

Attempt all questions. Any missing data may be reasonably assumed.

- | | <u>Marks</u> |
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| <u>Question (1):</u> | <u>[20]</u> |
| a) Define the following : | |
| • Seepage force under an earth dam | (10) |
| • Equipotential lines and flow lines | |
| • The piping in soil as a result of seepage under earth dams | |
| b) A dam section is shown in fig. (1). Given : $K_x = 9.0 \times 10^{-5}$ mm/s , $K_z = 1.0 \times 10^{-5}$ mm/s
Draw a flow net and calculate the rate of seepage under the dam. | (10) |
| <u>Question (2):</u> | <u>[20]</u> |
| a) Find the equation of flow net in one directional flow using the following: | |
| 1 – Darcey's law of flow | (10) |
| 2 – Laplace's equation of continuity | |
| 3 – Continuity equation of flow | |
| b) For the same dam section in fig.(1) , Determine the rate of seepage if a vertical sheet pile with 6.0 m length is placed at 6.0 m distance from point(a) | (10) |
| <u>Question (3):</u> | <u>[20]</u> |
| a) عرف دمك التربة وما يترتب عليه من تحسين خواص التربة مع توضيح كيفية التحكم في درجه الدمك في الموقع وطرق نزع المياه من الحفر. | (10) |
| b) وضح مخاطر الانهيار وتغير الشكل المقبول نتيجة انهيار القص مع توضيح العوامل المؤثرة علي ثبات ميول القطوع والعوامل المؤثرة علي تصميم الجسور. | (10) |
| <u>Question (4):</u> | <u>[20]</u> |
| a) Discuss the factors controlling the choice of soils for earthworks? | (10) |
| b) Identify the common followed criteria in choice of earth dams construction materials? | (10) |
| <u>Question (5):</u> | <u>[20]</u> |
| a) A cantilever sheet pile penetrates a granular soil. G.W.T. is located at 2.0 m from ground surface. Dredge level is (-5.0) from ground level. Soil unit weights above and below G.W.T. are 15.9 & 19.33 kN/m ³ , respectively. $\phi_{\text{soil}} = 32^\circ$. Estimate: | (10) |
| • The theoretical depth of embedment below dredge line (D)? | |
| • Using a F.S of 30% in (D), what would be the total sheet pile length? | |
| b) Resolve the previous problem if the sheet pile is embedded in clayey soil having the following characteristics: Unit weights above and below G.W.T. are 15.2 & 18.50 kN/m ³ . Cohesion = 50 kN/m ² . All other factors are not altered. | (10) |

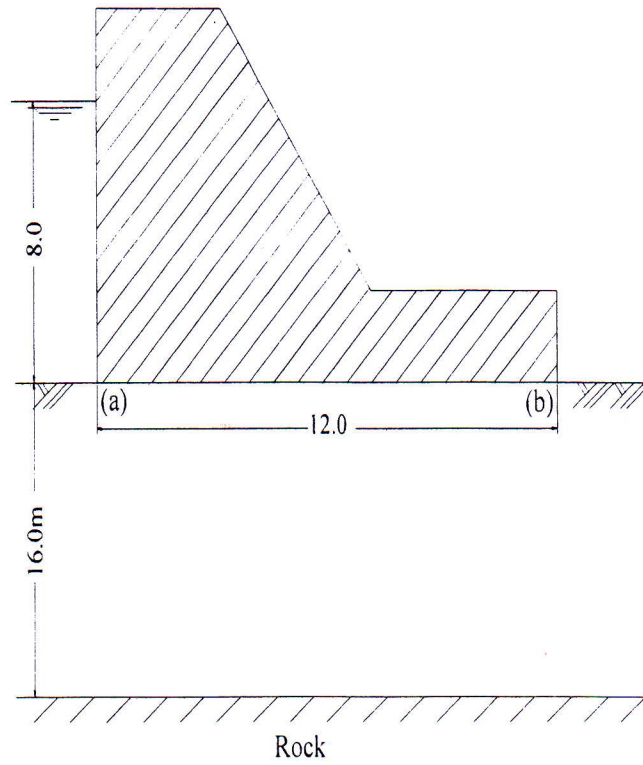


Figure (1)

Examiners committee

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