

University of Mumbai
Examination 2020

Program: Electronics & Telecommunication Engineering

Curriculum Scheme: Rev2016/2012

Examination: Third Year Semester VI

Course Code: ECC603 and Course Name: Antenna and Radio Wave Propagation

Time: 1 hour

Max. Marks: 50

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

Q1.	Which of the following is NOT a Maxwell's equation? (Bold letters indicate vectors)
Option A:	$\nabla \cdot \mathbf{B} = 0$
Option B:	$\nabla \cdot \mathbf{D} = \rho_v$
Option C:	$\nabla \times \mathbf{H} = \mathbf{J} + \frac{\partial \mathbf{D}}{\partial t}$
Option D:	$\nabla \times \mathbf{E} = \mathbf{B}$
Q2.	An antenna has uniform radiation intensity in all directions. The directivity of the antenna is
Option A:	1
Option B:	0
Option C:	0.5
Option D:	0.25
Q3.	As the aperture area of an antenna increases, its gain
Option A:	Increases
Option B:	Reduces
Option C:	Remains same
Option D:	Unpredictable
Q4.	Which of the following antennas has typically the highest gain?
Option A:	Horn antenna
Option B:	Hertzian dipole
Option C:	Handy antenna
Option D:	Isotropic radiator
Q5.	The measured half power beamwidths (HPBW) of an antenna in the two orthogonal planes are 30° and 20°. What will be the approximate directivity of the antenna in dBi?
Option A:	4.8
Option B:	9.9
Option C:	18.4
Option D:	22.4
Q6.	In _____ and _____ range of frequencies are most omnidirectional horizontally polarized antennas used?
Option A:	VHF, UHF

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Option B:	VLF, LF
Option C:	SH, EHF
Option D:	MF, HF
Q7.	A quarter wave monopole antenna operates at 25 MHz. The length of antenna is
Option A:	3 m
Option B:	48 m
Option C:	6 m
Option D:	12 m
Q8.	The radiation resistance of a circular loop of 1 turn is 0.01 ohms. The radiation resistance of 5 turns in ohms will be
Option A:	0.01
Option B:	0.25
Option C:	0.05
Option D:	0.002
Q9.	A N-turn circular loop antenna has a diameter of 2 cm, and the wire diameter is 1 mm. It is wound on the ferrite core, whose effective permeability is 10. How many turns are required to obtain $R_{in} = 50$ ohm at 3MHz
Option A:	127485
Option B:	127655
Option C:	137485
Option D:	127385
Q10.	What is a typical advantage of arrays?
Option A:	Lower gain
Option B:	More Radiation
Option C:	Smaller size
Option D:	Better directivity
Q11.	If the length of elements of an array is greater than $\lambda/2$, which will be the operating region of an array?
Option A:	Transmission line region
Option B:	Active region
Option C:	Reflective region
Option D:	Refractive region
Q12.	Parasitic element that is typically about 5 percent longer than the half-wave dipole-driven element is called _____
Option A:	Array element
Option B:	Director element
Option C:	Reflector element
Option D:	Driven element
Q13.	Parabolic reflector antenna performs which of the following conversion

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	mechanism?
Option A:	Plane to spherical wave
Option B:	Spherical to plane wave
Option C:	Plane to Elliptical wave
Option D:	Spherical to Elliptical wave
Q14.	The ratio of the focal length to the diameter of the mouth of the parabola is called _____
Option A:	aperture
Option B:	focal point
Option C:	foci
Option D:	major axis
Q15.	Using a small reflector to beam waves to the larger parabolic reflector is known as
Option A:	Focal feed
Option B:	Horn feed
Option C:	Cassegrain feed
Option D:	Coax feed
Q16.	At 20 GHz, the gain of a parabolic dish antenna of diameter 1 metre and 70 % efficiency is around
Option A:	15 dB
Option B:	25 dB
Option C:	35 dB
Option D:	45 dB
Q17.	The widely used shape for patch antennas is
Option A:	Rectangular
Option B:	Circular
Option C:	Elliptical
Option D:	Parabolic
Q18.	Compared to conventional microstrip antenna compact microstrip antenna has
Option A:	Lower gain
Option B:	Higher Bandwidth
Option C:	Higher gain
Option D:	Lower input impedance
Q19.	What will be the length of RMSA for Wi-Fi application (2.400 to 2.483 GHz)? Chose Substrate: $\epsilon_r = 2.32$, $h = 0.16$ cm and $\tan \delta = 0.001$
Option A:	4.7cm
Option B:	3.9cm
Option C:	5.7cm
Option D:	6.7cm

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Q20.	Which antennas are renowned as patch antennas especially adopted for space craft applications?
Option A:	Aperture
Option B:	Microstrip
Option C:	Array
Option D:	Lens
Q21.	In general, the earth will act as a -----
Option A:	leaky resistor
Option B:	leaky inductor
Option C:	leaky capacitor
Option D:	leaky transistor
Q22.	Maximum usable frequency of an ionospheric layer at 60 degrees incidence and 8 MHz critical frequency is
Option A:	9.24 MHz
Option B:	16 MHz
Option C:	8 MHz
Option D:	6.93 MHz
Q23.	Which of the following are types of radio wave propagation?
Option A:	Space Wave Propagation
Option B:	Ground Wave Propagation
Option C:	Surface Wave Propagation
Option D:	All of the above
Q24.	The upper part of the atmosphere where the ionisation is appreciable is known as
Option A:	Stratosphere
Option B:	Ionosphere
Option C:	Troposphere
Option D:	Mesosphere
Q25.	The directivity of Hertzian monopole antenna is
Option A:	1/3
Option B:	1/5
Option C:	2
Option D:	3