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| GATE |
| Linear Algebra |
| PYS’s and Solution |

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| VARUN KUMAR  7-31-2025 |

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# **CSE**

## 2025

**S1**

**Q.** Consider the given system of linear equations for variables 𝑥 and 𝑦, where 𝑘 is a real-valued constant. Which of the following option(s) is/are CORRECT?

1. There is exactly one value of 𝑘 for which the above system of equations has no solution.
2. There exist an infinite number of values of 𝑘 for which the system of equations has no solution.
3. There exists exactly one value of 𝑘 for which the system of equations has exactly one solution.
4. There exists exactly one value of 𝑘 for which the system of equations has an infinite number of solutions.

ANS: - a, d

**Q.** Let 𝐴 be a 2 × 2 matrix as given.

What are the eigenvalues of the matrix 𝐴13?

1. 1, −1
2. 2√2, −2√2
3. 4√2, −4√2
4. 64√2, −64√2

**ANS: - d**

**S2**

**Q**. If then which ONE of the following is 𝐴8?

a. c.

b. d.

ANS: - c

**Q.** Let 𝐿, 𝑀, and 𝑁 be non-singular matrices of order 3 satisfying the equations

Which ONE of the following is the value of the determinant of (𝑀 − 𝑁)?

1. 0
2. 1
3. 2
4. 3

ANS: - a

**Q.** Consider a system of linear equations 𝑃𝑋 = 𝑄 where and . Suppose 𝑃 has an LU decomposition, 𝑃 = 𝐿𝑈, where

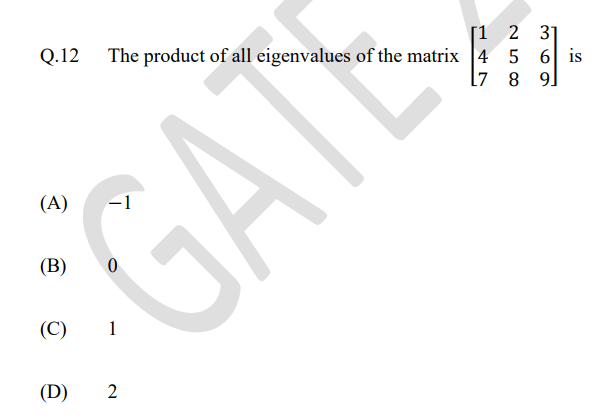
L = and

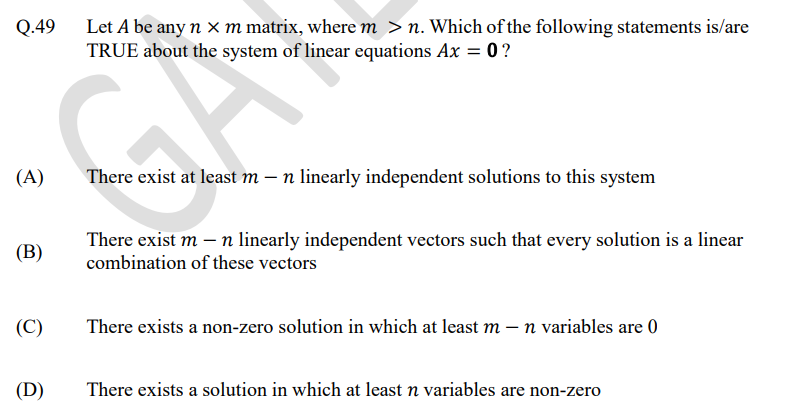
Which of the following statement(s) is/are TRUE?

1. The system 𝑃𝑋 = 𝑄 can be solved by first solving 𝐿𝑌 = 𝑄 and then 𝑈𝑋 = 𝑌.
2. If 𝑃 is invertible, then both 𝐿 and 𝑈 are invertible
3. If 𝑃 is singular, then at least one of the diagonal elements of 𝑈 is zero.
4. If 𝑃 is symmetric, then both 𝐿 and 𝑈 are symmetric.

