



# MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

## VII SEMESTER B.TECH. (CHEMICAL ENGINEERING)

### END SEM EXAMINATIONS, DEC 2021 (DESCRIPTIVE PART)

#### SUBJECT: PE-IV PROJECT ENGINEERING [CHE 4069]

#### REVISED CREDIT SYSTEM

Time: 75 +10 min

(17/12/2021)

MAX. MARKS: 20

#### Instructions to Candidates:

- ❖ Answer **ALL** the questions.
- ❖ Missing data may be suitable assumed.

1.A	A filtration process is carried out in a leaf filter. The filtering characteristics is given by the equation $Q=A (K \theta_f)^{0.6}$ , where Q is the tons of filtrate obtained per cycle and A is the area of filtration and $K = 1.35 \times 10^{-6}$ . The slurry is to be filtered in a leaf filter ( $a=1$ ) with a filtration duty of 4800 tons/ year. The cake is not washed. The dumping and assembling time is established at 5.5 hrs. The direct costs for power, labor during filtering and dumping are ₹ 13 per $m^2$ , and annual fixed costs ₹ 19 per $m^2$ . The plant operates for 3600 hour/ year. What is the optimum cycle time?	05
1.B	Draw the PID instrumentation symbol for the following description:  Combined dual service board mounted manual level recording controller number 3 and level recording controller connected to the controller and transmitter by electrical means, transmitter to the pipeline through capillary beading, controller to the equipment mechanical means, locally mounted pressure indicator number 2 connected to the equipment through mechanical means	03
1.C	Define the terms: less than car load lot, beltline rail road	02
2.A	Explain with sketches the working of 90° street elbow, 45° elbow, coupling and tee used in threaded pipe joints.	04
2.B	Discuss maintenance facilities and plant roadways under secondary utilities required for the plant operation.	04
2.C	Explain any two properties to be considered for selecting refractory materials.	02