

**JALPAIGURI GOVERNMENT ENGINEERING COLLEGE**  
**[A GOVERNMENT AUTONOMOUS COLLEGE]**  
**DEPARTMENT OF CIVIL ENGINEERING**

**First Class Test**

**Paper Name: Concrete Technology and Construction Materials**

**Paper Code: PC-CE401**

Full Marks: 15

Times: 1 Hour

Date: 21/03/25

1. What is heat of hydration? Explain. (3), CO1
2. What is setting time of cement? Explain the procedure for determining the setting time in laboratory. (3+4), CO1
3. What are the different types of classification of lime? Explain. (5), CO1

**Soil Mechanics I, PC-CE 403, 1<sup>st</sup> class test, (Assume reasonable values for any parameters that are not provided)** [1] Calculate the effective stress on a soil element at depth  $(4+0.1*LTDR)m$ . Water table (WT) is located at 2m below G.L. Saturation above WT = 60%,  $w = (30+0.001*LTDR)\%$ . Water content below WT =  $(40+0.001*LTDR)\%$ .  $G_s = 2.69$ . Draw variation of stress along depth. (5)// [2] Classify a soil as per USCS system, given: soil contains 60% passing the 0.075 mm sieve and has a Liquid Limit (LL) of 30% and a Plasticity Index (PI) of  $(23+0.02*LTDR)\%$ . (3)// [3] What are the possible classification of the following soil (USCS system). Given:  $(50+0.1*LTDR)\%$  of soil particles  $> 0.075mm$ . Gravel fraction  $>$  sand fraction? (3)// [4] Which of the following clay minerals is the most active, and why? a) Kaolinite b) Illite c) Montmorillonite. (2)// [5] What will be the approximate weight of soil collected from an excavated pit with dimensions  $1m \times 1m \times (1+0.02*LTDR)m$ ? (2).

**LTDR = Last Two Digits of Roll**

**JALPAIGURI GOVERNMENT ENGINEERING COLLEGE**  
**JGEC/B.TECH/ CIVIL ENGINEERING/ PC-CE402/ 2024-2025**  
**2025 / 1ST INTERNAL / DATE: 25.03.2025 / TIME: 01:00 PM – 02:00 PM**  
**ENGINEERING HYDROLOGY**

Full Marks: 15

Duration: 1 Hour

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Q1. Estimate the constant rate of withdrawal from a 1385 ha reservoir in a month of February during which reservoir level dropped by 0.72 m inspite of an average inflow into the reservoir of 0.52 Mm<sup>3</sup>/day. During the month the average seepage loss from the reservoir is 2.6 cm, total precipitation on the reservoir is 17.6 cm and total evaporation is 9.8 cm.

Q2. The watershed of a stream has five raingauge stations inside the basin. When Thiessen polygons were constructed, three more stations lying outside the watershed were found to have weightages. The details of Thiessen polygons surroundings each raingauge and the recordings of the raingauges in the

Raingauge station	A	B	C	D	E	F	G	H
Thiessen Polygon area (km <sup>2</sup> )	720	1380	1440	1040	900	2220	419	1456
Recorded rainfall in mm during July 2012	135	143	157	128	102	115	99	101

month of July 2012 are given below:  
Stations B, D and F are outside the watershed. Determine the average depth of rainfall on the watershed in July 2012 by (i) arithmetic mean method, and (ii) Thiessen mean method.

CO2

8

CO1

7

## JGEC- Civil Engineering Department

Sub: Solid Mechanics

1st Internal Test

Time: 45 min

2025

Answer all the questions

5+4+6= 15 Marks

1. Define the terms – Poisson's ratio, Ductility, Gauge length in tension test, Yield Load and factor of safety.
2. A short hollow cast iron cylinder with a wall thickness of 1.5cm is to carry a compressive load  $P=15t$ . Compute the required outside diameter  $D_o$ , if working stress in compression is  $\sigma_w = 800 \text{ kg/cm}^2$
3. A simply supported beam with overhang at one end is subjected to a concentrated load of 60KN at 2.0m from left support. The beam is also subjected to a uniformly distributed load 15.0KN/m over the overhang length (cantilever length only). Simply supported length of the beam is 5.0m and overhang length is 1.0m. Total length of the beam is 6m.  
Draw Bending moment and shear force diagram for the beam.



$$\begin{aligned}
 & \text{Mg } H_2C_2O_6 \\
 & = 24 + 1 \times 2 + 12 \times 2 + 16 \times 6 \\
 & = 24 + 2 + 24 + 96
 \end{aligned}$$

**JGEC\_Internal Assessment Examination I-2025\_ Environmental Engineering I (PC-CE404)**

Maximum Marks- 15

Time: 60 minutes

<u>Q/N</u>	<u>Question statement</u>	<u>COs</u>	<u>Marks</u>												
1	In a town it is decided to supply water @ 135 lpcd. Estimate design capacity of all components of a water supply scheme in ML/day. Consider the firefighting demand to be estimated by IS formula.	1,3 & 4	4												
	<table><tr><td>Census year</td><td>1971</td><td>1981</td><td>1991</td><td>2001</td><td>2011</td></tr><tr><td>Population</td><td>40000</td><td>57500</td><td>86500</td><td>135000</td><td>154500</td></tr></table>	Census year	1971	1981	1991	2001	2011	Population	40000	57500	86500	135000	154500		
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Population	40000	57500	86500	135000	154500										
	Use geometrical increase method.														
2	Di-hydride of oxygen i.e. water is liquid where di-hydride of other elements in the group 16 of the periodic table are gases in spite of their higher molecular mass. Explain.	2	2												
3	You have dissolved 200 mg Ferric sulphate in one liter distilled water. Calculate the concentration of ferric and sulphate ions in mg/l, milimoles/L, miliequivalents/L and mg/L as CaCO <sub>3</sub> . [Consider the atomic mass of iron, sulphur and oxygen as 56, 32 and 16 amu respectively.]	2 & 5	3												
4	A stream with flow of 200 cumec having pH=4 meets another stream with flow of 100 cumec having pH=10. Find out the resultant pH of the mixing stream.	3	2												
5	An analysis for suspended solids (SS) is run as follows: 1) A fiberglass filter is dried to a constant mass of 0.137 g. 2) 100 mL of sample is drawn through the filter and 3) the filter and residue are placed in drying over a 104° C until a constant mass of 0.183 is reached. Determine the SS in mg/L.	2 & 5	2												
6	Write down the two sources of underground water.	3	2												