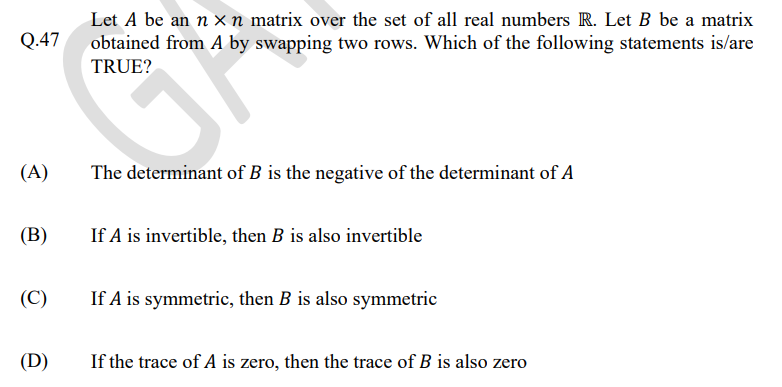
ANS: - a, b, c

## 2024

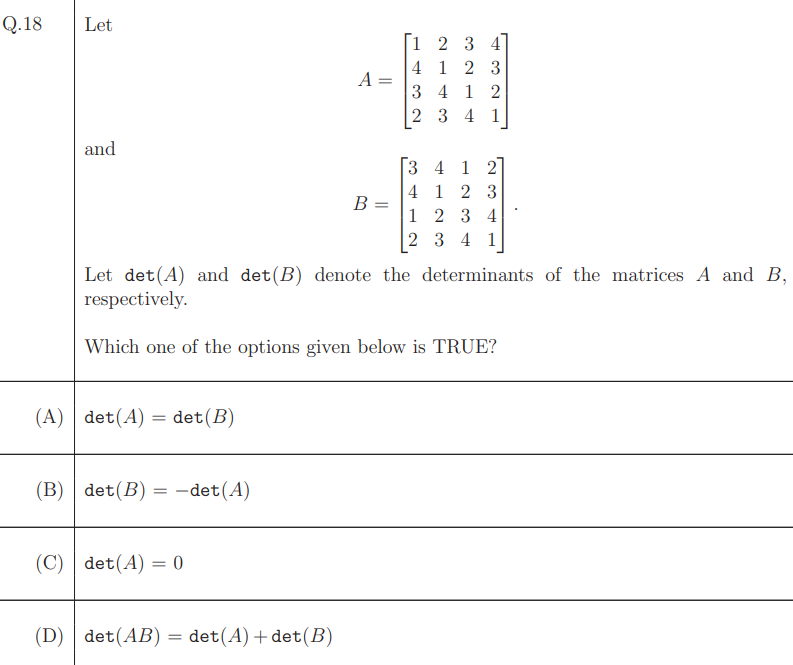


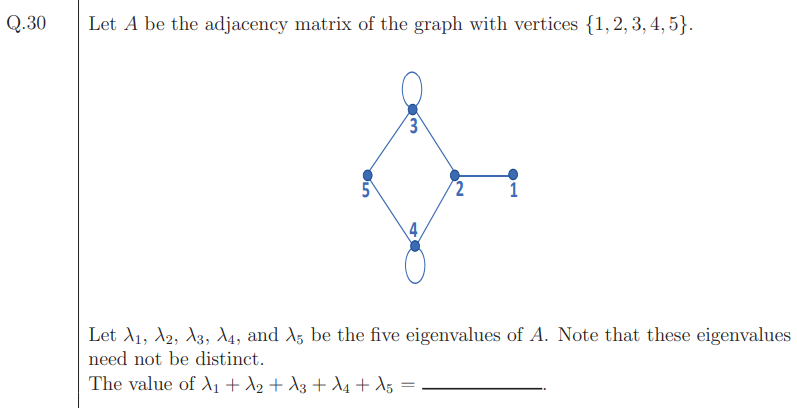


**S2**

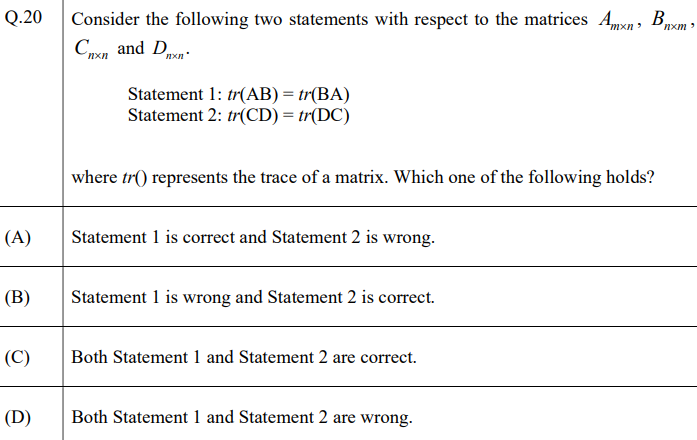


