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

IV B.Tech II Semester Regular Examinations, April/May - 2017

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) List out the methods of producing gamma rays. [3]
   b) Write the limitations of ultrasonic testing. [4]
   c) List the materials involved in liquid penetrant testing method [3]
   d) Enumerate the applications of magnetic NDT [4]
   e) State the limitations of eddy current testing. [4]
   f) Write the span of NDE activities in railways. [4]

PART–B *(3x16 = 48 Marks)*

2. a) Explain the method of X-ray generation with neat sketch [8]
   b) Briefly discuss various radiographic inspection techniques [8]

3. a) What is ultrasonic testing (UT)? Explain pulse echo method of UT [8]
   b) Explain the following terms:
   (i) Mode conversion at oblique incidence
   (ii) sound field [8]

4. a) Explain the principle and process in detecting flaws in a materials using Liquid penetrant method with the help of neat sketches. [10]
   b) Enumerate the limitations of liquid penetrant testing. [6]

5. a) Explain the principle of magnetic particle testing (MPT). What are its advantages and limitations? [8]
   b) What are the defects that are faced after magnetic particle testing? [8]

6. a) With a neat sketch explain the principle and working of eddy current inspection. [8]
   b) Discuss various applications of eddy current testing. [8]

7. a) Discuss about defects in casting, forging and welding. [10]
   b) What is the importance of NDE in off shore gas and petroleum projects? [6]

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

IV B.Tech II Semester Regular Examinations, April/May - 2017
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) List out the components of radiographic equipment. [3]
   b) What are the characteristics of transducers in ultrasonic testing [4]
   c) Define Cohesion and adhesion. [4]
   d) Name the materials which can be tested by magnetic particle testing? [3]
   e) Outline the principle of eddy current technique of NDT [4]
   f) Write any four differences between destructive and non destructive tests. [4]

PART–B ***(3x16 = 48 Marks)***

2. a) Mention the properties of X and gamma rays? [8]
   b) Explain the Interpretation of Radiograph and State safety precaution in Industrial radiography. [8]

3. a) Discuss briefly various components of pulse-eco flaw detector in ultrasonic equipment. [8]
   b) Explain different transducers in ultrasonic testing with neat sketch. [8]

4. a) Classify different types of penetrants used in liquid penetrant test. [8]
   b) Explain how liquid penetration method is used for non-destructive testing. [8]

5. a) Which materials are subjected to magnetic particle testing? Discuss them briefly. [8]
   b) Name different methods of magnetization. Discuss briefly any one. [8]

6. With the help of block diagram explain the eddy current testing principles and instrumentation. [16]

7. a) How NDE is involved in nuclear and non nuclear applications. [10]
   b) What is the importance of NDT in coal mining industries? [6]

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

IV B.Tech II Semester Regular Examinations, April/May - 2017

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 parameters in radiographic testing? Mention its uses. [3]
   b) Define refraction and diffraction. [4]
   c) What are the properties of a good penetrant? [3]
   d) Why and how demagnetization is carried out? [4]
   e) How an eddy currents are produced in conducting material [4]
   f) How liquid penetrant test applicable for automotive industries. [4]

PART–B ***(3x16 = 48 Marks)***

2. What are the different sources of radiation used in radiographic inspection method? Describe the advantages of gamma ray radiography over X-ray radiography. [16]

3. a) What is ultrasonic testing? Give its advantages, limitations and applications [8]
   b) Write short notes on piezoelectric effect. [8]

4. a) Explain various steps involved in liquid penetrant testing. [8]
   b) Discuss briefly about effectiveness and limitations of liquid penetrant testing. [8]

5. Explain demagnetization in Magnetic particle testing? How do you ensure it? What are portable Equipments used in MPT? [16]

6. a) What is the principle of eddy current testing (ECT)? [8]
   b) What kind of defects can be detected by Eddy current testing method? [8]

7. a) How liquid dye penetrant can be used to inspect weld joints. [8]
   b) How NDT is used in aerospace industries. [8]

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

IV B.Tech II Semester Regular Examinations, April/May - 2017
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 safety aspects of industrial radiography. [4]
   b) Define reflection and attenuation [4]
   c) How capillary rise related to liquid penetrant test. [4]
   d) Write short notes on magnetic materials. [4]
   e) List out the various factors effecting eddy currents [3]
   f) State the applications of NDE. [3]

PART–B ***(3x16 = 48 Marks)***

2. a) Differentiate clearly between X-ray and Gamma radiography techniques. [8]
   b) What are filters and sceens used in X- ray radiography? Why are they used? [8]

3. a) Discuss the limitations of ultrasonic testing. [8]
   b) Explain the principle of wave propagation in ultrasonic testing. [8]

4. a) Explain the technique of excess removal of penetrant from the workpiece surface. [8]
   b) Explain the principle of liquid penetrant test. [8]

5. Discuss Magnetic Particle Testing with reference to
   (i) Principle
   (ii) Method of Magnetization
   (iii) Limitations [16]

6. a) Explain the process of Eddy Current Testing with principle, applications and limitations. [8]
   b) Discuss various test coils used in Eddy current testing. [8]

7. Explain the magnetic particles inspection method to detect any defects in casting and welding operation. [16]