

MIZAN TEPI UNIVERSITY
ENGINEERING AND TECHNOLOGY COLLEGE
DEPARTMENT OF HYDRAULIC AND WATER RESOURCES ENGINEERING
Tutorial Class for Exit Exam (Civil Engineering)

Answer the following question and give explanation

- 1) What are some common problems with dams as they age?
- 2) WHAT ARE THE ENVIRONMENTAL IMPACTS OF DAMS?
- 3) What benefits are gained by removing dams?
- 4) What role does a dam play in heavy rainfalls or flooding situations?
- 5) Why and when are dams open or closed?
- 6) How many dams does Ethiopia have?
- 7) When was the Great Ethiopian Renaissance Dam built?
- 8) Where was the great renaissance dam built?
- 9) How long is the Renaissance Dam?
- 10) What rank is the Ethiopian Renaissance Dam in the world?
- 11) What is the news on Grand Renaissance Dam of Ethiopia?
- 12) What is the problem Grand Ethiopian Renaissance Dam?
- 13) How many turbines are in the Renaissance Dam?
- 14) What is the history of dam construction?
- 15) What is the difference between embankment dam and concrete dam
- 16) What is the difference between embankment dam and earthen dam?
- 17) Where are embankments used?
- 18) What are the advantages of embankments?
- 19) What are the main parts of dam?
- 20) What are 5 disadvantages of dams?
- 21) What are the positive impacts of dam?
- 22) What are three main problems from dam?
- 23) What are the main points to be considered while selecting a site for dam construction?

MIZAN TEPI UNIVERSITY
ENGINEERING AND TECHNOLOGY COLLEGE
DEPARTMENT OF HYDRAULIC AND WATER RESOURCES ENGINEERING
Tutorial Class for Exit Exam (Civil Engineering)

Multiple Choice Questions focuses on “Design of Gravity Dams”.

- 1) In high dams, the safety against sliding should be checked only for friction.
- a) True
b) False
- 2) For full reservoir condition in a gravity dam, the critical combination of vertical and horizontal earthquake accelerations to be considered for checking the stability is _____
- a) Vertically upward and horizontally downstream
b) Vertically downward and horizontally downstream
c) Vertically upward and horizontally upstream
d) Vertically downward and horizontally upstream
- 3) The base width of a solid gravity dam is 35 m and the specific gravity of dam material is 2.45. What is the approximate allowable height of the dam having an elementary profile without considering the uplift?
- a) 64.68 m b) 54.80 m c) 164 m d) 80 m
- 4) A low gravity dam of elementary profile made up of concrete of relative density 2.57 and safe allowable stress of foundation material 4.2 MPa. What is the maximum height of the dam without considering the uplift force?
- a) 120 m b) 217 m c) 279 m d) 325 m
- 5) The vertical stress at the toe was found to be 3.44 MPa at the base of the gravity dam section. If the downstream face of the dam has a slope of 0.617 horizontal: 1 vertical, the maximum principal stress at the toe of the dam when there is no tail water is _____
- a) 1.7 MPa b) 2.4 MPa c) 3.6 MPa d) 4.8 MPa
- 6) Concrete gravity dam having a maximum reservoir level at 200 m and the RL of the bottom of the dam 100 m. The maximum allowable compressive stress in concrete is 3000 KN/m² and the specific gravity of concrete is 2.4. Calculate the height of the dam and check whether it is a high dam or low dam.
- a) H = 90 m High gravity dam b) H = 90 m Low gravity dam

MIZAN TEPI UNIVERSITY
ENGINEERING AND TECHNOLOGY COLLEGE
DEPARTMENT OF HYDRAULIC AND WATER RESOURCES ENGINEERING
Tutorial Class for Exit Exam (Civil Engineering)

- c) $H = 214.2$ m High gravity dam d) $H = 214.2$ m Low gravity dam
- 7) The axis of a gravity dam is the _____
- a) Line of the crown of the dam on the downstream side
 - b) Line of the crown of the dam on the upstream side
 - c) center-line of the top width of the dam
 - d) Line joining mid-points of the base
- 8) Presence of tail-water in a gravity dam _____
- a) Increases the principal stress and decreases the shear stress
 - b) Increases both the principal stress and the shear stress
 - c) Decreases the principal stress and increases the shear stress
 - d) Decreases both the principal stress and the shear stress
- 9) The factor of safety against overturning generally varies between _____
- a) 2 to 3 b) 1.5 to 2 c) 0.5 to 1.5 d) 1 to 2
- 10) What is the maximum permissible tensile stress for high concrete gravity dam under worst conditions?
- a) 500 KN/m² b) 500 kg/cm² c) 5 kg/m² d) 50 KN/m²
- 11) Which failure occurs when the net horizontal force above any plane in the dam or at the base of the dam exceeds the frictional resistance developed at that level?
- a) Overturning b) Crushing c) Sliding d) BY development of tension
- 12) Which failure occurs when the minimum stress exceeds the allowable compressive stress of the dam material?
- 13) Tension cracks in the dam may sometimes lead to the failure of the structure by?
- a) Sliding of the dam at the cracked section b) Overturning about the toe
 - c) Crushing of concrete starting from the toe d) Both overturning and crushing