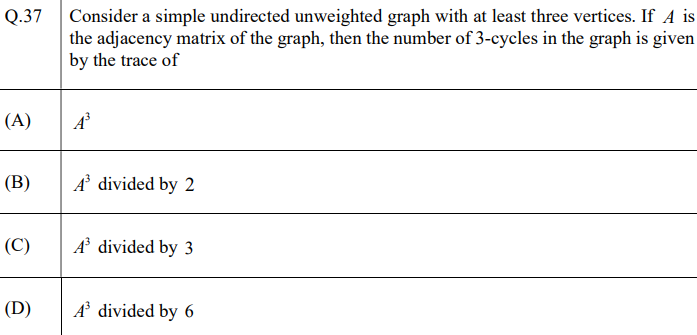
## 2023

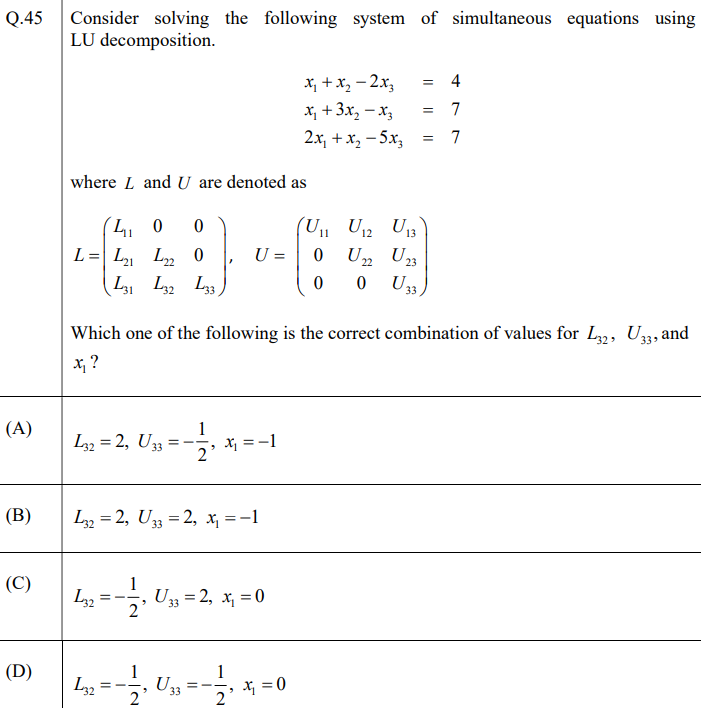


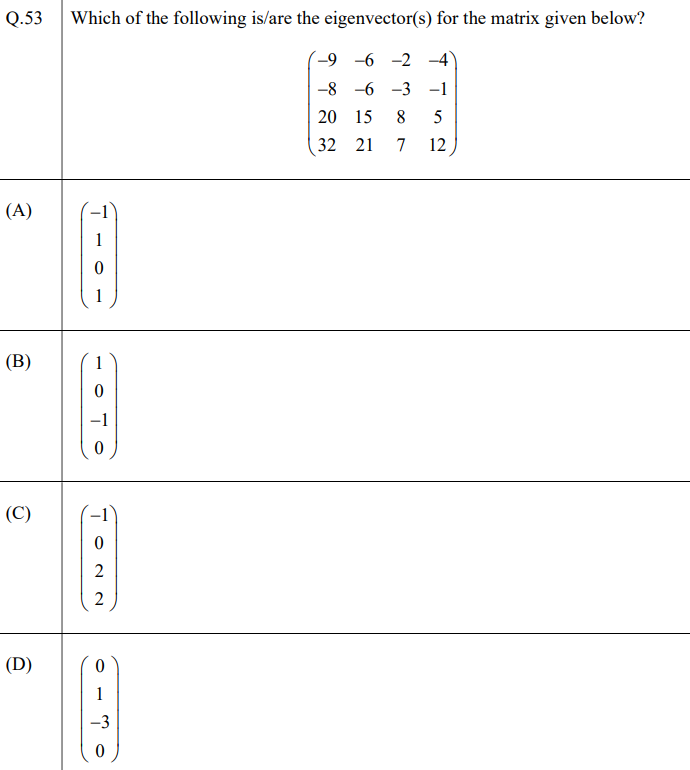


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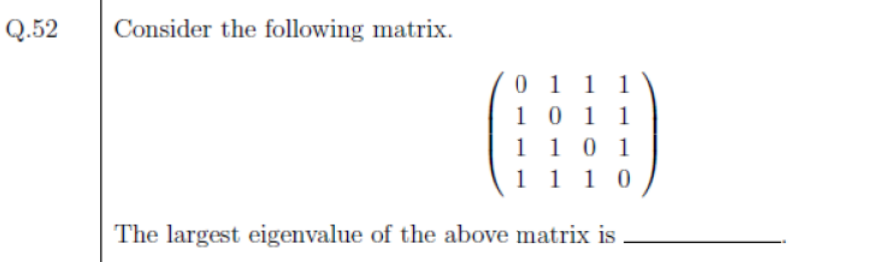






