

University of Mumbai
Examination 2020 under cluster 4 (PCE)

Program: BE EXTC Engineering
Curriculum Scheme: Rev2012
Examination: Fourth Year Semester VII

Course Code: ETC704
Time: 1 hour

Course Name: Microwave & RADAR Engineering
Max. Marks: 50

Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	In order to obtain the resonant frequency of a rectangular waveguide, the closed cavity has to satisfy:
Option A:	Gaussian equation
Option B:	Helmholtz equation
Option C:	Ampere's law
Option D:	Faraday's law
Q2.	Smith chart is based on the polar plot of
Option A:	Voltage reflection co-efficient
Option B:	Current
Option C:	Voltage
Option D:	Reactance
Q3.	parameters used for microwave circuit analysis are
Option A:	S parameter
Option B:	ABCD parameter
Option C:	Y parameter
Option D:	Z parameter
Q4.	Microwave resonators can be constructed from which structure of waveguide
Option A:	open
Option B:	close
Option C:	short circuited
Option D:	parallel
Q5.	A rectangular cavity supports:
Option A:	TEM mode of resonance
Option B:	TM mode of resonance
Option C:	TE mode of resonance
Option D:	TE, TM modes of resonance
Q6.	. _____ is a microwave device in which the frequency of operation is determined by the biasing field strength.
Option A:	Backward wave oscillator
Option B:	Gyrotron
Option C:	Helix BWO
Option D:	Amplitron
Q7.	A microwave tube amplifier uses an axial magnetic field and a radial electric field. This is the

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Option A:	Traveling-wave magnetron
Option B:	. reflex klystron
Option C:	coaxial magnetron
Option D:	Crossfield Amplifier
Q8.	The cavity magnetron uses strapping to -----.
Option A:	prevent mode jumping
Option B:	prevent cathode back-heating
Option C:	ensure bunching
Option D:	improve the phase-focusing effect
Q9.	A microwave point contact diode detector has a reverse saturation current of 1 mA. Assuming $n = 1.4$, $V_T = 26$ mV, the detector current for a microwave signal amplitude of 1 V at room temperature will be
Option A:	0.37nA
Option B:	3.7nA
Option C:	37nA
Option D:	3.7 μ A
Q10.	A small-signal IMPATT diode amplifier has an R_d of - 3 ohm and is operated into a load of 5 ohm. The power gain at the resonant frequency will be ?
Option A:	12
Option B:	13
Option C:	14
Option D:	16
Q11.	In RADAR, Clutter means
Option A:	A desired Echo
Option B:	a target
Option C:	Undesired Echo
Option D:	a RADAR beam
Q12.	On which factor the maximum range of radar depends
Option A:	Pulse duration
Option B:	Pulse energy
Option C:	Pulse frequency
Option D:	Pulse width
Q13.	The capacitance per unit length of broadside parallel lines with width W and separation d is:
Option A:	$\epsilon W/d$
Option B:	$\epsilon d/W$
Option C:	dW/ϵ
Option D:	$dW/2\epsilon$
Q14.	The total number of ones in the scattering matrix of an ideal circulator is:
Option A:	4
Option B:	3

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Option C:	2
Option D:	5
Q15.	For TM ₀₁ mode of propagation in a circular waveguide with $P_{01}=2.405$, with the inner diameter of the circular waveguide being equal to 25 mm. What is the cut off frequency for this mode of propagation?
Option A:	2.8 GHz
Option B:	6 GHz
Option C:	3.06 GHz
Option D:	4 GHz.
Q16.	An air coaxial cable has attenuation of 0.022 and phase constant of 104.7, then the quality factor of a $\lambda/2$ short circuited resonator made out of this material is:
Option A:	2380
Option B:	1218
Option C:	1416
Option D:	1000
Q17.	Bunching process can be graphically explained by a curve or diagram
Option A:	of input resonator electrical field vs. electron density
Option B:	of electron density vs. distance from input gap
Option C:	called velocity diagram called Applegate diagram
Option D:	repeller voltage against output voltage
Q18.	Which of the following diode is used for mixing and detection
Option A:	Gunn diode
Option B:	Varactor diode
Option C:	Crystal diode
Option D:	PIN diode
Q19.	Instrumentation landing system consist of three main components, Localizer, glide path and _____
Option A:	transmitter
Option B:	receiver
Option C:	Marker beacons
Option D:	modulator
Q20.	A circular cavity resonator is filled with a dielectric of 2.08 and is operating at 5GHz of frequency. Then the wave number is:
Option A:	181
Option B:	151
Option C:	161
Option D:	216
Q21.	Find the wave number of a rectangular cavity resonator filled with a dielectric of 2.25 and designed to operate at a frequency of 5 GHz.
Option A:	157.08
Option B:	145.2

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Option C:	345.1
Option D:	415.08
Q22.	A reflex Klystron operates at 9GHz at the peak $n=2$ mode with $V_0= 600V$, $R_{sh} = 20 K \Omega$, $L =1mm$. If gap transit time and beam loading are neglected. Find the repeller voltage
Option A:	2500V
Option B:	250V
Option C:	250kV
Option D:	255V
Q23.	As an amplifier, Silicon junction transistors are used in the frequency range of
Option A:	5-10MHz
Option B:	2-10GHz
Option C:	40-50MHz
Option D:	12-45GHz
Q24.	The remedy for the problem of "blind speed " is
Option A:	Variation of PRF
Option B:	Use of MTI
Option C:	Use of monopulse
Option D:	Change in Doppler frequency
Q25.	A radar used for measuring the height of an aircraft is known as
Option A:	RADAR elevator
Option B:	RADAR speedometer
Option C:	RADAR altimeter
Option D:	RADAR latitude

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	B
Q2.	A
Q3.	A
Q4	B
Q5	D
Q6	B
Q7	D
Q8.	A
Q9.	C
Q10.	D
Q11.	C
Q12.	B
Q13.	A
Q14.	B
Q15.	C
Q16.	A
Q17.	C
Q18.	C
Q19.	C
Q20.	B
Q21.	A
Q22.	B
Q23.	B
Q24.	A
Q25.	C