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**Question Paper Code: 57403**

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2021

Seventh Semester

Electronics and Communication Engineering

15UEC703-MICROWAVE ENGINEERING

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A device used for coupling microwave energy is known as: CO1- R  
a) Transmitter      (b) Resonator      (c) Waveguide      (d) Loop
  
2. Microwave is a region of Electromagnetic spectrum having frequency ranging from \_\_\_\_\_ CO1- R  
(a) 1GHz to 100 GHz      (b) 1Hz to 100 Hz  
(c) 1Hz to 100 GHz      (d) None of the mentioned
  
3. Most of the power measuring microwave devices measure CO2- R  
(a) Average power      (b) Peak power  
(c) Instantaneous power      (d) None of these
  
4. HEMT(High Electron Mobility Transistor) used in microwave circuit is a CO2- U  
(a) Source      (b) Detector  
(c) High power amplifier      (d) Low noise amplifier
  
5. Reflex Klystron is a CO3- R  
(a) Amplifier      (b) Oscillator      (c) Attenuator      (d) Filter
  
6. On which of the following principle does Klystron operate CO3- R  
(a) Amplitude Modulation      (b) Frequency Modulation  
(c) Pulse Modulation      (d) Velocity Modulation

7. For the capacitors used in MMICs, the insulating dielectric films used are CO4- U  
 (a) Air (b) SiO (c) Titanium (d) None of These
8. Which of the following noise becomes important at microwave frequencies CO4- U  
 (a) Shot noise (b) Flicker noise (c) Thermal noise (d) Transit time noise
9. The reflection coefficient on a line is 0.2 angle of 45°. The SWR is CO5- A  
 (a) 0.8 (b) 1.1 (c) 0.8 (d) 1.1
10. \_\_\_\_\_ is a key component in the scalar or vector network analyzer. CO5- U  
 (a) Reflectometer (b) Radiometer  
 (c) Frequency meter (d) None of the mentioned

PART – B (5 x 2= 10 Marks)

11. Write the properties of S matrix CO1- U
12. Give Manley Rowe Relation CO2 R
13. What are the applications of reflex klystron? CO3- U
14. List out the advantages and applications of MMIC CO4- R
15. Distinguish between low frequency and microwave measurements CO5- U

PART – C (5 x 16= 80Marks)

16. (a) Explain the operation of H-Plane Tee. Derive the S matrix for the same CO1- U (16)  
 Or  
 (b) Explain the operation of E-Plane Tee. Derive the S matrix for the same CO1- U (8)
17. (a) What is transferred electron effect? In which type of material it is present. How the domain formation is taking place in Gunn devices and what are its various modes of operation? CO2- U (16)  
 Or  
 (b) Discuss the working principle of GUNN diode as a transferred electron device with two valley model, also draw the structure, equivalent circuit and V-I characteristics of GUNN diode. CO2- U (16)
18. (a) Explain about velocity modulation and bunching in a Reflex klystron amplifier, with neat circuit diagrams and relevant equations. CO3- U (16)

Or

- (b) Draw a neat sketch showing the constructional features of a cavity magnetron and explain why Magnetron is called as crossed field device CO3- U (16)
19. (a) Explain the different types of materials used in MMIC and list their characteristics CO4- U (16)
- Or
- (b) Explain in detail with suitable diagrams, the fabrication techniques of a Monolithic Microwave Integrated Circuit. CO4- U (16)
20. (a) Explain the mathematical formulation of measurement of dielectric constant of a solid using rectangular waveguide. CO5- U (16)
- Or
- (b) Explain in detail about the impedance measurement using microwave devices CO5- U (16)

