**18EI703**

**Hall Ticket Number:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **IV/IV B.Tech (Supplementary) DEGREE EXAMINATION** | | | |
| **April,2023** | **Electronics & Instrumentation Engineering** | | |
| **Seventh Semester** | **Analytical instrumentation** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1. | a) | What is grating in spectroscopy? | CO1(BL1) | | **1M** |
|  | b) | Why sensitive detector is required for spectrophotometer? | CO1(BL1) | | **1M** |
|  | c) | What is collimator? | CO2(BL1) | | **1M** |
|  | d) | How the ESR principle used in analytical instrumentation? | CO3(BL1) | | **1M** |
|  | e) | Why high intensity magnets are preferred for NMR? | CO3(BL1) | | **1M** |
|  | f) | Define term ionization. | CO4(BL1) | | **1M** |
|  | g) | Write the principle of mass spectrometer. | CO3(BL1) | | **1M** |
|  | h) | Define dead time of a GM counter. | CO4(BL1) | | **1M** |
|  | i) | State Brags equation. | CO1(BL1) | | **1M** |
|  | j) | List various applications of X-ray spectroscopy. | CO4(BL1) | | **1M** |
| **Unit – I** | | | | | |
| 2. | a) | Explain absorption filters and interference filters. | CO1(BL2) | **5M** | |
|  | b) | Illustrate the working of double beam ratio recording spectrophotometer. | CO1(BL3) | **5M** | |
|  |  | **(OR)** |  |  | |
| 3. | a) | Outline the principles of visible spectroscopy and detailed comparison of various detecting units. | CO1(BL4) | **5M** | |
|  | b) | Determine the relation between absorption and concentration of a sample. | CO1(BL3) | **5M** | |
| **Unit – II** | | | | | |
| 4. | a) | Explain the working of FT-IR spectrophotometer with a neat diagram. | CO2(BL2) | **5M** | |
|  | b) | Discuss the various detectors used in IR spectroscopy. | CO2(BL2) | **5M** | |
|  |  | **(OR)** |  |  | |
| 5. | a) | Write about the emission and recording systems of flame photometer. | CO2(BL1) | **5M** | |
|  | b) | Explain the construction and working of clinical flame photometer. | CO2(BL2) | **5M** | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit – III** | | | | |
| 6. | a) | Illustrate the magnetic deflection type mass analyzer. | CO3(BL3) | **5M** |
|  | b) | Outline the construction and working principle of FTNMR spectrometer. | CO3(BL4) | **5M** |
|  |  | **(OR)** |  |  |
| 7. | a) | Define Electron spin and how it is used in spectroscopy. | CO3(BL1) | **5M** |
|  | b) | Describe the constructional details of ESR spectrometer with a neat sketch. | CO3(BL2) | **5M** |
| **Unit – IV** | | | | |
| 8. | a) | Illustrate the basic design of ionization chamber and how it can be operated in different modes. | CO4(BL3) | **5M** |
|  | b) | Explain in detail about instrumentation associated with X-Ray spectroscopy. | CO4(BL2) | **5M** |
|  |  | **(OR)** |  |  |
| 9. | a) | Outline the different types of X-Ray Fluorescence spectrophotometer. | CO4(BL4) | **5M** |
|  | b) | Explain graphically the comparative operation of ionization chamber, GM counter and Scintillation counter. | CO4(BL2) | **5M** |

****