



**B.E/B.TECH DEGREE EXAMINATIONS: APRIL /MAY 2024**

(Regulation 2018)

Seventh Semester

**AERONAUTICAL ENGINEERING**

U18AEE0012: Non Destructive Testing

**COURSE OUTCOMES**

- CO1: Identify various methods of Non-destructive testing (NDT) to test the material integrity used in engineering application.
- CO2: Apply different NDT processes in aerospace industry.
- CO3: Utilize Thermal inspection, Optical holography NDT methods for aerospace applications.
- CO4: Distinguish various defect types and select the appropriate NDT methods for better evaluation.

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

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|---|-----|-------------------|
| 1. State the importance of NDT in quality assurance.  | CO1 | [K <sub>2</sub> ] |
| 2. List the benefits of using NDT techniques.   | CO1 | [K <sub>2</sub> ] |
| 3. State the principles of X-ray radiography.   | CO2 | [K <sub>2</sub> ] |
| 4. List out the applications of Radiographic Inspection.  | CO2 | [K <sub>2</sub> ] |
| 5. What are the variables affecting an ultrasound test?   | CO2 | [K <sub>2</sub> ] |
| 6. Explain the pulse-echo technique in ultrasonic testing.  | CO2 | [K <sub>2</sub> ] |
| 7. What is the principle behind the Magnetic Particle Test, and how does it help in detecting surface defects in materials?   | CO4 | [K <sub>2</sub> ] |
| 8. State one factor that affects the generation of eddy currents in materials during eddy current testing and briefly explain its impact on the inspection process. | CO4 | [K <sub>2</sub> ] |
| 9. State the principles of optical holography.  | CO3 | [K <sub>2</sub> ] |
| 10. List the sources of acoustic emission in composite materials.   | CO3 | [K <sub>2</sub> ] |

**Answer any FIVE Questions:-**  
**PART B (5 x 16 = 80 Marks)**  
**(Answer not more than 400 words)**

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|-----|----|---|----|-----|-------------------|
| 11. | a) | Demonstrate Visual inspection techniques with its procedure.  | 8  | CO1 | [K <sub>2</sub> ] |
|     | b) | Explain coin tapping technique for composite structures and adhesive bonds.   | 8  | CO1 | [K <sub>2</sub> ] |
| 12. | a) | Discuss on Production of X-rays.  | 8  | CO2 | [K <sub>2</sub> ] |
|     | b) | Explain the process of reading and interpreting radiographs.  | 8  | CO2 | [K <sub>2</sub> ] |
| 13. | a) | Explain A-scan, B-Scan and C-scan in Ultrasonic Testing.  | 8  | CO3 | [K <sub>2</sub> ] |
|     | b) | Explain the procedure for liquid penetrant test.  | 8  | CO3 | [K <sub>2</sub> ] |
| 14. |    | Explain the principles, equipment, procedure, and interpretation/evaluation involved in the Magnetic Particle Test (MPT) for detecting surface defects in materials.  | 16 | CO4 | [K <sub>3</sub> ] |
| 15. |    | Describe the key components of an eddy current testing system and explain how they contribute to the inspection process. Finally, provide examples of industrial applications where eddy current testing is commonly employed and discuss its effectiveness in each scenario. | 16 | CO4 | [K <sub>3</sub> ] |
| 16. |    | Discuss the principles, equipment, inspection methods, and applications of thermal inspection in non-destructive testing. Also highlight the advantages and limitations of thermal inspection.  | 16 | CO3 | [K <sub>3</sub> ] |

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