

C. U. SHAH UNIVERSITY

Winter Examination-2022

Subject Name: Design of Hydraulic Structures

Subject Code: 4TE06DHS1

Branch: B.Tech (Civil)

Semester: 6

Date: 23/09/2022

Time: 11:00 To 02:00

Marks: 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1	Attempt the following questions:	(14)
	a) What is Dam?	01
	b) The stability of a gravity dam depends on what?	01
	c) Classify the dams according to structural behaviour.	01
	d) Write a disadvantage of Arch dam.	01
	e) Bhakhra dam is which type of dam?	01
	f) What is a catchment area of Sardar Sarovar Project, Gujarat?	01
	g) Hirakund dam is located at which river?	01
	h) Give the relation between void ratio and porosity.	01
	i) What is inverted filter?	01
	j) What is phreatic line?	01
	k) What is equipotential line?	01
	l) Write down the factors affecting coefficient of discharge.	01
	m) At which river Ukai dam, Gujarat is located?	01
	n) Nagarjunsagar project is which type of dam?	01

Attempt any four questions from Q-2 to Q-8

Q-2	Attempt all questions	(14)
A	Why spillways are considered 'Safety Valve' for dams. Classify and write suitability for various spillways.	07
B	Discuss in details factors affecting selection of dam types.	07
Q-3	Attempt all questions	(14)
A	Discuss the Swedish Slip Circle method.	07
B	Show forces acting on a gravity dam with sketch.	07
Q-4	Attempt all questions	(14)
A	Describe with neat sketches various methods adopted for controlling seepage through the body of an embankment dam and through foundation.	07
B	Write a short note on: Drainage Gallery.	07



- Q-5** **Attempt all questions** **(14)**
- A** Distinguish clearly between a low gravity dam and high gravity dam. **07**
Derive an expression used for such a distinction.
- B** Explain stability requirements of a gravity dam. **07**
- Q-6** **Attempt all questions** **(14)**
- A** Define spillway. What is the purpose to provide it? What are essential requirements? Where the spillway is located? **07**
- B** Explain the methods of plotting phreatic line for an earth dam with horizontal filler at downstream. **07**
- Q-7** **Attempt all questions** **(14)**
- A** Write a short note on: Water stops. **07**
- B** A homogeneous earth dam has top width equal to 6 and height of 25 m. the upstream and downstream slopes are 4:1 and 3:1 respectively. The phreatic line may be assumed to be 5 m below the crest of the dam at the top shoulder of the upstream slope of the dam. The properties of soil mass are as given below:
Saturated unit weight = 22.1 KN/m^3
Angle of internal friction = 27°
Cohesion = 36.24 KN/m^2
Dry unit weight = 18.0 KN/m^3
Check the stability of upstream portion of dam against horizontal shear at the base of the dam. **07**
- Q-8** **Attempt all questions** **(14)**
- A** Design only a practical section for a gravity dam when the following data are available: **07**
HFL of Dam 831.0 m
Lowest B.L. at Dam site 801.0 m
Specific Gravity of Dam Material = 2.4 m
Maximum permissible stress in Compression = 1.3 N/mm^2
Density of Water = 1 t/m^2
Velocity of Wind = 25 kmph
Fetch of water for such wind = 40 Km
- B** Write a short note on: (1) Construction joints in a dam (2) Keys **07**