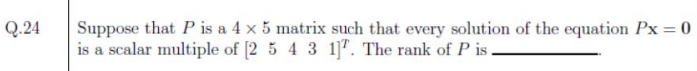


## 2021, S-1



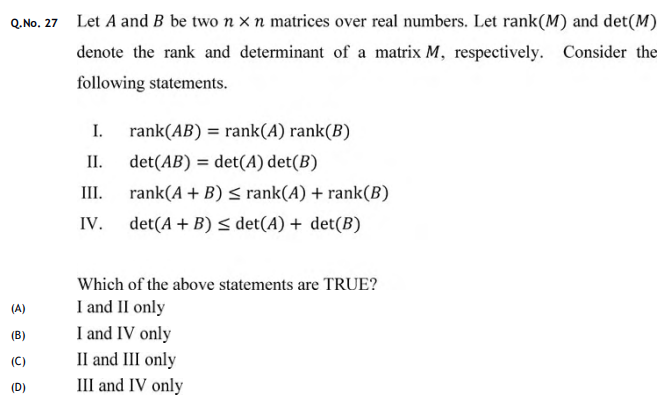
ANS: - 3

## 2021, S-2



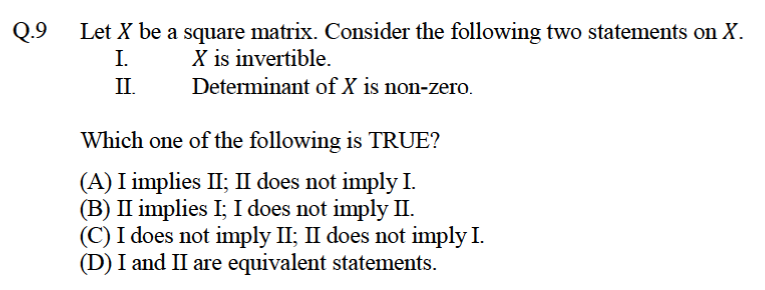
ANS: - 4

## 2020

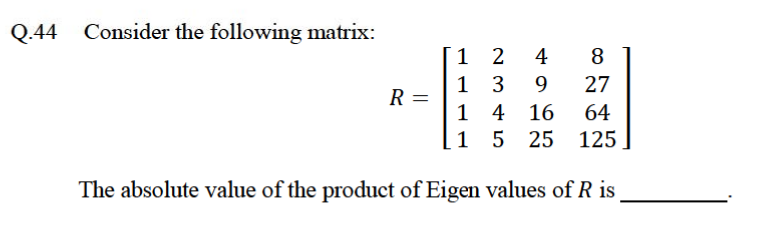


ANS: - C

## 2019

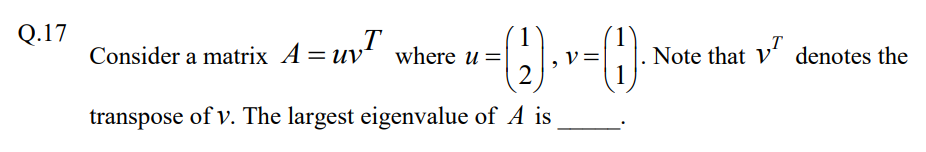


