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8E4032

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B. Tech. VIII Sem. (Main/Back) Exam., April, 2015

Civil Engineering

8CE2 Water Resources Engineering - II

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five** questions, selecting **one** question from each unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL

2. NIL

UNIT - I

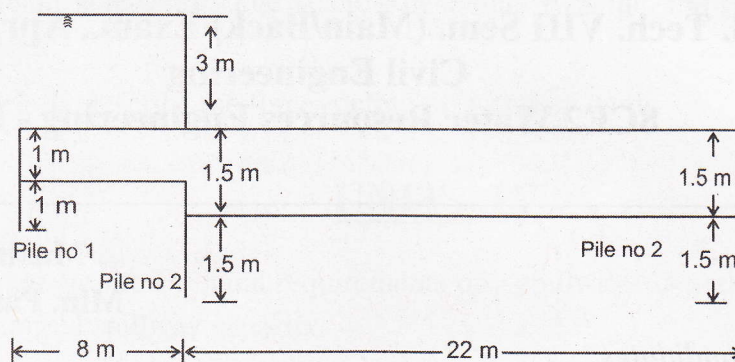
- Q.1 (a) Describe the necessity of providing a canal fall. What are the factor to be considered while deciding the location of a fall? [8]
- (b) What are the factors to be considered for selecting suitable type of cross drainage works? [8]

OR

- Q.1 (a) Draw the sketch and explain the design of various components of a Sarda type fall. [8]
- (b) Describe the points to be considered for selecting the site of a cross drainage work. [8]

UNIT – II

Q.2 (a)



Calculate uplift pressures at key points of all the three piles of the structure shown above. Also check the thickness provided and the exit gradient. The safe exit gradient is 1.5 [12]

(b) Compare the Bligh's and Khosla's theories. [4]

OR

Q.2 Design a vertical drop weir using Bligh's theory and check the exit gradient and the thickness of floor by Khosla's theory for the given data.

- (i) Design flood discharge = $4000 \text{ m}^3/\text{s}$
- (ii) H. F. L. before construction = 200.00
- (iii) F. S. L. of canal = 199.00
- (iv) Average bed level of river = 192.00
- (v) Retrogression of bed = 0.50m
- (vi) Lacey's silt factor = 1.0
- (vii) Safe exit gradient = $1/5$
- (viii) Coefficient of creep = 11
- (ix) D/S bed level = 192.00
- (x) Afflux = 1.0m

Draw the sketch of vertical drop weir showing all the components.

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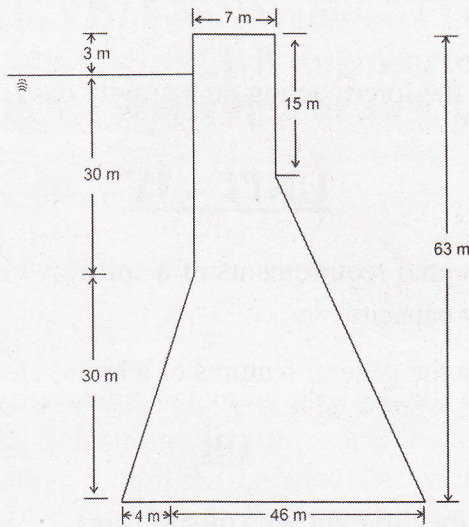
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[16]

UNIT – III

Q.3 (a)

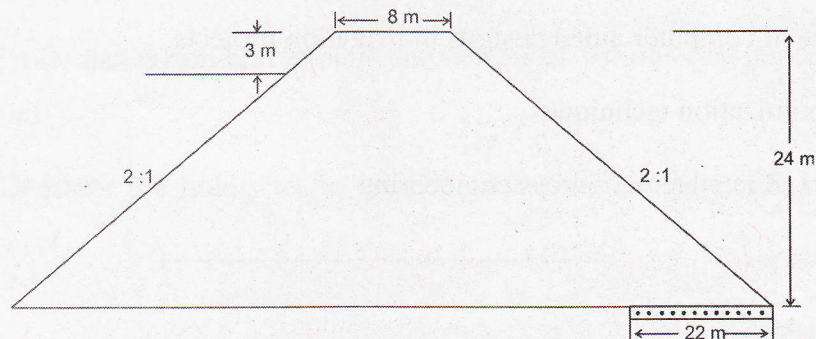


Check the stability of the gravity dam shown above for the reservoir empty and reservoir full conditions. Calculate the principal stresses and shear stress at toe and heel of the dam. Consider only self weight, weight of water, water pressure and uplift pressures. Average shear strength (q) = 1.4 MPa and $W_c = 24 \text{ KN/m}^3$. [12]

(b) Describe the phenomenon of piping in earth dam and its prevention methods [4]

OR

Q.3 (a) Check the stability of u/s and d/s slopes of the given earth dam. Assume The saturated unit weight = 21 KN/m^3 and unit weight under steady seepage = 20 KN/m^3 , the $\phi = 25^\circ$ and under $C = 20 \text{ KN/m}^2$ and $\delta = 60^\circ$



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The areas of rectangle plotted are, $a_N = 13.0 \text{ cm}^2$, $a_T = 6.6 \text{ cm}^2$ and $a_U = 3.0 \text{ cm}^2$, with scale $1 \text{ cm} = 5 \text{ m}$ for downstream side, $a_N = 14.0 \text{ cm}^2$ $a_T = 4.2 \text{ cm}^2$ for upstream side with same scale. The radius r of the slip circle = 75 cm in both cases. [8]

- (b) Briefly describe the forces acting on a gravity dam. [8]

UNIT – IV

- Q.4 (a) What are the essential requirements of a spillway? Describe the factors affecting required spillway capacity. [8]
- (b) Draw and explain the general features of a hydro electric scheme. [8]

OR

- Q.4 (a) Sketch and describe different type of spillways. [8]
- (b) Describe the function of a draft tube. Explain cavitations. [8]

UNIT – V

- Q.5 (a) Describe briefly environmental impact assessment of water resource projects. [8]
- (b) Describe water shed management. [8]

OR

- Q.5 Write short notes on the following. [4×4=16]

- (i) Reservoir Sedimentation
 - (ii) Use of computer aided designs in irrigation projects.
 - (iii) Optimization techniques.
 - (iv) G. I. S in water resources engineering
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