



University Of Technology
Building and Construction Eng. Dept.
Final Exam –2014/2015 1st Attempt
Subject : Const. of Hydraulic Struc. Class: Second
Branch : Water and Dams Eng. Time : 3 Hours
Date : 1/6/ 2015



Answer Five Questions only and The Marks are Equally Divided

Q1: Complete the following:

- 1- The technical specifications define the distance between the main reinforcing bars in concrete beams by ----- and the amount of overlap when the length of bars which must be used is more than the manufacturer lengths of steel bars, is -----
- 2- The characteristics of normal Portland cement are the following
1 ----- 2 ----- 3 ----- 4 -----
- 3- The rocks are classified due to their physical and chemical properties into 1----- 2----- 3-----
- 4- The key factors which are used in the selection of, structural buildings, steel or concrete structure, are 1 ----- 2 ----- 3 -----
4 ----- 5 -----
- 5- The rafter is defined as-----
- 6- Some sections of standard precast and pre-stress beams are:
1-----2 -----3 -----
- 7- The partitions are structurally divided to 1----- 2-----

Q2: Give the reasons for the following:

- 1- Use of locally available materials and low-cost coating works in the banks of the rivers or canals
- 2- In the establishment of any building it is required to study of the soil that held it .
- 3- The use of filtration process in water treatment plants.
- 4- The division of all buildings broadly into light and heavy
- 5- The depth of reinforcement concrete beam is limited between (1/25) to (1/15) of the length of its space .

Q3: Explain in drawing the details for the following:

- 1- The header angle and sharp angle arches with giving the number of their centers.
- 2- cross section in the spillway.
- 3- cross section of water joint .
- 4- Section in refracted joint.
- 5- Plan , longitudinal section , and cross-section of step fish ladder.

Q 4: A) – classify the following:

- 1 - The structures of power generation.
- 2 - bricks depending on the materials used in its manufacture.
- 3 - Beams due to its location in building and depending on the

purpose of use.

4- The fish passages.

5- The single center or radial arches .

B) State the principles which must be taken into account to achieve good link in brick building

Q 5: A) Answer the followings:

1- State the principles which are noted when the buildings are covered with stone .

2- State the steps which must be accomplished when intended to pass the ship from the space of lower water level to the space of higher water level

B) State the properties of water used in concrete mixtures and what are the points that define its function.

Q 6: Answer the following:

A-) State a detailed types of hydroelectric stations falling within the river hydraulic structures and operating by pumping the stored water.

B-) State the advantages of bulldozers.

With our best wishes for your success

(1) $\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \frac{1}{8}$

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Q1:

1- Diameter of bar when equal and the largest diameter when different -

4- Diameter of bar

2- 1- Smoothness about 60% in lap and 40% in lap

2- Coherence, 3- Tensile stress

4- Pressure effort

3- 1- Morphology 2- Time 3- Sand rocks

4- 1- Sections provide for the appropriate use for the forces the conveyed.

2- The value of land

3- Speed work - 4- height of building

S - cost

5- it is beam used with inclined ceiling and be placed in parallel and convergent

Spaces

6- Box section, channel section, Double T

T-section, unsymmetrical I-section,

Inverse T-section, I-section

7- External, internal

Q-2:

1- Because the coating beams extend to great distance and require a substantial amount of materials used.

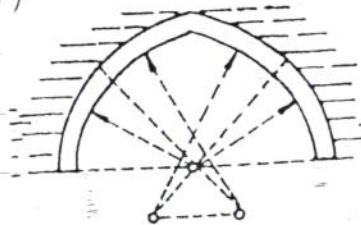
2- To determine the appropriate place for the foundation which need to determine the ground water level and to put the solutions when it lay with this level.

(2)

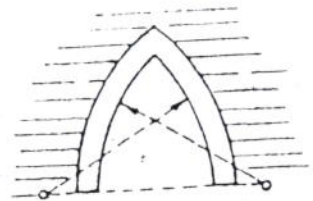
- 3 - To remove the colloids suspended solids which causing the turbidity of water.
- 4 - Depending on the method of transmission forces through its members during the construction.
- 5 - To prevent the curvature of beam over the limited value due to the technical specifications.

