University of Mumbai

Civil Engineering Examination

Sub: CE-C-703 Water Resource Engineering-II **Year/Sem: -** BE/ VII

Max. Marks: 80 **Duration: -** 2Hrs

Q1. Attempt all the MCQS (20 X 2 mark= 40 marks)

1) Q. 1. The forces which are considered for the analysis of elementary profile of a gravity dam under Reservoir Full Condition are:

i) Water Pressure
ii) Self-Weight
iii) Uplift
iv) Pressure due to earthquake

The Correct Answer is

a) Only (ii)
b) (i), (ii) and (iii)
c) (i), (ii) and (iv)
d) (i), (ii), (iii) and (iv)

2) When the upstream face of a gravity dam is vertical, then the intensity of water pressure will act at?

a) 4H/3π
b) H/2
c) H/3
d) 3H/4π

3) The Uplift pressure on the face of a drainage gallery in a dam is taken as :

a) hydrostatic pressure at toe
b) average of hydrostatic pressure at toe and heel
c) two-third of hydrostatic pressure at toe plus one-third of hydrostatic pressure at heel
d) equal to hydrostatic pressure at heel

4) Horizontal acceleration due to earthquake results in :

a) Hydrodynamic pressure
b) inertia force into the body of the dam
c) Wind Pressure
d) Hydrodynamic Pressure & Inertia force into the body of dam

5) The Vertical component of the earthquake wave , which produce adverse effects on the stability of a dam, is, when it is acting in;

a) upward direction
b) Downward direction
c) Inclined direction
d) horizontal direction

6) In a concrete gravity dam with a vertical upstream face, the stabilizing force is provided by the:

a) weight of the dam
b) the water supported against the upstream slope
c) uplift pressure
d) Wind Pressure

7) The factor among the following, which does not try to destabilize a masonry gravity dam, is:

a) water seeping below the foundation of the dam
b) generation of waves by high winds
c) deposition of silt in dead storage zone of the reservoir
d) water standing against the downstream face of the dam

8) Development of tensile stresses in a concrete or masonry gravity dam are usually not allowed, because it may lead to development of tension cracks, ultimately causing failure of the structure, by :

a) excessive seepage
b) excessive tensile stresses
c) excessive compressive stresses
d) excessive erosive stresses

9) For usual values of permissible compressive stress and specific gravity of concrete, a high concrete gravity dam is the one, whose height exceeds :

a) 48m
b) 70m
c) 88m
d) 50m

10) Leakage through the transverse joints in a gravity dam is prevented by :

a) Shear keys
b) Key ways
c) Water stops
d) Tensile keys

11) Point out the correct statement with reference to Earthen Dams:

a) These dams are very costly as compared to other types
b) They are less susceptible to failure as compared to rigid dams

c) They can be constructed almost on every type of foundation
d) Highly skilled labour is generally not required

12) The most preferred soil for the central impervious core of a zoned embankment type of an earthen dam, is:

a) Highly impervious clay
b) Highly pervious gravel
c) Coarse sand
d) Clay mixed with fine sand

13) The most preferred type of an earthen dam section is the one, in which the:

a) Entire embankment is made of one type of soil
b) Inner embankment is made of highly porous soil, surrounded by the outer shell of highly impervious soil, both separated by transition filter material of mediocre permeability
c) Inner embankment is made of highly impervious soil surrounded by the outer shell of highly pervious soil, both separated by transition filter of mediocre permeability
d) None of the above

14) Pure Clayey soils are generally not preferred for the central impervious cores of a zoned type of earthen dams, because:

a) Clays are highly impervious
b) Clays are highly pervious
c) Clays are susceptible to cracking
d) Clays are susceptible to tensile failure

15) Co-ordination between field and design engineers to ensure continuous field observations and modifications in design during construction, is more importantly required in case of :

a) Concrete gravity dams
b) Masonry gravity dams
c) Arch Dams
d) Earthen Dams

16) The only provision among the following, which can help control the seepage through the body of an earthen dam, and thus , to keep the phreatic line well within the dam width is:

a) Upstream impervious cutoff
b) Drain trench along the downstream toe
c) Relief wells
d) Chimney drain

17) During the maintenance of an earthen dam, the apparent seepage through the foundation of the dam is best taken care of, by providing:

a) A Chimney drain
b) A rock toe
c) A drain trench along the downstream toe

d) An upstream impervious cutoff

18) The base width of a rock fill dam, in comparison to that of an earthen dam, is:

a) Much larger
b) Much smaller
c) Sometimes larger sometimes smaller
d) Almost equal

19) On moderate foundations, and particularly in seismic areas, the type of dam which can preferably be considered for construction, is:

a) Masonry gravity dam
b) Earthen dam
c) Rock fill dam
d) Arch dam

20) The anit-dunes develop on beds of alluvial streams, when Froude number is:

a) 0
b) 0.5
c) 1
d) 1.2

Q2. Attempt any FOUR **(04 X 05 marks= 20 marks)**

1) Draw a neat sketch of Elementary profile of gravity dam and Explain
2) Classify canals.
3) What are the design considerations for a Irrigation Canal
4) Explain Swedish Circle method for stability of slopes.
5) Compare Kennedys and Laceys Theory
6) What are different types of earthen dams, explain in short.

Q3. Attempt any TWO **(02 X 10 marks= 20 marks)**

1) Design a regime channel for a discharge of $35 m^3/s$ with silt factor of 0.9 by Lacey's theory, taking side slope as 1H:2V
2) Explain different types of spillways with neat sketches.
3) What are the failure modes of gravity dam? Explain in detail

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