

B.E./B.TECH. Degree Examination, December 2020

Semester - VI

**EC16602 - Antenna and Wave propagation**

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions**PART A - (8 X 2 = 16 marks)**

1. Which term is regarded as an inductive field as it is predictable from Biot Savart law & considered to be of prime importance at near field or the distance close to current element?
  - a.  $1/r$
  - b.  $1/r^2$
  - c.  $1/r^3$
  - d.  $1/r^4$
2. If a linear uniform array consists of 9 isotropic elements separated by  $\lambda/4$ , what would be the directivity of a broadside array in dB?
  - a. 6.53 dB
  - b. 7.99 dB
  - c. 8.55 dB
  - d. 9.02 dB
3. A dipole carries r.m.s. current of about 300A across the radiation resistance  $2 \Omega$ . What would be the power radiated by an antenna?
  - a. 90 kW
  - b. 135 kW
  - c. 180 kW
  - d. 200 kW
4. Which mode of propagation is adopted in HF antennas?
  - a. Ionospheric
  - b. Ground wave
  - c. Tropospheric
  - d. All of the above
5. Justify that an open ended waveguide acts as a radiator.
6. An antenna has a radiation resistance of  $72 \Omega$ , loss resistance of  $8 \Omega$  and gain 12 dB. Find the Directivity.
7. Differentiate end-fire and broadside array.
8. Discuss polarization in antenna and its significance.

**PART B - (4 X16 = 64 marks)**

09. (a) (i) Discuss in detail about Antenna Noise Temperature. **(8)**  
(ii) Justify that baluns act as an effective matching structure. **(8)**  
**(OR)**
- (b) Derive the radiating fields and radiation resistance of a half wave dipole antenna and specify the significance of the antenna. **(16)**
10. (a) Derive and plot the radiation pattern of Arrays of two point sources fed with  
1. Equal amplitude and phase  
2. Equal amplitude and opposite phase **(16)**  
**(OR)**
- (b) What are called phased arrays ? Explain the construction and operation of Adaptive array with neat sketches **(16)**
11. (a) Design paraboloidal reflector antenna and explain the operation with neat diagrams,also elaborate its feeding methods. **(16)**  
**(OR)**
- (b) Illustrate the design procedure for the construction of Microstrip patch antenna, also elaborate its feeding methods. **(16)**
12. (a) Justify that space wave propagation is the viable solution for satellite communication **(16)**  
**(OR)**
- (b) Justify that free space supports communication elaborating on the detailed make up of the atmosphere. **(16)**