Q.3 =

1-))



Header Angle

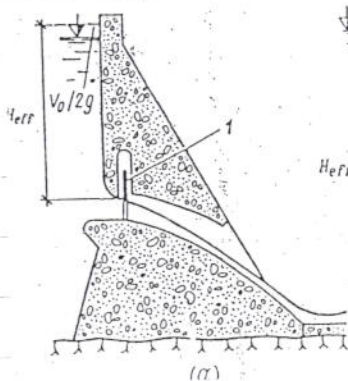


Sharp Angle

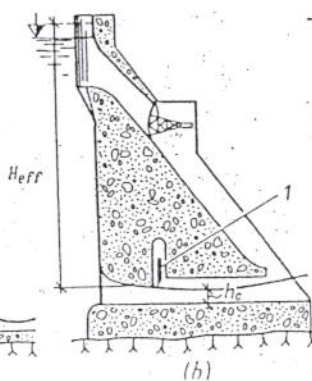
three center arches

+ two center for

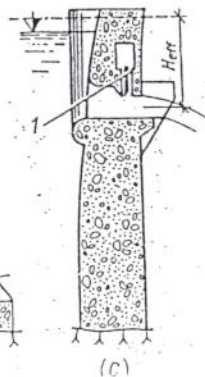
2-))



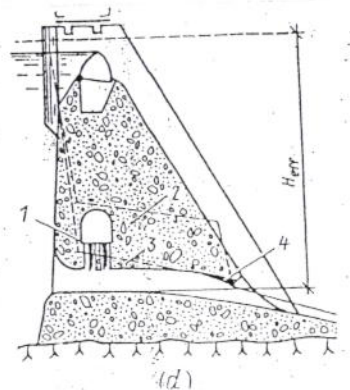
(a)



(b)

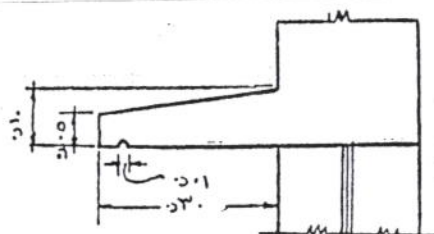


(c)



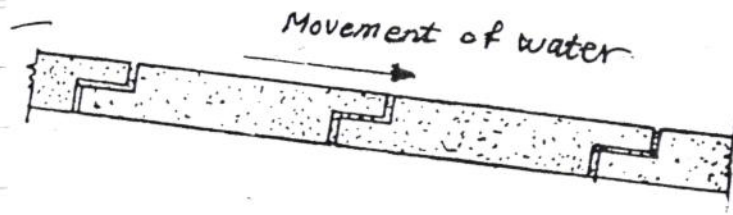
(d)

3-))

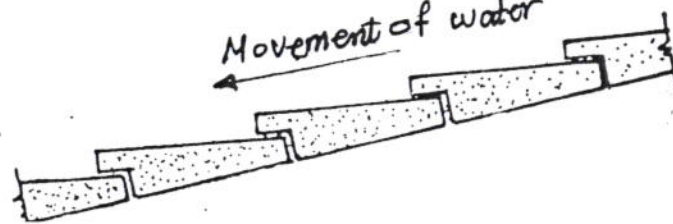


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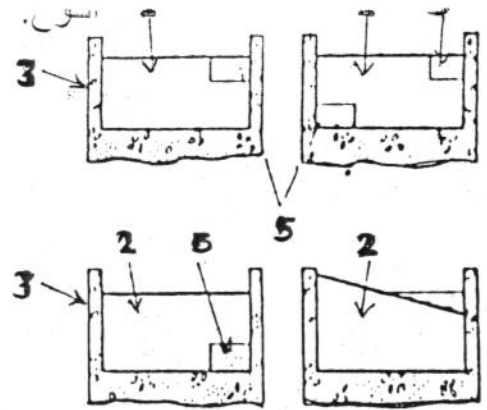
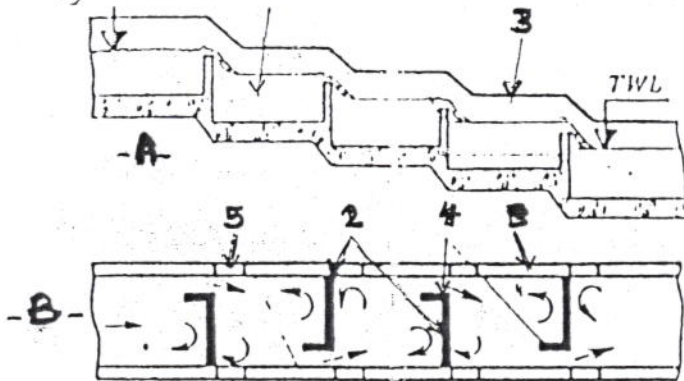
4-))



