Code No: **RT42034A** **R13** **Set No. 1**

**IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018**

# NON DESTRUCTIVE EVALUATION

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any THREE questions from Part-B***
*****

## PART–A *(22 Marks)*

1. a) Mention the importance of the radiographic test. [4]
   b) What are ultrasonic transducers and their characteristics? [4]
   c) What are the limitations of Liquid penetration test? [4]
   d) State the principle of Magnetic particle test. [4]
   e) Define the effectiveness of eddy current. [3]
   f) List the NDE applications in aerospace industries. [3]

## PART–B *(3x16 = 48 Marks)*

2. a) State the principle of Radiographic test and what are the safety aspects of test? [8]
   b) Explain importance of NDT over Destructive Testing methods. [8]

3. a) Draw the neat sketch of Ultrasonic test setup? Explain how the pulse echo technique implemented in the U.T? [8]
   b) Discuss the advantages, limitations and variables of Ultrasonic testing. [8]

4. a) Write principle of Liquid Penetrant Testing. Also discuss on its application and Limitations. [8]
   b) Discuss the factors which affect visual testing method. Explain its remedies. [8]

5. a) Distinguish ultrasonic and magnetic particle tests. [8]
   b) How the magnetic particle test procedure is calibrated? What are the basic properties specimen to qualify for magnetic particle test? [8]

6. a) What is the principle of Eddy current testing? List out its application. [8]
   b) What are different types of test coils used in E.C.T.? Explain their typical applications. [8]

7. a) What are the safety norms in industrial radiography? Write its method of application. [8]
   b) Explain the principle of Acoustic emission testing with line diagram. [8]

Code No: **RT42034A** **R13** **Set No. 2**

**IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018**

**NON DESTRUCTIVE EVALUATION**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any THREE questions from Part-B***
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## PART–A *(22 Marks)*

1. a) Classify various methods of Non-destructive tests? [4]
   b) List the main components of ultrasonic method. [4]
   c) Define the sensitivity related to penetrant flow detection. [4]
   d) What is the sensitivity related with penetrant flow detection. [4]
   e) Identify the instrumentation of eddy current testing. [3]
   f) State the principle behind acoustic emission technique? [3]

## PART–B *(3x16 = 48 Marks)*

2. a) State the principle of Leak and pressure testing and explain in detail. [8]
   b) Discuss the various parameters influencing the radiographic imaging. [8]

3. a) Draw the Ultrasonic testing flaw detector architecture? Explain [8]
   b) Why an ultrasonic probe? Draw its neat sketch? Write its functions. [8]

4. a) Explain the method of liquid penetrant testing. Which type of jobs are suitable? [8]
   b) Explain the effectiveness and limitations of liquid penetrant testing. [8]

5. a) Explain the Magnetic particle inspection test in detail. [8]
   b) Explain the interpretation and evaluations procedure for magnetic particle test. [8]

6. a) Explain Eddy current Testing method. What is sensitivity in ECT? [8]
   b) Explain the single frequency and multi frequency eddy current testing. [8]

7. a) Explain the principle of radiographic testing. What are the applications and its limitations? [8]
   b) Explain the span of NDE activities in railways. [8]

Code No: **RT42034A** **R13** **Set No. 3**

**IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018**

**NON DESTRUCTIVE EVALUATION**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any THREE questions from Part-B***
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## PART–A *(22 Marks)*

1. a) What are the various NDE techniques used in Radiography? [4]
   b) How accurate the Ultrasonic test while measuring surface topography? [4]
   c) What are the limitations of Liquid penetrant test? [4]
   d) List the sequence of steps in magnetic particle testing procedure. [4]
   e) What are the applications of Eddy current test? [3]
   f) What is the significance thermographic testing method? [3]

## PART–B *(3x16 = 48 Marks)*

2. a) Explain the Fluroescent Penetration NDT examination method. State its limitations. [8]
   b) State and explain the principle and working X rays equipment. [8]

3. a) Discuss any two ultrasonic inspection techniques for detection of sub layer cracks in the materials. [8]
   b) What is a ultrasonic transducers and mention their characteristics. [8]

4. a) Write the procedure for liquid penetrant test with a suitable example. [8]
   b) Describe the different field of application of liquid penetrant test. What are its limitations? [8]

5. a) Draw the schematic diagram of Magnetic particle test equipment with a sketch? Explain. [8]
   b) Discuss in detail of the standardization and calibration of Magnetic particle test. [8]

6. a) Explain the sensitiveness of eddy current test techniques with necessary sketches. [8]
   b) What is the working principle of eddy current test? List out its advantages. [8]

7. a) Explain the principle of Acoustic emission testing with the line diagram. [8]
   b) Write short note on safety in industrial Radiography. [8]

Code No: **RT42034A** **R13** **Set No. 4**

**IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018**

**NON DESTRUCTIVE EVALUATION**

**(Mechanical Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***
***Answer ALL sub questions from Part-A***
***Answer any THREE questions from Part-B***
*****

## PART–A *(22 Marks)*

| | | | |
|---|---|---|---|
| 1. | a) | Differentiate X rays and Gamma rays. | [4] |
| | b) | What is dwell time in liquid penetrate testing? | [4] |
| | c) | What is the concept of magnetography? | [4] |
| | d) | What is demagnetization of materials? | [4] |
| | e) | What type of applications are suitable for eddy current test? | [3] |
| | f) | Write steps in the holography method. | [3] |

## PART–B *(3x16 = 48 Marks)*

| | | | |
|---|---|---|---|
| 2. | a) | Explain the types of radiation and their fields of applications produced during radioactive decay. | [8] |
| | b) | Identify the safety aspects of industrial radiography. | [8] |
| 3. | a) | Explain the design of ultrasonic transducers with suitable sketches. | [8] |
| | b) | State the principle of wave propagation, reflection in ultrasonic test. | [8] |
| 4. | a) | Compare the magnetic particle and liquid penetrant inspection methods. | [8] |
| | b) | Describe about the penetrant testing materials and applications. | [8] |
| 5. | a) | Show the eddy current test system with a neat diagram? Explain. | [8] |
| | b) | How do you measure the effectiveness of eddy current testing? | [8] |
| 6. | a) | Explain the high sensitivity eddy current testing techniques with necessary sketches. | [8] |
| | b) | What are the limitations of eddy current tests? | [8] |
| 7. | a) | Explain the method for NDE for pressure vessels. Discuss the test methods. | [8] |
| | b) | Describe the NDE applications for offshore gas and petroleum projects. | [8] |