

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: TE Semester V

Course Code: CEC- 503 and Course Name: Applied Hydraulics

Time: 2 hour

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Momentum is a _____ quantity
Option A:	Scalar
Option B:	Vector
Option C:	Infinite
Option D:	Zero
2.	Energy per unit weight of water measured with respect to the datum is called as _____
Option A:	Total energy
Option B:	Specific energy
Option C:	Velocity head
Option D:	Datum head
3.	The fluid coming into the centrifugal pump is accelerated by _____
Option A:	Throttle
Option B:	Impeller
Option C:	Nozzle
Option D:	Governor
4.	Two Pelton wheels A and B have the same specific speed and are working under the same head. Wheel A produces 400 kW at 1000 rpm. If B produces 100 kW, then its rpm is
Option A:	4000
Option B:	2000
Option C:	1500
Option D:	1250
5.	Calculate the mean hydraulic radius for a channel having 20m ² cross sectional area and 50m of wetted perimeter
Option A:	0.4 m
Option B:	0.5 m
Option C:	0.6 m
Option D:	0.3 m

6.	Impulse Momentum equation is based on
Option A:	Newton's First law of motion
Option B:	Newton's Second law of motion
Option C:	Newton's third law of motion
Option D:	Law of conservation of mass
7.	The propulsive force drives the jet in the _____
Option A:	Backward direction
Option B:	Forward direction
Option C:	Perpendicular direction
Option D:	Parallel movement
8.	A horizontal water jet with a velocity of 10 m/s and cross sectional area of 10 mm ² strikes a flat plate held normal to the flow direction. The density of water is 1000 kg/m ³ . The total force on the plate due to the jet is
Option A:	100 N
Option B:	10 N
Option C:	1 N
Option D:	0.1 N
9.	If the velocity of curved vane is equal to the velocity of jet, then the efficiency of the wheel will be
Option A:	50 %
Option B:	100 %
Option C:	59.2 %
Option D:	0 %
10.	The ratio of normal force of jet of water on a plane inclined at an angle of 30° as compare to that when the plate normal to jet is
Option A:	$1/\sqrt{2}$
Option B:	$1/2$
Option C:	1
Option D:	2
11.	Centrifugal pump is a _____
Option A:	Turbomachinery
Option B:	Flow regulating device
Option C:	Drafting device
Option D:	Intercooling device
12.	A 1: 50 scale model of a spillway is to be tested in the laboratory. The discharge in the prototype is 1000 m ³ /s. The discharge to be maintained in the model test is
Option A:	0.08 m ³ /s
Option B:	5.7 m ³ /s
Option C:	0.057 m ³ /s
Option D:	0.57 m ³ /s
13.	What is the angle made (in degree) by the sloping side when the trapezoidal channel discharges to the maximum extent?
Option A:	30

Option B:	45
Option C:	60
Option D:	90
14.	A surface profile is a measure of _____
Option A:	Temperature changes
Option B:	Pressure changes
Option C:	Flow changes
Option D:	Volumetric changes
15.	The repeating variables in dimensional analysis should :
Option A:	include the dependent variable
Option B:	have amongst themselves all the basic dimensions
Option C:	be derivable from one another
Option D:	exclude one of the basic dimensions
16.	In Inward radial flow reaction turbine if angle made by absolute velocity with its tangent is 90 degrees and component of whirl is zero at outlet is _____
Option A:	Radial inlet discharge
Option B:	Radial outlet discharge
Option C:	Flow ratio
Option D:	Speed ratio
17.	_____ is defined as ratio between power delivered to runner and power supplied at inlet of turbine.
Option A:	Mechanical efficiency
Option B:	Volumetric efficiency
Option C:	Hydraulic efficiency
Option D:	Overall efficiency
18.	The velocity of the flow through the Kaplan turbine is 25m/s. The available head of the turbine is 60m. Find the flow ratio of the turbine (take $g = 10\text{m/s}^2$).
Option A:	0.65
Option B:	0.72
Option C:	0.69
Option D:	0.80
19.	Dynamic similarity is said to exist between two fluid flows when at corresponding points there are:
Option A:	Kinematic similarity and geometric similarity
Option B:	Geometric similarity and similarity of forces involved
Option C:	Interaction between inertia, viscous and pressure forces
Option D:	interaction of inertia and viscous forces
20.	The formation of vapour cavities is called _____
Option A:	Static pressure drop
Option B:	Cavitation
Option C:	Isentropic expansion
Option D:	Emulsion

Q2.	Solve any Four out of Six	5 marks each
A	Write a note on multistage pump	
B	Explain term hydraulic jump. Drive an expression for the depth of hydraulic jump in term of the upstream Froude number.	
C	Explain Undistorted Model. What are the use of Undistorted Model.	
D	Explain different type of efficiencies of hydraulic turbine	
E	Derive conditions for the most economical trapezoidal channel section	
F	Derive expression for force exerted by jet on stationary curved plate when jet striking at Centre.	

OR

Q3.	Solve any Four out of Six	5 marks each
A	State and derive moment of momentum equation	
B	What are the methods of dimensional analysis) Explain it.	
C	Derive condition for most economical circular section for maximum velocity	
D	What is jet propulsion of ship? Explain with neat sketch.	
E	Define the specific speed of a turbine. Derive an expression for the specific speed	
F	Compare between impulse turbine and reaction turbine.	