

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION)**

CLASS: BE  
BRANCH: ECE

SEMESTER: VII  
SESSION : MO/2019

**SUBJECT : EC7203 ANTENNA AND WAVE PROPAGATION FOR WIRELESS COMMUNICATION**

TIME: 1.5 HOURS

FULL MARKS: 25

**INSTRUCTIONS:**

1. The total marks of the questions are 30.
  2. Candidates may attempt for all 30 marks.
  3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. The missing data, if any, may be assumed suitably.
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- Q1 (a) A radiating element of 1cm carries an effective current of 0.5Amp at 3GHz. Calculate the radiated power. [2]  
(b) Using the expression for  $P_{av}$  (starting from  $P_{av}$ ) Obtain the expression for radiation resistance of quarter wave monopole. [3]
- Q2 (a) What is the effective area and efficiency of half wave dipole operates at 500MHz, having directivity 1.6 and power gain of 0.9. [2]  
(b) Define Transmission loss. Find the basic and actual transmission losses between two antennas separated by 60m operates at 10MHz when the gain of each antenna is 1.65dB. [3]
- Q3 (a) What is array factor? What is its significance for calculating radiation pattern of arrays? [2]  
(b) What is the basic difference between uniform, linear and binomial array? [3]
- Q4 (a) Draw the radiation pattern for eight elements using pattern multiplication (Mention each step) [2]  
(b) The center source of a array has a (current) amplitude of unity. For a sidelobe level 0.1 of the main lobe maximum field, find the Dolph-Tchebyscheff value of the amplitude of the end sources. The sources spacing  $d = \lambda/2$ . [3]
- Q5 (a) Mention one of the application of folded dipole antenna with diagram. Find the terminal impedance of 3wire folded dipole antenna for  $Z_{11} = 70 + j0\Omega$ . [2]  
(b) What is the basic difference between resonant and non resonant antennas Give one example of each? Also draw radiation pattern for resonant and non resonant antenna. [3]
- Q6 (a) Draw a neat diagram of Helical antenna. What do you mean by axial ratio and modes? [2]  
(b) Draw a neat diagram of Yagi-Uda antenna. What are the effects of parasitic elements? (Gain, Directivity, radiation pattern, impedance) [3]

::: 20/09/2019M ::::