

AQ - 2939

First Semester M. E. Civil (Geotech.) Examination

EARTH DAM ANALYSIS AND DESIGN

Paper - 1 SFGE 5

P. Pages : 2

Time : Three Hours]

[Max. Marks : 80

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- Note :** (1) All question carry equal marks.
(2) Due credit will be given to neatness and adequate dimensions.
(3) Assume suitable data wherever necessary.
(4) Illustrate your answer wherever necessary with the help of neat sketches.
(5) Solve any **Two** subquestions from each question.
(6) Use pen of Blue/Black ink/refill only for writing the answer book.

1. Attempt any **Two** :—

- (a) Explain various different safe design criterias for earthen dam and also explain structural failure in detail. 8
- (b) Draw typical cross section of earth dams when :
- (i) Only pervious material is available.
- (ii) Only impervious material is available.
- (iii) Both pervious and impervious materials are available. 8
- (c) Explain different methods of drawing flow net. 8

2. Attempt any **Two** :—

- (a) Explain phreatic line for a homogenous earth dam without any drainage system with exit correction. 8
- (b) Explain flow net in an earthen dam constructed of an anisotropic soil. 8
- (c) Explain Bennet's method based on zoned section and homogeneous section. 8

3. Attempt any **Two** :—

- (a) Explain various parameters to be decided in the preliminary section of earthen dam with slopes recommended by Terzaghi. 8

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- (b) Explain design procedure for the design of upstream impervious blanket of uniform thickness. 8
- (c) Explain the stability of down stream slope during steady seepage condition. 8

4. Attempt any Two :—

- (a) Explain the surface protections of earthen dam and state its different types. 8
- (b) What are the basic requirements of the filter and rules for the design of filter according to various agencies such as U.S. Army Corps of Engineer and U.S.B.R. ? 8
- (c) Determine the factor of safety of the earthen dam having upstream slope 2:5:1 and down stream slope is 2:1 with height of dam is 20m and top width is 5m ($C = 30 \text{ kN/m}^2$, $\tau = 20 \text{ kN/m}^3$, $\phi = 20^\circ$). It is provided with toe filter of length 30m. Draw phreatic line for the dam section by determining atleast four co-ordinate on it. Also determine seepage discharge taking $k = 4 \times 10^{-6} \text{ m/s}$. Free Board = 3 m. 8

5. Attempt any Two :—

- (a) What are the different types of Rockfill dams ? In what conditions a rockfill dam is more suitable than an earth dam ? 8
- (b) Explain how stability analysis of Earthen dam is carried out considering earthquake forces. 8
- (c) Explain various equipments used in embankment construction. 8

