

Hydraulics Engineering Msc Entrance Examination

1. In a certain highway there are two side drains constructed in the left and right sides, one day there was intense rainfall and in one of the crossing structures due to some trash materials and stone inside it, water was not flowing d/s and immediately d/s of the crossing structures, water was on the verge of over flowing towards the asphalt road, but few meters u/s the depth of water rather low, the depth of the channel being constant what would you think is the reason for this? Sketch clear picture for the problem.
2. For a given reservoir site, the triangular unit hydrograph of 10mm rainfall rises from 0-20m³/s in 3hr and fall to 0 in further 4hrs. For the chosen return period 30mm of R.F in 4hrs, 66% of falling in the middle 50% of storm duration & 34% in the remaining 50%. The percentage runoff from the catchment is 60. Produce the design flood hydrograph for the chosen return period. Base flow in the river is 4m³/s.
3. Hydrologic variables of a reservoir for the month September are as given in the table. Estimate change of storage reservoir in m³ and cm.

Month	RF(mm)	E(mm)	Seepage loss	Gw contribution	I(m ³ /s)	O (m ³ /s)	Ave, surface area Km ²
Sep	1000	300	100mm	120mm	20.3	80	1200.5

Where RF= rainfall

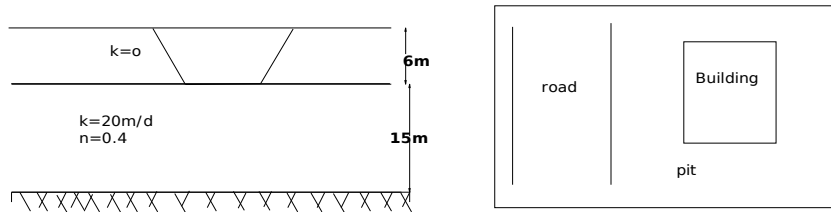
E= monthly reservoir evaporation

I= monthly inflow in to total reservoir

O=monthly outflow in total reservoir.

4. Irrigation farming is given to be practiced somewhere in a piece of land, the owner needs to build an office building there. The type of soil in the building pit to be constructed is as shown above with completely impervious upper layer ($K=0$) and under neath there is a layer with $k=20\text{m/d}$ and $n=0.4$. If we insert a piezometer in the soil layers we can observe a ground water potential 2m below the land surface. Due to this we need to drill two wells to keep dry working condition in the building pit. The radius of wells can only be 0.15m.

Where is the critical point?



5. The earth dam is designed in a section of a river. Having seen the seepage and stability analysis, the factor of safety for all slip circles considered was less than 1.3. Two designers wanted to increase the factor of safety before compiling the design and submit for the client. If you are the engineer in the charge of this design, what measures do you suggest to increase the factor of safety to acceptable level? Please

Answer the question exhaustively looking at

- A. General geometry of the design
 - B. Material property
 - C. Possible reduction of destructive(sliding) forces
6. What are the main parties /stake holders/ in construction project?
Describe their role in construction industry in detail
7. What is the difference between general condition of contract and specific condition of contract?
8. Describe the role of construction management in Ethiopia construction industry?
9. There are many documents that make up a construction contract. Mention these essential documents of contact documents.
10. What are the main processes in construction management?
11. Define
- ✓ retention money
 - ✓ Advance payment
 - ✓ Liquid damage
 - ✓ Bid bond
 - ✓ Performance bond
 - ✓ Defect liability period
12. Assume you are mega project manager, what is your duties and responsibility within the project site?
13. What are major component of concrete. Mention the major factors that affect concrete strength.
14. For proposed beam section, if the check diagonal compression fails, what will be your recommendation

a) Providing appropriate shear reinforcement

b) Increase the depth

c) Providing longitudinal reinforcement

d) Increasing width

e) Increasing grade of concrete

15. Describe advantage and disadvantage of steel structures over reinforced concrete structure.

16. Draw influence line for shear force at m-n of the beam

