MANIPAL INSTITUTE OF TECHNOLOGY



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# MANIPAL INSTITUTE OF TECHNOLOGY

### SEVENTH SEMESTER B.TECH. (CIVIL ENGINEERING)

## END SEMESTER EXAMINATION, NOV 2022

#### **COASTAL ENGINEERING (CIE 4076)**

(21–11 - 2022)

TIME: 3 HRS.

#### MAX. MARKS: 50

#### Note: 1. Answer all questions.

#### 2. Any missing data may be suitably assumed.

Q. NO	QUESTION								MARKS	CO
1A	Determine the wave period and celerity for a wave having a length of 75 m								2	1
	in 8 m depth of water using Airy's wave theory.									
1B	Specify the Boundary conditions used for obtaining the velocity potential ' $\Phi$ '								3	1
	of a linear water wave problem.									
1C	Obtain dispersion relation using equation of velocity potential.								5	1
2A	With a neat sketch, explain how water particle displacements vary at various water depths.									3
2B	List out the natural and manmade causes for coastal erosion								3	3
2C	Plot the distribution of maximum horizontal and maximum vertical water								5	1
	particle velocities across depth at 2 m interval. The ocean wave measured at 10 m is having a wave height of 2.5 m and wave period of 8 sec									
	8		8			r r				
<b>3</b> A	Determine if Sainflou's method can be adopted for a vertical wall breakwater									3
	design of 15 m height. The water depth at site is 10 m with a wave period of									
	10 s. The refra	ction dia	gram g	ave spa	cing be	tween a	adjacent	orthogonals in		
	deep water to be 2 units and at structure site as 3 units. Consider shoaling									
	coefficient of 0.9981 for a deepwater wave height of 5 m.									
<b>3B</b>	With a neat ske	etch diffe	rentiate	e betwee	en gravi	ng and	floating	dry dock.	3	4
<b>3</b> C	What is a berthing structure? With the help of neat diagram explain variou							explain various	5	5
	types of berthing structures.									
<b>4</b> A	Compute $H_{mean}$ , $H_{1/10}$ , $H_{1/3}$ for the short term wave data recorded over 20 mins								3	5
	duration which yielded 100 waves.									
	H in m	0-0.5	0.6-	1.2-	1.8-	2.4-	3-3.5			
			1.1	1.7	2.3	2.9		-		
	No. of	21	25	20	18	10	6			
	occurrences									
<b>4B</b>	What are the requirements of a good harbor?								3	4
<b>4</b> C	What are breakwaters? Give a detailed classification of breakwaters with figures.							4	5	
5A	Design and draw a cross-section of Trunk of rubble mound breakwater at a location with following details							preakwater at a	5	5
									1	



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	$ \begin{array}{l} \mbox{Mean water depth} - 10 \mbox{ m} \\ \mbox{Design wave height - 4m, Wave period-9 Sec} \\ \mbox{Wave runup - 4 m} \\ \mbox{Tidal correction} & -1.5 \mbox{ m} \\ \mbox{Armour unit} & - \mbox{Quarried natural rocks up to 125 kN size with Unit weight} \\ \mbox{of } 2.6 \mbox{ t/m}^3 \mbox{ can be used.} \\ \mbox{Take } K_D - 2.8 \mbox{ and } K_\Delta - 1. \end{array} $		
5B	Write a short note on coastal eco-systems	3	5
<b>5</b> C	What is Coastal pollution and its implications?	2	5