

University of Mumbai

Program: **Electronics and Telecommunication Engineering**

Curriculum Scheme: Rev2016

Examination: BE Semester VII

Course Code: ECC701

Course Name: Microwave Engineering

Time: 2 hour 30 minutes

Max. Marks: 80

Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	The modes of propagation supported by a rectangular wave guide is:
Option A:	TM, TEM, TE modes
Option B:	TM, TE
Option C:	TM, TEM
Option D:	TE, TEM
2.	The fundamental or dominant mode in a rectangular waveguide is
Option A:	TE ₀₁
Option B:	TE ₁₀
Option C:	TE ₁₁
Option D:	TE ₂₁
3.	The intrinsic impedance of the waveguide at $f=1.5f_c$ in TM and TE modes is, respectively
Option A:	140 Ω , 253 Ω
Option B:	218 Ω , 652 Ω
Option C:	281 Ω , 506 Ω
Option D:	109 Ω , 326 Ω
4.	The isolators constructed using ferrite materials must operate at:
Option A:	Gyro magnetic resonance
Option B:	Magnetic resonance
Option C:	Isolator resonance
Option D:	None of the mentioned
5.	_____ is a device that produces a phase shift of a required amount of the input wave.
Option A:	Phase shifter
Option B:	Attenuator
Option C:	Resonator
Option D:	None of the mentioned
6.	The two adjustable parameters in single stub matching are distance 'd' from the load to the stub position, and
Option A:	Susceptance or reactance provided by the stub
Option B:	Length of the stub

Option C:	Distance of the stub from the generator
Option D:	Changing the characteristic impedance
7.	If a load of 10Ω has to be matched to a transmission line of characteristic impedance of 50Ω , then the characteristic impedance of the matching section of the transmission line is:
Option A:	50Ω
Option B:	10Ω
Option C:	22.36Ω
Option D:	100Ω
8.	Shunt stubs are preferred for:
Option A:	Strip and microstrip lines
Option B:	Coplanar waveguides
Option C:	Circular waveguide
Option D:	Circulators
9.	For co-axial lines and waveguides, _____ is more preferred.
Option A:	Open circuited stub
Option B:	Short circuited stub
Option C:	Slotted section
Option D:	Co-axial lines cannot be impedance matched
10.	If the instantaneous RF potentials on the two sides of a magnetron cavity are opposite polarity, the operation is in the
Option A:	Π mode
Option B:	2Π mode
Option C:	$\Pi/2$ mode
Option D:	$\Pi/4$ mode

Q2	Solve any Two Questions out of Three	10 marks each
A	Design an L -section matching network to match a series RC load with an impedance $Z_L = 200 - j100$ ohms to a 100 ohms line at a frequency of 500 MHz	
B	Derive an expression for the phase velocity, cut-off frequency and cut-off wavelength of a rectangular waveguide	
C	With the help of suitable diagram explain mechanism of operation of Magnetron. What is mode jumping in Magnetron? How are various modes separated?	

Q3	Solve any Two Questions out of Three	10 marks each
A	Explain the significance of RWH theory and explain two valley models in GUNN diode	
B	Explain how VSWR is measured at microwave frequencies.	
C	Write a short note on types of MIC.	

Q4	Solve any Two Questions out of Three	10 marks each
A	What is the importance of beam coupling coefficient? Derive the expression for velocity modulation in two cavity klystron.	
B	Design two single stub matching network (shunt- short) for a given load of $60-j80$ ohms to match with a 50 ohms transmission line using Smith Chart.	
C	Explain Impedance measurement Technique in microwave.	