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 **PRESIDENCY UNIVERSITY**

  **Bengaluru**

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| **Ph.D. Course Work End Term Examinations – JAN-FEB 2025** |
| **Date:** 03 – 02- 2025 **Time:** 09:30 am – 12:30 pm |

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| **School:** SOE | **Program:** Ph. D |
| **Course Code :** MAT826 | **Course Name** : Spectral theory and Topological indifference |
| **Semester**:  | **Max Marks**: 100 | **Weightage**: 50% |

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| **CO - Levels** | **CO1** | **CO2** | **CO3** | **CO4** |
| **Marks** | **30** | **30** | **20** | **20** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Do not write anything on the question paper other than roll number.*

**Part A**

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| **Answer ALL the Questions. Each question carries 10marks. 6Q x 10M=60Marks** |
| **1** | Write a brief history of Randic index, ABC index and Zagreb index. | **10 Marks** | **L2** | **CO1** |
| **2** | Show that GA index of Benzopolyperinaphthalene monoradic seriesis $6+\frac{4n√6}{5}+2n-3=0$. | **10 Marks** | **L22** | **CO2** |
| **3** | Explain in detail spectral properties of molecular graph | **10 Marks** | **L2** | **CO3** |
| **4** | Prove that the trace of A3 is six times the number of triangles in the graph | **10 Marks** | **L2** | **CO4** |
| **5** | If WL(∑(Kn)) is the vertex labeled signed graph then prove that R-[WL(∑(Kn))]=R(Kn).  | **10 Marks** | **L2** | **CO3** |
| **6** | Explain graph energy with suitable examples | **10 Marks** | **L2** | **CO4** |

**Part B**

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| **Answer the Questions. Each question carries 20 marks 2Q x 20 = 40 Marks** |
| **7.** |  | Explain all degree based topological indices of chemical graphs with suitable example.  | **20 Marks** | **L3** | **CO1** |
|  |
| **8.** |  | If LS(Bn) is the labeled signed book graph then prove that the second Zagreb index is given as M2[LS(Bn)]=4(2n-1+1)[3(n+1)2+n(2n-1+1)].  | **20 Marks** | **L3** | **CO2** |

**\*\*\*\*\* BEST WISHES \*\*\*\*\***