



Water Resources Engineering - II
(New) (1300)

P. Pages : 3

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any two** bits from each question.
5. Figure to the right indicate full marks.
6. Assume suitable data if required.
7. Use of non programmable calculator is allowed.

1. a) i) Discuss effect of earthquake on gravity dam. 5
ii) Explain low gravity dam and high gravity dam. 5
b) A masonry dam 10 m high is trapezoidal in section with a top width of 1 m and bottom width 8.25 m. The face exposed to the water has a batter of 1:10. Test the stability of dam. Assume unit weight of masonry as 2240 kg/m³, shear stress of joint = 14 kg /cm². 10
c) Write short note on :
i) Galleries in gravity dam. 5
ii) Arch dam. 5
2. a) i) A Saddle siphon has the following data 6
Full reservoir level = 435.00 m
Level of centre of siphon outlet = 429.60 m
High flood level = 435.85 m
High flood discharge = 600 cumecs
If the dimension of throat of siphon are width 4 m, Height = 2 m.
Determine the number of Siphon unit required to pass the flood safely. The siphon discharges freely in air.

- ii) Compute the discharge over an ogee weir with coefficient of discharge 2.4 m and head = 2 m. The length of spillway is 100 m. The weir crest is 8 m above the bottom of approach channel having same width as that of spillway. 4
- b) Explain design procedure for standard stilling basin type – I. 10
- c) Write short notes on :
- i) J.H.C. and T.W.C. 5
- ii) Cavitation in ogee spillway. 5
3. a) What do you mean by phreatic line. Explain graphical method of locating phreatic line. 10
- b) i) Explain lanes theory. 5
- ii) What are different design criteria for earthen dam. 5
- c) Fig shows the section of a hydraulic structure founded on sand. Calculate the average hydraulic gradient. Also find the uplift pressures at points 6, 12, and 18 m from the U/S end of the floor and find the thickness of the floor at those points. 10

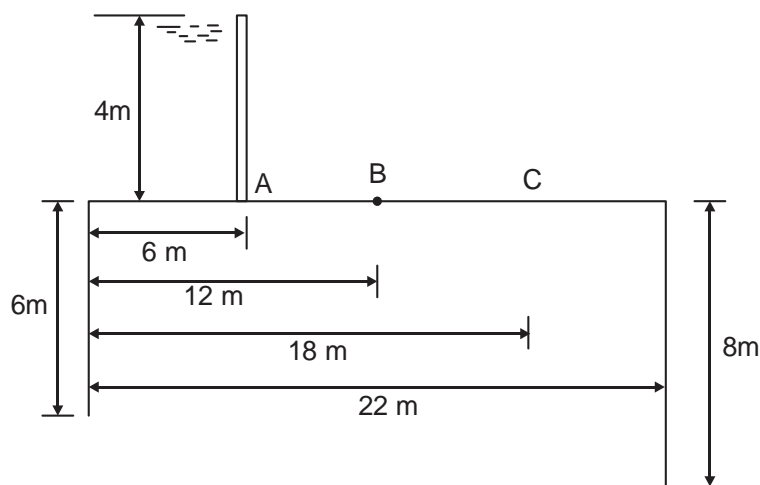


Fig. Q.3 (c)

4. a) Design an irrigation channel in alluvial soil according to Lacey's silt theory. Given the following data. 10
 Full supply discharge = $15 \text{ m}^3/\text{sec}$
 Lacey's silt factor = 1.0
 Channel side slopes = $\frac{1}{2} : 1$
- b) Design an irrigation channel to carry a discharge of 45 cumecs. 10
 Assume $N = 0.225$ and $m = 1$. The channel has a bed slope of 0.16 m per km.

- c) Write short notes on :
i) Garret diagram. 5
ii) Balancing depth of a canal. 5
5. a) What are component of hydropower plant. Draw neat layout of medium head hydropower plant. 10
b) What do you mean by canal fall. Discuss the necessity, location and development of canal fall. 10
c) Write short note on :
i) Bank protection. 5
ii) Spures. 5
