

Reg. No.

**MANIPAL INSTITUTE OF TECHNOLOGY**

MANIPAL

(A constituent unit of MAHE, Manipal)

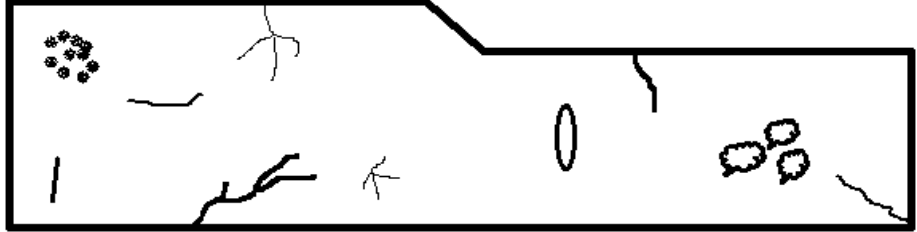
V SEMESTER B.TECH. (CIVIL ENGINEERING)**END SEMESTER EXAMINATIONS, NOV/DEC 2018****SUBJECT: NON-DESTRUCTIVE TESTING OF MATERIALS [CIE 4023]****REVISED CREDIT SYSTEM****(/ /2018)**

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ❖ Answer **ALL** the questions.
- ❖ Draw the neat sketch wherever necessary.

Q.No	Questions	Marks	CO
1A.	What are the major classifications of Non-destructive Testing? Explain.	5 marks	1
1B.	What is Liquid Penetrant Inspection (LPI)? Explain. State the requirements of LPI.	5 marks	2
2A.	Explain the influence of Metallurgical Composition, Size and Shape, Physical condition, Magnetization and Magnetic field on selection of magnetising method in Magnetic Particle Inspection.	5 marks	5
2B.	What is Penetration Resistance method of testing of concrete? Explain.	3 marks	2,3
2C.	How the results of Half Cell Electrical Potential test are presented? Explain.	2 marks	5
3A.	Mention and explain the factors which affects the Rebound Hammer inspection method.	5 marks	5
3B.	Compare Absolute probe and Differential probe used in Eddy current inspection	2 marks	2
3C.	Mention the use of Half-cell Electrical potential ranges in determination of corrosion of reinforcement.	3 marks	4
4A.	Explain how homogeneity of concrete, surface crack depth and the thickness of layer of inferior concrete is measured using ultrasound NDT.	5 marks	5
4B.	Mentioning the type of probe and probe technique used in ultrasound inspection, sketching typical display of the waveform, explain the procedure for inspection of defects in concrete member shown below. 	5 marks	5
5A.	Mention the ranges of ultrasound wave velocity in concrete. Explain how concrete quality is determined using ultrasound wave velocity.	3 marks	4
5B.	Define: Reflection strength, Positive reflection polarity, Negative reflection polarity, Two-way travel time and Ground Penetrating Radar attenuation. Explain how these factors are helpful in inspection of concrete.	5 marks	5
5C.	What are the advantages and disadvantages of Ground Penetrating Radar in general and with reference to concrete inspection?	2 marks	3