Reg. No.

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

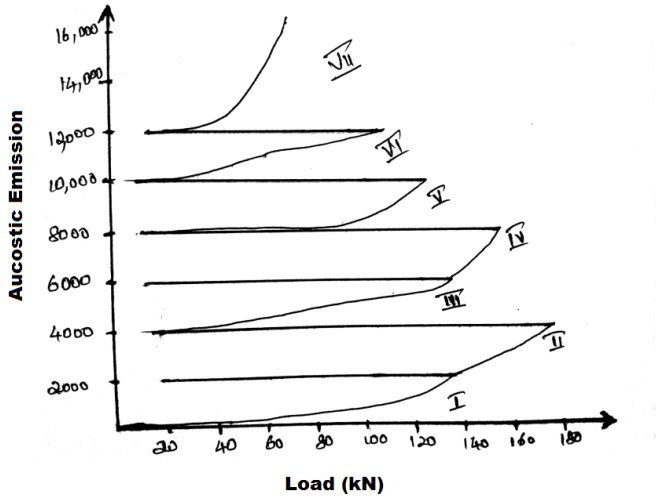
II SEMESTER M.TECH. END SEMESTER EXAMINATION

SUBJECT: **Non-destructive Testing of Materials [CIE 5303]**

Date of Exam:11/05/2024 Time of exam: 9:30 AM to 12:30 PM Max. Marks: 50

Instructions to Candidates:

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

Q. No		MARKS	CO
1A.	Discuss the advantages and applications of Acoustic Emission Testing (AET).	2	3
1B.	Illustrate and explain the transmission and reflection of ultrasound through the workpiece with and without a couplant.	3	3
1C	Illustrate and explain the interaction of ultrasound waves with the following defects found in the workpiece when inspected using reflection probes and an 'A' scan display. (i)Porosity, (ii) Angled defect, (iii) Elliptical defect, (iv) Micro crack and (v) Macro crack	5	3
2A	Describe the sequence of testing operations followed in AET.	2	3
2B	Explain the arrangement of acoustic emission sensor referring to zonal location and point location technique of AET	3	3
2C	A workpiece was subjected to loading and unloading cycles and the observed acoustic emission activity is as shown below. Compute the felicity ratio and explain the damage behaviour of the workpiece referring to falicity ratio values. 	5	3
3A	Illustrate and explain production and intraction of Eddy current (EC) with a crack in a metallic conductor.	2	4
3B	Describe internal diameter probe and external diameter probe.	3	4
3C	Explain the influence of frequency, geometry of test piece, dimension, lift-off, and conductivity of non ferro-magnetic conductor on penetration of EC.	5	4

4A	Compare film and real-time radiography?	2	4
4B	Distinguish between Eddy Current and Ultrasound inspection taking an example of surface crack in a metal .	3	4
4C	Explain probe shielding and probe loading technique to limit the spread of EC.	5	4
5A	Explain the objectives of leak testing.	2	5
5B	Explain transition flow, viscus flow, laminar flow and turbulent flow.	3	5
5C	It is proposed inspect a pressured pipe for any leakage using bubble leak and liquid penetrant leak testing techniques. Compare and explain the procedure of conducting both the tests	5	5