MIZAN TEPI UNIVERSITY
ENGINEERING AND TECHNOLOGY COLLEGE
DEPARTMENT OF HYDRAULIC AND WATER RESOURCES ENGINEERING
Tutorial Class for Exit Exam (Civil Engineering)

14) The major principal stress at the toe of a gravity dam under full reservoir condition neglecting the tail water effect is given by _____

- a) P_v b) $P_v \tan \phi^2$ c) $P_v \sec \phi^2$ d) $P_v \sin \phi^2$

15) Which of the following criteria has to be satisfied for no tension at any point on a gravity dam?

- a) The resultant of all the forces must always pass through the mid-point of the base of the dam
- b) The resultant force for all conditions of loading must pass through the middle third of the base
- c) The resultant of all the forces must pass through the upstream extremity of the middle third of the base
- d) The resultant of all the forces must pass through the downstream extremity of the middle third of the base

Multiple Choice Questions focuses on “Embankment Dams”.

1) What is the U.S.B.R recommended value for freeboard when the height of the dam is more than 60 m?

- a) 2 m to 3 m b) 2.5 m above the top of gates

2) What is the recommended formula for top width of a very low dam?

- a) $H + 3$ b) $0.2H + 3$ c) $0.2 H$ d) $H + 5$

3) If the height of the dam is 10 m, then the value of top width (A) according to Strange's recommendations is _____

- a) 1.85 m b) 2.5 m c) 3.0 m d) 4.0 m

4) Calculate the top width (T) of the earth dam of height 50 m.

- a) 5.0 m b) 4.75 m c) 6.13 m d) 3 m

5) A phreatic line in seepage analysis is defined as the line on which pressure is _____

- a) Equal to the atmosphere b) greater than atmosphere
- c) Lower than atmosphere d) varying

MIZAN TEPI UNIVERSITY
ENGINEERING AND TECHNOLOGY COLLEGE
DEPARTMENT OF HYDRAULIC AND WATER RESOURCES ENGINEERING
Tutorial Class for Exit Exam (Civil Engineering)

6) During seepage through an earthen mass, the direction of seepage is _____ to the equipotential lines.

- a) Perpendicular b) parallel c) not defined d) diagonal

7) The upstream face of the earth dam is considered as _____

- a) Equipotential line b) Streamline c) streak line d) path line

8) In order to prevent the possibility of the cross-flow towards the earthen embankments, it is necessary to provide _____

- a) Counter berms b) sides walls of sufficient height and length
c) Spoil banks d) sufficient freeboard

9) In foundation slide failure _____

- a) Top of embankment gets cracked and lower slope moves outward forming large mud waves near the heel
b) Top of embankment gets cracked and lower slope moves inward forming large mud waves near the heel
c) Bottom of embankment gets cracked and lower slope moves outward forming large mud waves near the heel
d) Bottom of embankment gets cracked and lower slope moves inward forming large mud waves near the heel

10) What is the most critical condition of slide of the U/s slope?

- a) The sudden drawdown of the reservoir
b) Reservoir full condition
c) Steady seepage condition
d) Sudden drawdown and reservoir full condition

11) When the reservoir is full, the slope which is most likely to slide is _____

- a) The upstream slope
b) The downstream slope
c) Both upstream and downstream slope

MIZAN TEPI UNIVERSITY
ENGINEERING AND TECHNOLOGY COLLEGE
DEPARTMENT OF HYDRAULIC AND WATER RESOURCES ENGINEERING
Tutorial Class for Exit Exam (Civil Engineering)

- d) No effect
- 12) In order to keep the saturation line in a canal embankment well within the toe, it is necessary to provide _____
- a) Spoil bank b) Counter berm c) freeboard d) berm
- 13) Which of the following failures generally occur due to the development of unaccounted pore pressures?
- a) Hydraulic failures b) Piping through the dam body
- c) Sliding in embankments d) Sloughing of the d/s toe
- 14) A rock toe and a horizontal filter is provided on the downstream base of an earthen dam in order to _____
- a) Prevent piping action in the dam body
- b) Prevent piping action in the dam foundation
- c) Reduce the seepage quantity by blocking its flow
- d) Collects and drain out the seepage flow
- 15) What is provided in the form of a transition zone between the homogenous embankments-fill and rock toe?
- a) Toe filter b) Horizontal blanket c) Chimney drain d) Trenches
- 16) The length of horizontal blanket should be equal to _____
- a) 3 times the height of the dam
- b) 4 times the height of the dam
- c) 5 times the height of the dam
- d) 6 times the height of the dam
- 17) Which of the following earth dam is suitable only on impervious foundation?
- a) Zoned embankment type b) Homogenous embankment type
- c) Non-homogenous type d) Diaphragm type

MIZAN TEPI UNIVERSITY
ENGINEERING AND TECHNOLOGY COLLEGE
DEPARTMENT OF HYDRAULIC AND WATER RESOURCES ENGINEERING
Tutorial Class for Exit Exam (Civil Engineering)

18) Which of the following zone in Zoned type embankment prevents piping through cracks?

