**20EC102/20EE102**

**(PH01)**

**Hall Ticket Number:**

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| **I/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **July, 2021** | **Common to ECE,EEE and EIE** | | |
| **First semester** | **Waves & Modern Physics** | | |
| **Time:** Three Hours | | **Maximum: 7**0 Marks | |
| *Answer Question No.1 compulsorily.* | | | (14X1 = 14 Marks) |
| *Answer ONE question from each unit.* | | | (4X14=56 Marks) |

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| 1 | Answer all questions | | | (14X1=14 Marks) | |
|  | a) | | Explain the term “ Pumping” | |  |
|  | b) | | Define Acceptance angle | |  |
|  | c) | | List out the advantages of optical fibers | |  |
|  | d) | | What are matter waves | |  |
|  | e) | | Define inductive reactance in AC circuit. | |  |
|  | f) | | Define quality factor. | |  |
|  | g) | | What is poyinting vector? | |  |
|  | h) | | What is Hall effect? | |  |
|  | i) | | Discuss the applications Ultrasonic waves | |  |
|  | j) | | What are the radio isotopes? | |  |
|  | k) | | Define piezo electric effect. | |  |
|  | l) | | What is the purpose of quenching agent? | |  |
|  | m) | | Write the properties of laser. | |  |
|  | n) | | What is the de-Broglie wave length of electron accelerating in 100V potential difference? | |  |
| **UNIT - I** | | | | | |
| 2. | | a) | Illustrate the construction and working mechanism of Ruby laser with neat diagram | | 8M |
|  | | b) | Write the applications of laser. | | 6M |
| **Or** | | | | | |
| 3. | | a) | Define numerical aperture and acceptance angle and derive expression for them. | | 10M |
|  | | b) | Calculate the numerical aperture of a given optical fiber, if the refractive indices of core  and cladding are 1.54 and 1.42 respectively | | 4M |
| **UNIT - II** | | | | | |
| 4. | | a) | Derive the expressions of impedance of LCR series circuit and obtain the condition for resonance. | | 10M |
|  | | b) | Write the integral and differential forms of Maxwell’s equations | | 4M |
| **Or** | | | | | |
| 5. | | a) | Explain the principle, construction and working of cyclotron and write limitations. | | 10M |
|  | | b) | Write the applications of Hall effect. | | 4M |
| **UNIT III** | | | | | |
| 6. | | a) | Explain de-Broglie hypothesis and derive the wave length of matter waves | | 8M |
|  | | b) | State and explain Heisenberg’s uncertainty principle | | 6M |
| Or | | | | | |
| 7. | | a) | Derive one dimensional Time independent Schrodinger wave equation for a particle. | | 8M |
|  | | b) | Explain physical significance of wave function and write its limitations | | 6M |
| **UNIT IV** | | | | | |
| 8. | | a) | Describe the production of ultrasonic waves by magnetostriction method. | | 10M |
|  | | b) | Discuss the various properties of ultrasonic waves | | 4M |
| Or | | | | | |
| 9. | | a) | Describe the construction and working of GM counter. | | 10M |
|  | | b) | Write the applications of radio isotopes in medicine | | 4M |

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