Movement of water



5-))



Q-4 :

A-))

1. station that arise in the course of the river

2. Station that constructed within the Dam,

a- The station in the course of the river,

b - standard stations with water surplus banks.

c - Stations operated by storage pumping water,

* Group of Conversion station

* Group of stations operated by pumping stand water

2 - Clay, Sand, concrete brick.

(4)

- 3 - Girdler, Rafter, Joists.
- 4 - Slipping stream ladders, Pond ladders, step ladders.
- 5 - Half circular, Sector, Horseshoe, Hanging.

B-)

- 1 - Brick placed on a regular basis in the construction and with joints of equal width.
- 2 - Use less of what can break the bricks.
- 3 - The vertical joints in the frequent layers on the straight line and is perpendicular to the surface of the wall.
- 4 - Use brick of equal dimensions in order to achieve uniformity in construction.

Q.5:

A-)

- 1 - All horizontal joints should be perpendicular to the driving forces in the wall so as to prevent slipping between the stones.
- 2 - The joints should be organized so that not be parts of the construction like beams for example, to display shear or tensile strength.
- 3 - The joints must be organized so that not leave any sharp angle in any piece of related interval.

2-

- 1 - open the gate of the navigation channel in the downstream to enter the ship into the channel.
- 2 - close the gate of the channel referred to it in (1) above after the entry of the ship.
- 3 - fill the chamber navigational channel with water from

(5)

the upper space through the delivery of water until the water level in the channel will be equaled with the upstream water level.

4 - open the gate of the channel which is incident in the upstream of it to lead the ship to pass to the upper channel approach.

5 - close the gate of the navigation channel in the upstream after the ship pass.

6 - Discharge the water from the chamber of the navigation channel through the drainage holes in the downstream to decrease the level of the water in it to become ready to pass other ships.

B-)) The water must be free of fatty materials or acids alkalis and construction materials. And must meet the properties of water used in drinking. Its functions contains:

- 1 - Interaction with the cement material that adjust to the work of cohesion.
- 2 - Published works on cement particles on the surface sand and gravel.
- 3 - work to facilitate the mixing of sand and gravel to mix with homogeneous mass
- 4 - reserves a certain vacuum in the concrete mass.

|||||

A-1)

3 - Stations operating by storage pumping water: increased in recent years and in all parts of the world to build hydroelectric plants operating by pumping storage water. Because these stations are used to provide a reserve surplus electricity during periods of low consumption of electrical energy which is used to pump water into the tank, then used later to generate electricity in the maximum consumption hours.

This type of stations includes two groups:

A - The Group of Conversion Stations Operating by pumping the stored water: which uses the difference in water levels in two basins with each connected by channels.

B - The Group of Stations operating by pumping stored water: Which are constructed in the course of the river and within the body of the dam.

That the simplest designs of hydroelectric stations operating by pumping the stored water, and are within the first group of stations contains the following hydraulic structures:

Water basin in the upstream, water intake, water pressure pipes, the building of hydroelectric station,

- B-1))
- 1 - leveling and modify the land intended for the establishment of projects.
 - 2 - the opening of roads in mountainous or rocky areas and the leveling of its tracks.
 - 3 - filling swamps and ditches and leveling them.
 - 4 - Remove the old buildings of the land to be perhaps the establishment of projects.
 - 5 - maintenance of roads.
 - 6 - the uprooting of trees, shrubs, and clean the work

(7)

site of the remains of the root.

7 - fractures and cracking solid rock or soil by the quarries that bind them.

8 - private land to create work places for the purpose of facilitating the work of other construction machinery like skimming and graders , and others.