? Also discuss the general considerations for design of canal head regulator. **(12.5)**

Q5 Calculate the maximum vertical stress at heel and toe of the dam shown in figure. Neglect the earthquake effect. Also calculate the major principle stress at the toe of the dam and the intensity of shear stress on a horizontal plane near toe. **(12.5)**



OR

For the following profile investigate the safety against overturning and sliding. Given: Coefficient of friction is 0.75, density of concrete is 2.4 tonnes/m³. Also check the safety against tension and compression, shear strength at the base is 14kg/cm² and Uplift intensity factor, C = 60% **(12.5)**