ANS: - D

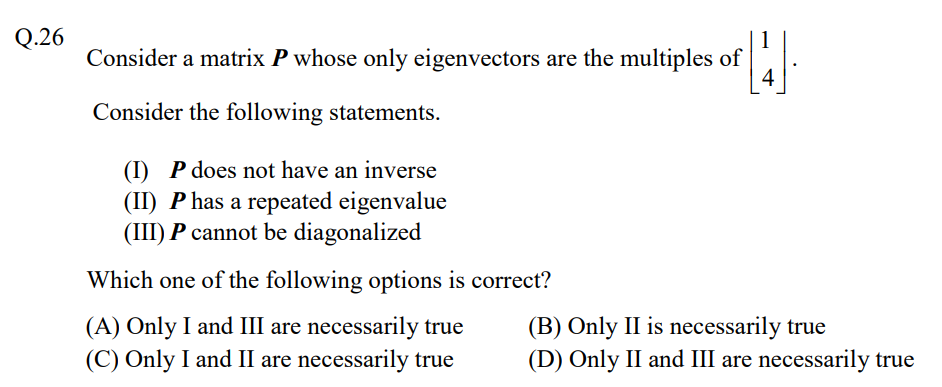


ANS: - 12

## 2018



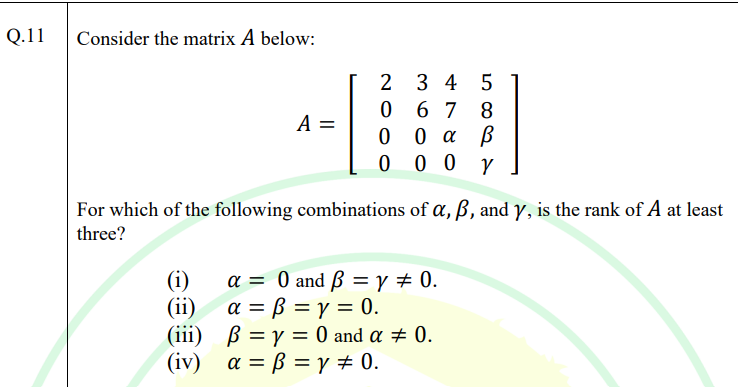
ANS: - 3



ANS: - D

# **ECE**

## 2025



(A) Only (i), (iii), and (iv)

(B) Only (iv)

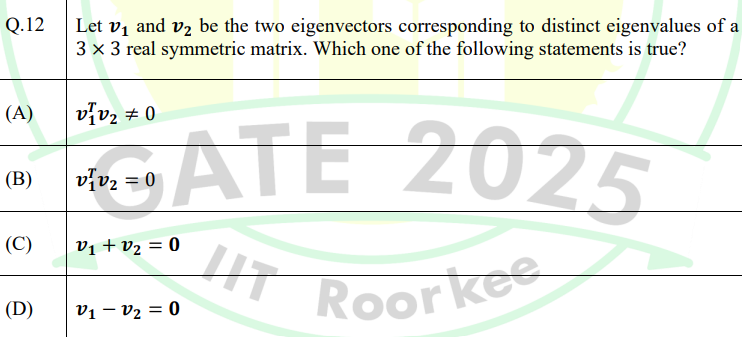
(C) Only (ii)

(D) Only (i) and (iii)

