

M.TECH/ECE/1ST SEM/ECEN 5101/2020
ANTENNA & RADIATING SYSTEMS
(ECEN 5101)

Time Allotted : 3 hrs

Full Marks : 70

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and any 5 (five) from Group B to E, taking at least one from each group.

Candidates are required to give answer in their own words as far as practicable.

Group - A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**
- (i) For a 300Ω antenna operating with 5 A of current, the radiated power is
(a) 7500 W (b) 750 W (c) 75 W (d) 1500 W.
 - (ii) If the flare angle of the horn increases, then its beam width
(a) Decreases (b) Increases
(c) Depends on aperture of horn (d) Independent of flare angle.
 - (iii) Basic transmission loss between two antennas depends on
(a) frequency (b) distance
(c) frequency and distance (d) gain of antennas.
 - (iv) The radiation pattern of travelling wave antenna is
(a) Unidirectional (b) Bidirectional
(c) Multidirectional (d) None of these.
 - (v) In axial mode of operation, helical antenna offers
(a) Circular polarisation (b) Linear polarisation
(c) Elliptical polarisation (d) Near circular polarisation.
 - (vi) When flaring of the waveguide is done in one plane, the horn antenna is known as
(a) Conical horn (b) Pyramidal horn
(c) Sectoral horn (d) Corrugated horn.

- (vii) When two point sources separated at the distance of half wavelength and fed with uniform currents with opposite phase, the array acts as
a
(a) End-fire array (b) Broadside array
(c) Collinear array (d) Parasitic array
- (viii) A pencil beam has
(a) High directivity (b) Narrow beamwidth
(c) Circular cross section (d) All of these.
- (ix) Yagi Uda array consists of
(a) Rod reflector (b) Plane reflector
(c) Corner reflector (d) Parabolic reflector.
- (x) The input impedance of tuned monopole is
(a) $36.5+j21.25$ (b) $(73+j42.5)$ (c) 36.5Ω (d) 73Ω

Group – B

2. (a) Describe return loss of an antenna. How is it related with antenna VSWR?
(b) Derive the relationship between antenna gain, effective aperture and effective height.
5 + 7 = 12
3. (a) Why all antenna measurement is preferably done in far field? Discuss different nature of near field zone of any antenna.
(b) What are HPBW and FNBW of an antenna?
(c) Describe different methods of excitation of antenna.
4 + 4 + 4 = 12

Group – C

4. Why is it important that IoT should have a common architecture? What is “IoT – A” reference model? Draw the block diagram and explain the functions of the models.
2+ 2 + 8 = 12
5. What is the function of iCore architecture? Draw a block diagram. What are the functions of the Service Level and VO level?
2+ 4 + 6 = 12

Group - D

6. Define interoperability. Explain Technical, Syntactical and Semantic interoperability. Describe at least three IoT technical interoperability challenges and their rationale. **6 + 6 = 12**
7. (a) Mention and explain at least 5 security challenges faced in IoT networks.
- (b) Show the IoT security structure with a neat diagram. Explain the functions of Sensor domain, Fog domain and Cloud domain. **6 + 6 = 12**

Group - E

8. IoT evolution calls for protocol testing and characteristics of various aspects. Can you explain the importance of
i) Linked-Data, ii) Scalability, iii) Performance and iv) Extensibility? If so, explain briefly all four. **12**
9. (a) Explain how IoT is overcoming challenges to convert things to smart ones.
- (b) Show how IoT can help immensely to make health sector smart. **6 + 6 = 12**

Department & Section	Submission Link
ECE	https://classroom.google.com/w/MTcyMTA5MjE0MjA1tc/MjY1MTkwMDkyODYx

