

University of Mumbai

Examination 2020

Examinations Commencing from 23rd December 2020 to 6th January 2021 and from 7th January 2021 to 20th January 2021

Program: BE CIVIL ENGINEERING

Curriculum Scheme: Rev 2016

Examination: BE Semester VII

Course Code: CE C703 and Course Name: Water Resources Engineering-II

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The wetted perimeter P of a stable channel, having discharge, Q, is proportional to :
Option A:	Q
Option B:	$Q^{(0.5)}$
Option C:	Q^2
Option D:	$Q^{(1/4)}$
2.	Which one of the following is not the requirement of an ideal regime condition in Lacey's regime-theory ?
Option A:	the discharge in the channel is constant
Option B:	the channel flows through the same soil grade, as that of the sediment entering the channel from the headworks
Option C:	the sediment grade and its amount entering the channel is constant.
Option D:	the silt grade should consist of clay sized particles.
3.	Leakage through the transverse joints in a gravity dam is prevented by :
Option A:	shear keys
Option B:	key ways
Option C:	water stops
Option D:	joints
4.	The most preferred type of an earthen dam section is the one, in which the:
Option A:	entire embankment is made of one type of soil
Option 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
Option C:	inner embankment is made of highly impervious soil surrounded by the outer shell of highly pervious soil, both separated by transition filter material of mediocre permeability
Option D:	Both Inner embankment and outer shell of impervious soil.
5.	Pure clayey soils are generally not preferred for the central impervious cores of zoned type of earthen dams, because :
Option A:	clays are susceptible to cracking
Option B:	clays are highly pervious
Option C:	clays are highly impervious

Option D:	Clays are transmission materials
6.	The lateral braces are provided between buttresses in a buttress dam, to :
Option A:	transfer the load from the deck to the foundation
Option B:	transfer the load from the deck to the buttresses
Option C:	provide resistance against buckling of buttresses
Option D:	Providing resistance against friction of buttresses
7.	Which of the following dam is also known as Ambursen dam?
Option A:	multiple arch buttress dam
Option B:	mushroom head buttress dam
Option C:	massive head buttress dam
Option D:	free deck buttress dam.
8.	Which of the following component of a buttress dam is also called a counterfort?
Option A:	corbel
Option B:	buttress
Option C:	lateral brace
Option D:	sloping deck.
9.	Tension cracks in gravity dams may sometimes lead to the failure of the structure, by :
Option A:	sliding of the dam at the cracked section
Option B:	overturning about the toe
Option C:	Tensile property of concrete is lost
Option D:	crushing of concrete, starting from the toe
10.	The vertical downward earthquake acceleration $a_v = 0.1g$ acting on a gravity dam will _____
Option A:	increase the resisting weight of the dam by 10%
Option B:	decrease the resisting weight of the dam by 10%
Option C:	increase the uplift by 10%
Option D:	decrease the uplift by 10%
11.	In case of non-availability of space due to topography, the most suitable spillway is
Option A:	Shaft spillway
Option B:	Straight drop spillway
Option C:	Chute spillway
Option D:	Ogee spillway
12.	The surplus reservoir water after spilling over the crest of the spillway flows on the chute is _____
Option A:	parallel to the crest in a trough spillway
Option B:	parallel to the crest in a side-channel spillway
Option C:	perpendicular to the crest in a side-channel spillway
Option D:	obliquely to the crest in a chute spillway
13.	The Froude number of a hydraulic jump is 5.5. The jump can be classified as _____

Option A:	a weak jump
Option B:	an oscillating jump
Option C:	rough and choppy jump
Option D:	steady jump
14.	A sloping apron is provided partly above the river bed and partly below the river bed in the case when
Option A:	TWC coincides with the JHC at all discharges
Option B:	TWC lies above the JHC at all discharges
Option C:	TWC lies below the JHC at all discharges
Option D:	TWC lies above the JHC at low discharges and below the JHC at high discharges
15.	Standard USBR stilling basin-II is useful for energy dissipation at the bottom of the overflow structure, if the approaching Froude number is
Option A:	Less than 4.5
Option B:	More than 4.5
Option C:	Less than 2.5
Option D:	More than 2.5
16.	On flatlands what type of canal alignment is used?
Option A:	Side Slope Canal
Option B:	Contour Canal
Option C:	Watershed Canal
Option D:	Field Channel
17.	Which of the following is not a reason which leads to a canal breach?
Option A:	Due to faulty design and construction of banks
Option B:	Due to leakage or piping
Option C:	Due to the maintenance of service roads
Option D:	Due to intentional cuts made by cultivators
18.	What is the minimum value of free-board for Main and Branch Lined canals if the discharge is more than 10 cumecs as per specified by BIS code?
Option A:	0.60
Option B:	0.50
Option C:	0.30
Option D:	0.75
19.	In a siphon aqueduct, the worst condition of uplift on the floor occurs when _____
Option A:	the canal is full and the drainage empty with the water table at drainage bed
Option B:	the canal and drainage are flowing full
Option C:	the canal is empty and the drainage full with the water table at drainage bed
Option D:	the canal is full and the drainage empty with water table below the floor
20.	Point out the choice among the following, which is not a function of a distributary head regulator :
Option A:	it serves as a meter for measuring discharge in the off-taking canal
Option B:	it helps in controlling and regulating supplies in the entire downstream canal network.

Option C:	it serves to control silt entry into the off-taking canal
Option D:	it helps in controlling supplies in the off-taking canal.

Q2	Solve any Four out of Six	5 marks each
A	Enlist the difference between Low height and high height of gravity dam.	
B	Explain with neat diagram the hydraulic failure of earth dam.	
C	What are different types of spillway? Explain in detail with diagram ANY ONE of the spillway.	
D	Write in details the procedure for design of channel according to Kennedy's theory.	
E	Explain the detailed classification of dams.	
F	Write a short note on: Canal Outlet	

Option 2

Q3.	Solve any Two Questions out of Three	10 marks each
A	<p>For earth dam of homogeneous section with horizontal filter of 30m from toe. Draw the top flow line. If coefficient of permeability of the soil material used in the dam is 5×10^{-4} cm/sec, find the seepage flow per unit length of the dam.</p> <p>Top width = 6m, Bottom width = 146m, free board=2m, total depth 20m, u/s slope = 4:1, d/s slope 3:1</p>	
B	<p>Design the practical profile of a gravity dam of stone masonry, given the following data:</p> <p>RL of base of dam = 1450m RL of FRL = 1480.5m Sp. gravity of the masonry = 2.4 Safe compressive stress for masonry = 1200kN/m² Height of the waves = 1m</p>	
C	Explain with neat diagram all the forces acting on Gravity dam	