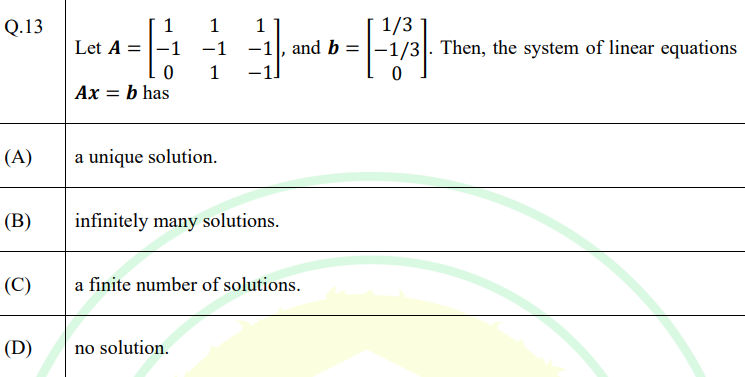
ANS: - A

# **EEE**

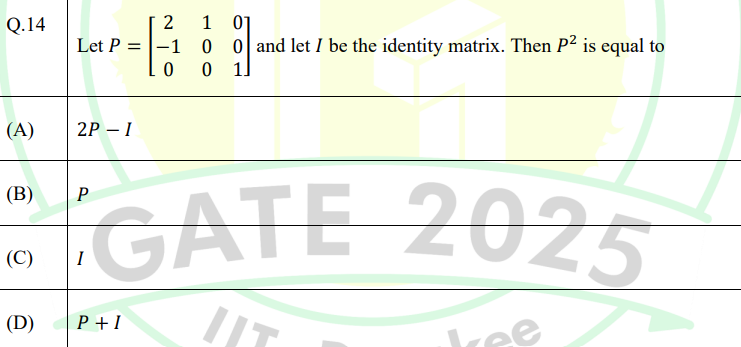
## 2025



ANS: - B



ANS: - B

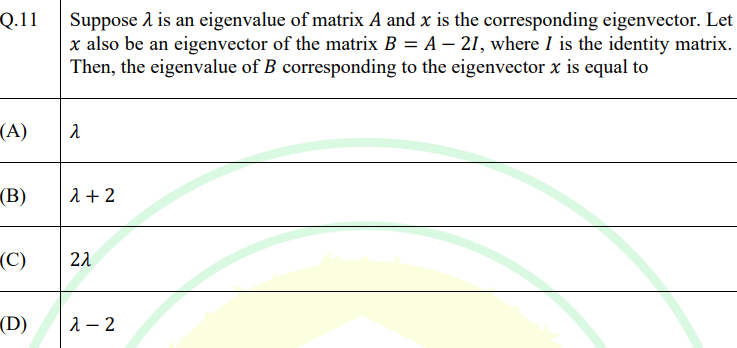


ANS: - A

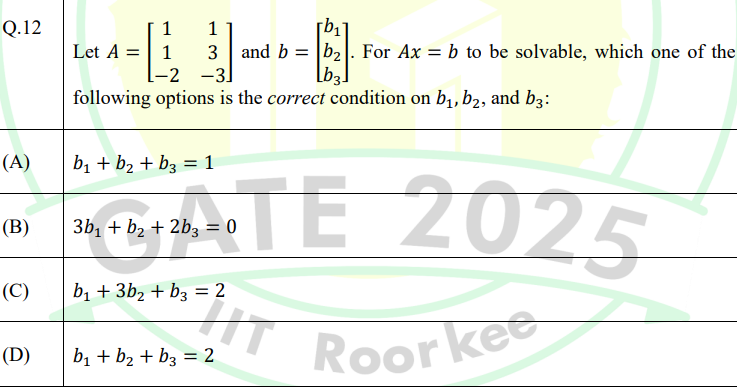
# **Civil**

## 2025

CE 1

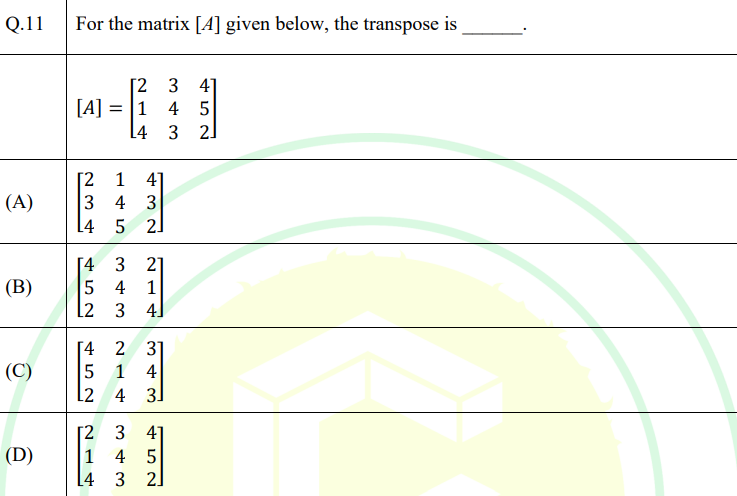


ANS: - D

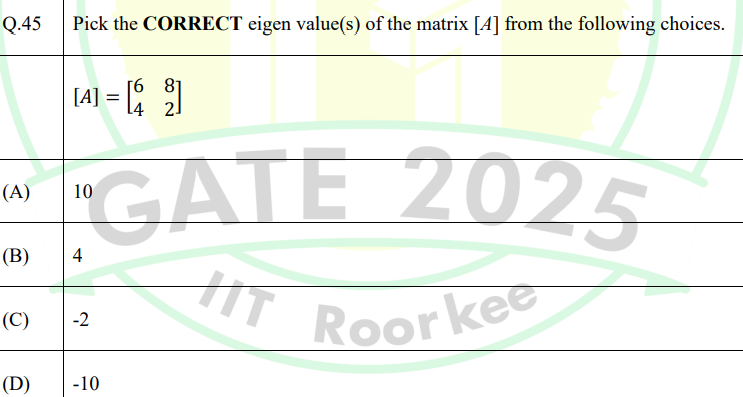


