**18EC701**

**Hall Ticket Number:**

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| **IV/IV B.Tech (Supplementary) DEGREE EXAMINATION** | | | |
| **April,2023** | **Electronics and Communication Engineering** | | |
| **Seventh Semester** | **Microwave and Radar Engineering** | | |
| **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) |

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| 1. | a) | Why conventional tubes cannot generate microwave power? | CO1 | L2 | 1M |
|  | b) | Name and draw some type of slow wave structures? | CO1 | L1 | 1M |
|  | c) | Give any two applications of PIN diode. | CO2 | L1 | 1M |
|  | d) | What is symmetric property of S-matrix? | CO2 | L2 | 1M |
|  | e) | What is frequency pulling and frequency pushing in cavity Magnetrons? | CO3 | L3 | 1M |
|  | f) | What is the purpose of isolator in microwave bench set up? | CO3 | L2 | 1M |
|  | g) | What is Doppler frequency shift? | CO3 | L2 | 1M |
|  | h) | What is meant by Blind Speed? | CO4 | L2 | 1M |
|  | i) | Write the significance of Delay line canceller. | CO4 | L1 | 1M |
|  | j) | Define noise figure? | CO4 | L2 | 1M |
| **Unit -I** | | | | | |
| 2. | a) | Explain the principle of operation of two-cavity klystron amplifier and derive an expression for the optimum length? | CO1 | L3 | 5M |
|  | b) | Describe the operation and working of 8-cavity cylindrical magnetron. | CO1 | L2 | 5M |
|  |  | **(OR)** |  |  |  |
| 3. | a) | Discuss the techniques for the enhancement of overall efficiency of TWT? | CO1 | L1 | 5M |
|  | b) | What is transferred electron effect? Explain how negative resistance is exhibited by Gunn Diode. | CO1 | L4 | 5M |
|  |  | **Unit -II** |  |  |  |
| 4. | a) | Explain about E-plane tee with suitable diagram and derive its S-Matrix? | CO2 | L3 | 5M |
|  | b) | Obtain the scattering matrix for a 3-port circulator and also prove that it is impossible to construct perfectly matched lossless reciprocal three port junction? | CO2 | L2 | 5M |
|  |  | **(OR)** |  |  |  |
| 5. | a) | What are the different types of techniques used for measuring microwave power and explain how power microwave measurement is done. | CO2 | L1 | 5M |
|  | b) | The calibrated power from a generator as read at the power meter is 25 mw. When a 3 dB attenuator with VSWR of 1.3/1 is inserted between the generator and the detector, what value should the power meter read? | CO2 | L4 | 5M |
|  |  | **Unit -III** | |  |  |
| 6. | a) | Derive the expression for radar range equation | CO3 | L2 | 5M |
|  | b) | Explain how the noise signals are limiting the performance of FMCW altimeter. | CO3 | L1 | 5M |
|  |  | **(OR)** |  |  |  |
| 7. | a) | Discuss the working of FM CW radar with neat diagrams. | CO3 | L2 | 5M |
|  | b) | What is Maximum Unambiguous Range? How is it related with pulse repetition rate? | CO3 | L1 | 5M |
|  |  | **Unit -IV** |  |  |  |
| 8. | a) | Explain the operation of MTI radar with neat block diagrams? | CO4 | L2 | 4M |
|  | b) | What is Blind Speed and explain in detail. | CO4 | L3 | 6M |
|  |  | **(OR)** |  |  |  |
| 9. | a) | What is the drawback of single delay line canceller? Explain the characteristics of Double cancellation. | CO4 | L2 | 5M |
|  | b) | Write short notes on the operation of an MTI radar system with a power amplifier as the transmitter. | CO4 | L1 | 5M |

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