K. J. Somaiya Institute of Engineering and Information Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)
End Semester Exam
Nov – Dec 2021
(B. Tech) Program: Electronics and Telecommunication Engineering
Examination: LY Semester: VII
Course Code: **1UEXC701** Course Name: Microwave Engineering

Duration: 03 Hours **Max. Marks: 60**

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT Level
Q 1	**Solve any six questions out of eight:**	**12**		
i)	Define scattering matrix.	02	CO1	U
ii)	What do you mean by hybrid junction?	02	CO2	R
iii)	What is the use of the stub?	02	CO2	R
iv)	Difference between E plane and H plane Tee?	02	CO2	R
v)	Application of Gunn diode.	02	CO3	U
vi)	Define velocity modulation.	02	CO4	U
vii)	Define antenna gain.	02	CO5	R
viii)	Mention the application of two-cavity klystron.	02	CO6	R
Q.2	**Solve any four questions out of six.**	**16**		
i)	Explain the operation of 2- holes directional coupler with S-matrix.	04	CO2	R
ii)	Compare IMPATT and TRAPAT diode.	04	CO3	U

iii)	Microstrip line is also called open strip line. Comment on this.	04	CO1	U
iv)	Explain travelling wave tube as an amplifier.	04	CO4	R
v)	Explain the procedure of measurement of dielectric constant at microwave frequency.	04	CO5	R
vi)	Derive radar range equation.	04	CO6	A
Q.3	**Solve any two questions out of three.**	**16**		
i)	The terminating impedance Z_L = 100+j100 Ω and the characteristics impedance Z_0 of the line and stub is 50 Ω. The first stub is placed at 0.40 λ away from the load. The spacing between the two stubs is 3λ/8. Determine the length of the short-circuited stub when the match is achieved.	08	CO2	A
ii)	Derive the wave equation for TE wave and obtain all the field components in a circular waveguide.	08	CO2	A
iii)	What is the importance of beam coupling coefficient? Derive the equation of velocity modulation in klystron.	08	CO4	R
Q.4	**Solve any two questions out of three.**	**16**		
i)	Draw and explain the backward wave oscillator	08	CO4	R
ii)	Explain operation of Gunn diode using two valley model and Explain different modes of Gunn diode.	08	CO3	U
iii)	Draw and explain the block diagram of the MTI radar system and list out its limitations	08	CO6	R