ANS: - B

CE – 2



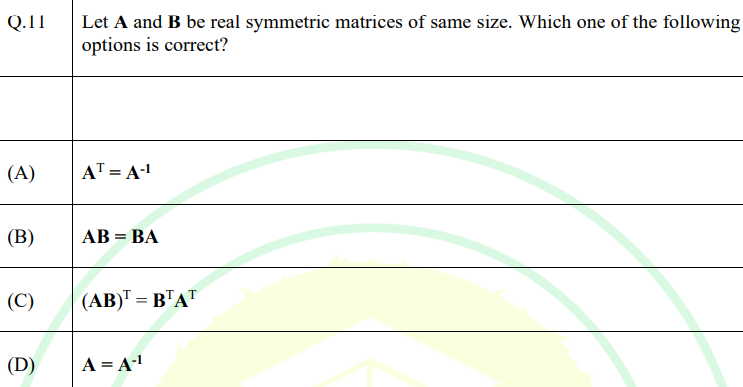
ANS: - A



ANS: - A, C

# **Mechanical**

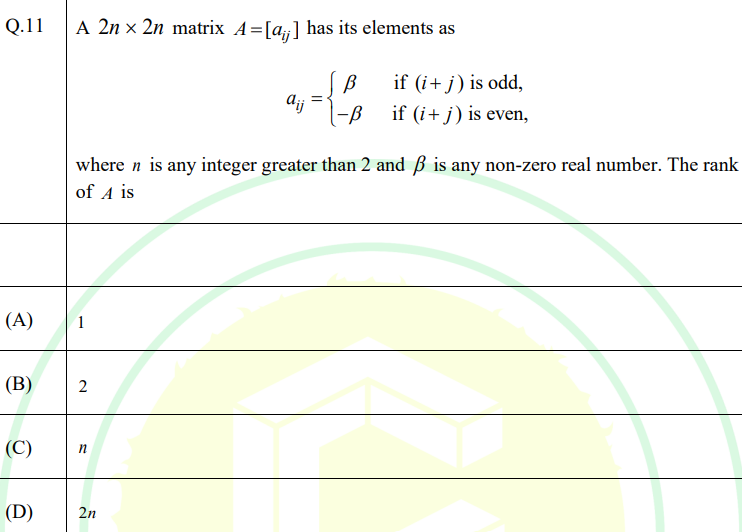
## 2025



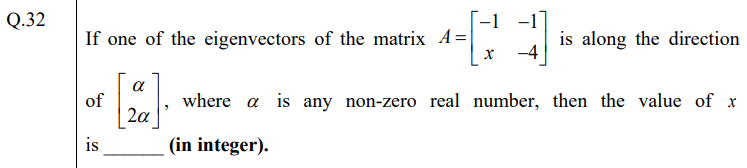
ANS: - C

# **Instrumentation Engineering**

## 2025



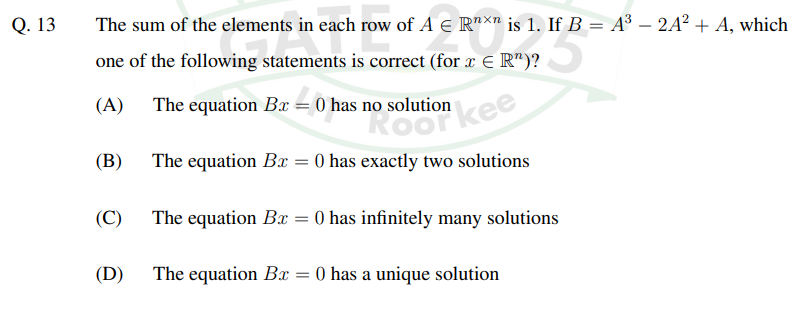
ANS: - A



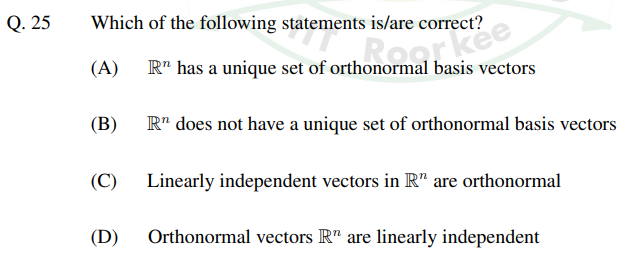
ANS: - 2

