

C 704: Irrigation Engineering

Max. Time: 3 Hours

Max. Marks: 70

Exam. No. of the candidate: _____ Supervisor's dated initial: _____

Instructions: - (1) Answer to the two sections must be written in separate answer books.

(2) Figures to the right indicate full marks.

(3) Assume suitable data if required.

Section - I

Q.1

- (A) What is flow net? Give properties of flow net. What are uses of flow net?
 (B) Locate the phreatic line in earth dam shown in Fig (1). Also draw flow net and determine the discharge. Take $k = 4 \times 10^{-6}$ m/sec, $N_f = 3$, $N_d = 15$.

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OR

- Q.1 (A) Give assumptions made in the seepage analysis. Derive equation for discharge passing through a flow net for isotropic soil.
 (B) Which methods are used for slope stability analysis? Explain in detail.

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Q.2

- (A) Figure (2) shows hydraulics structure built on fine sand. ($C = 15$)
 Determine (a) Check the stability of structure.
 (b) Uplift pressure head at A, B, C
 (c) Thickness of floor at A, B, C, Use Bligh creep theory.

 $G = 2.24$

- (B) Discuss the Khosla's method of independent variable with assumption and corrections apply for determination of pressure at key points for seepage below a weir.

OR

- Q.2 (A) What are the causes of piping failures and the failure due to rupture of floor? How would you prevent such failure?
 (B) What do you understand by a launching apron? How is it designed?

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Q.3

- (A) What is elementary profile of gravity dam? Derive equation for base width for no tension criterion and no sliding criterion.
 (B) For the gravity dam shown in fig (3).
 Determine (a) the factor of safety against sliding
 (b) the shear friction factor
 (c) the factor of safety against overturning
 (d) Is there any tension?

Section - II

Q.4

- (A) What are the advantages and disadvantages of Sprinkler irrigation?
(B) What do you understand by water logging? Explain various ill-effect of water logging.

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OR

- Q.4 (A) What is subsurface irrigation? Differentiate between the natural subsurface irrigation and artificial sub surface irrigation. Is the drip irrigation also the subsurface irrigation?
(B) Explain the silent features of the drip irrigation system. What are the advantages and disadvantages of drip irrigation?

Q.5

- (A) Design an irrigation channel for the following data using Jacey's theory.
Discharge = 22 cumecs, $m_r = 0.35$.
(B) Write short note on maintenance of canal.

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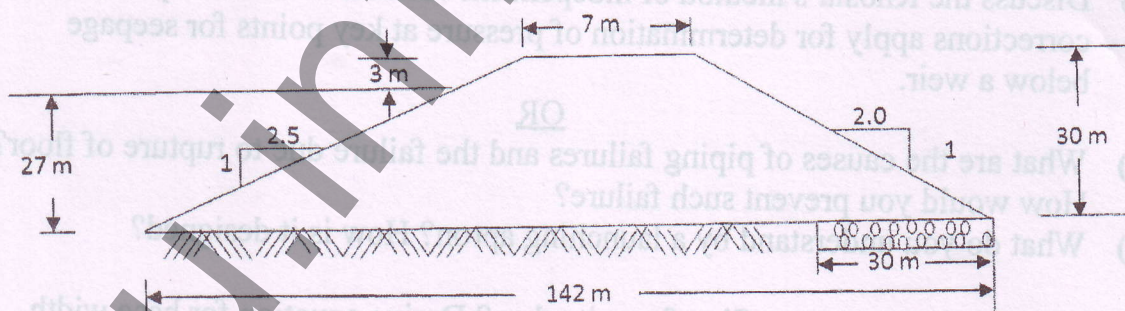
OR

- Q.5 (A) Design an irrigation channel for the following data using Kennedy's theory.
Discharge = 15 cumecs, $N = 0.0225$, $m = 1$ and $S = 1$ in 5000.
(B) Describe the various type of cross drainage work on a canal. In what condition each type is most suitable.

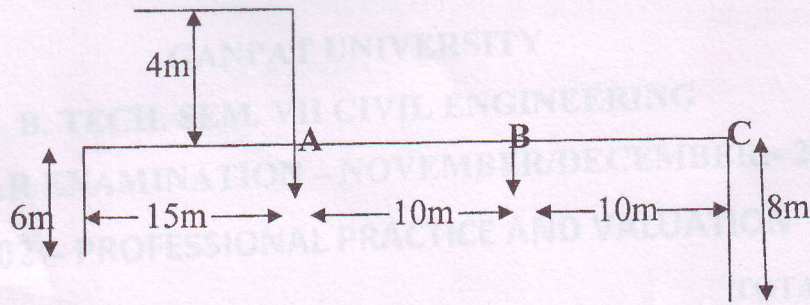
Q.6

- (A) Discuss in brief the benefits and ill-effect of irrigation.
(B) What do you understand by the lining of canal? What are the advantages and disadvantages of lining of canal?

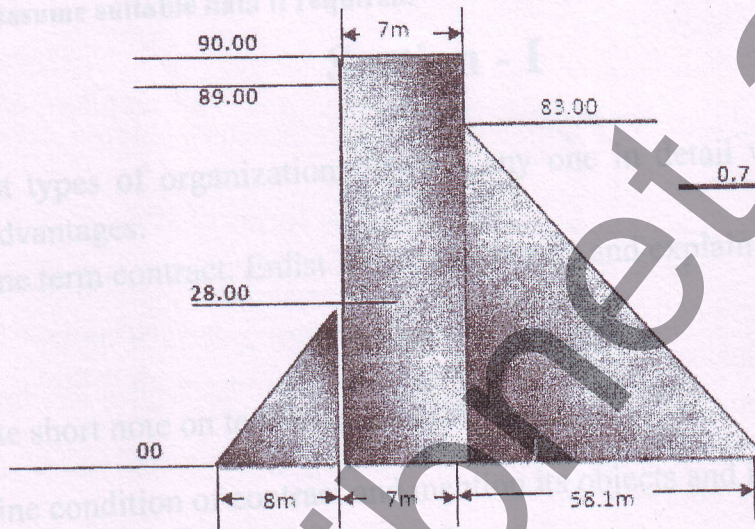
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(Fig.1)



(Fig.2)



(Fig.3)

END OF PAPER

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