- a) Central core b) Transition zone c) Outer zone d) Core wall

19) Which of the following soil material is most preferred for the central core material of zoned embankment type dam?

- a) Highly impervious clay b) Sands or silty clays
c) Coarse sands d) Gravels

20) The blanket in earth dam is provided _____

- a) At the ground level on u/s side b) At the ground level on the d/s side
c) At the ground level of the D/s side of the dam d) On the D/s slope

21) Which of the following statement is correct with reference to earthen dams?

- a) These dams are very costly as compared to other types
b) Gravity dams are less susceptible to failure as compared to rigid dams
c) These dams are suitable for construction on almost every type of foundation
d) Highly skilled labor is generally not required

22) The process of laying and compacting earth in layers by power rollers under OMC for construction of earthen dams is known as _____

- a) Rolled fill method b) Hydraulic fill method c) OMC method d) Compaction

23) The central core of the zoned embankment type earth dam _____

- a) Checks the seepage b) Prevents piping
c) Gives stability to the central impervious fill
d) Distribute the load over a large area

MIZAN TEPI UNIVERSITY
ENGINEERING AND TECHNOLOGY COLLEGE
DEPARTMENT OF HYDRAULIC AND WATER RESOURCES ENGINEERING
Tutorial Class for Exit Exam (Civil Engineering)

Multiple Choice Questions focuses on SPILLWAY

- 1) The safety valve of a dam is its _____.
a- drainage gallery b- inspection gallery
c- Spillway d- outlet sluices
- 2) Which of the following spillway is least suitable to earthen dams?
a- Ogee spillway b- Chute spillway
c- Side-channel spillways d- Shaft spillway
- 3) If the operating head on an ogee spillway is more than the design head then _____
a- the pressure on the crest will be zero
b- the pressure on the crest will be negative causing cavitation
c- the pressure on the crest will be positive
d- the discharge coefficient of the spillway will be reduced
- 4) In the functioning of an ogee spillway, the operating head _____
a- frequently exceeds the design head
b- rarely exceeds the design head
c- never exceeds the design head
d- has no connection with the design head
- 5) Which of the following spillway is an improvement over free overflow spillway?
a- Straight drop spillway b- Open channel spillway
c- Overflow spillway d- Siphon spillway
- 6) The spillway which can be called as an overflow spillway is essentially _____.
a- an ogee spillway b- a shaft spillway
c- a chute spillway d- a syphon spillway
- 7) According to US Army Corps, the u/s profile of ogee spillway extends up to _____
a- $x = 1.27 H_d$ b- $x = -1.27 H_d$
c- $x = 0.431 H_d$ d- $x = -0.431 H_d$
- 8) 10 If the upstream face of the spillway is kept vertical, the crest shape should also confirm to the lower nappe of an inclined sharp-crested weir.
a- True b- False
- 9) 13- The spillway can be best built independently of the dam when there is _____.
a- deep narrow gorge with steep slopes
b- deep narrow gorge with gradual slopes
c- wide gorge with a gradual slope

MIZAN TEPI UNIVERSITY
ENGINEERING AND TECHNOLOGY COLLEGE
DEPARTMENT OF HYDRAULIC AND WATER RESOURCES ENGINEERING
Tutorial Class for Exit Exam (Civil Engineering)

- d- wide valley with moderate slope
- 10) 14- Which of the following is a secondary safety arrangement?
- a- Safety valves b- Spillway gates
c- Subsidiary spillway d- Energy dissipaters
- 11) 15- Which of the following is the simplest type of spillway which can be provided independently and at low costs?
- a- Ogee spillway b- Trough spillway
c- Siphon spillway d- Saddle spillway
- 12) 17- The spillway which can be adopted with ease on gravity as well as earthen dams is _____
- a- ogee spillway b- chute spillway
c- both ogee and chute spillway d- straight drop spillway
- 13) 18- The surplus reservoir water after spilling over the crest of the spillway flow on the chute is
- a- parallel to the crest in a trough spillway
b- parallel to the crest in a side-channel spillway
c- perpendicular to the crest in a side-channel spillway
d- obliquely to the crest in a chute spillway
- 14) 23- Hydraulic jump is widely used for dissipation of energy in _____
- a- ogee spillways
b- trough spillways
c- side channel spillways
d- all of these
- 15) 24. In computing the spilling capacity of high ogee spillways, the velocity head is usually _____
- a- very small, and hence neglected
b- very large, and hence cannot be neglected
c- neither a) nor b)