# **Data Science and Artificial Intelligence**

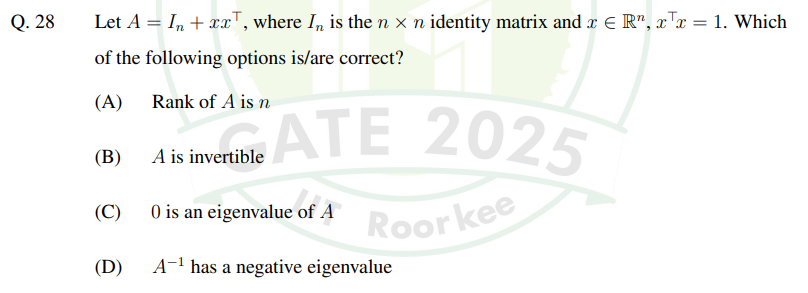
## 2025



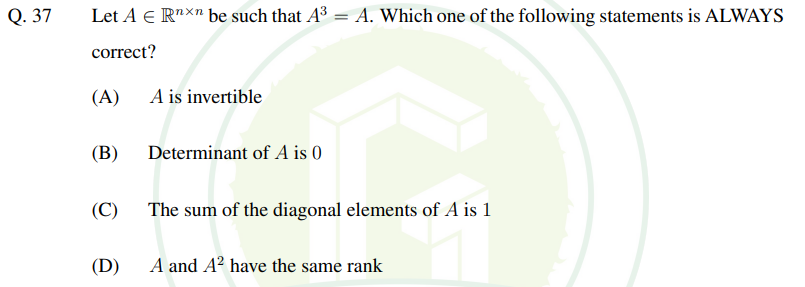
ANS: - C



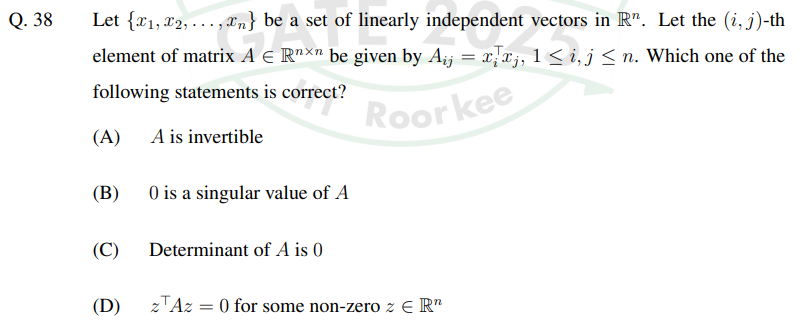
ANS: - B, D



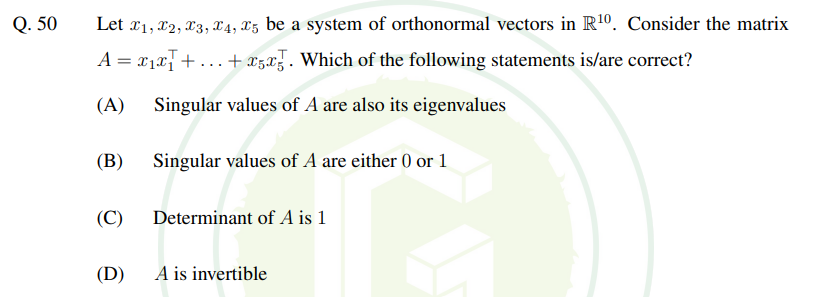
ANS: - A, B



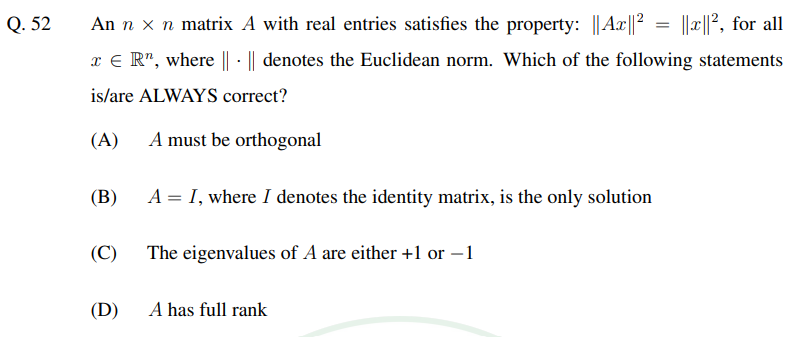
ANS: - D



ANS: - A



ANS: - A, B



ANS: - A, D