

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

**CLASS: BE
BRANCH: ECE**

**SEMESTER : VII
SESSION : MO/19**

SUBJECT: EC7203 ANTENNAS & PROPAGATION FOR WIRELESS COMMUNICATION
TIME: 3:00 HOURS **FULL MARKS: 60**

INSTRUCTIONS:

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
 2. Candidates may attempt any 5 questions maximum of 60 marks.
 3. The missing data, if any, may be assumed suitably.
 4. Before attempting the question paper, be sure that you have got the correct question paper.
 5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) What is the difference between Induction and field radiation field? Write down the expression. [2]
- Q.1(b) What is Hertzian dipole? Find the current required to radiate a power of **100W** at **100MHZ** from a **0.01m** Hertzian dipole. [4]
- Q.1(c) Using the Field expressions Derive the expression for power radiated and find the radiation resistance of a Half Wave dipole?(Diagram also) [6]
- Q.2(a) What is the excitation level required for binomial array for **n=5** and **n=6**? [2]
- Q.2(b) A uniform linear array is required to produce an end fire beam when it is operated at a frequency of **10GHZ**. It contains 50 radiators and are spaced at **0.5λ**. Find the progressive phase shift required to produce the end fire beam. [4]
- Q.2(c) What are the limitations in uniform and binomial arrays? What is the advantage of Tschebyscheff method. Explain this method in brief.(different steps only) [6]
- Q.3(a) What is the basic difference between omni directional and directional antenna? Give example of each. [2]
- Q.3(b) Design a three element Yagi -Uda antenna to operate at a frequency of **170MHZ**. [4]
- Q.3(c) With a suitable diagram explain the construction and principle of operation of Helical antenna. [6]
- Q.4(a) Mention the name of antennas used in microwave frequency range.(Any four) [2]
- Q.4(b) What do you mean by shape beam antennas.? What is basic difference between sector and Cosecant beams? [4]
- Q.4(c) With a suitable diagram explain the working of parabolic reflector. [6]
- Q.5(a) What are the advantages and limitations of microstrip patch antennas.? [2]
- Q.5(b) Explain transmission line model used to analyse microstrip antenna. (in brief) [4]
- Q.5(c) Mention the different broadband techniques used in microstrip antenna. [6]
- Q.6(a) Distinguish between electrically and physically small antennas. [2]
- Q.6(b) What are the requirements of antennas for satellite communication? [4]
- Q.6(c) Explain UWB antennas with its applications. [6]
- Q.7(a) Mention the frequency range and distance (region) for space wave and sky wave propagation with its application. (one application of each) [2]
- Q.7(b) What is the significance of modified refractive index and effective radius of earth in space wave propagation? [4]
- Q.7(c) Define critical and MUF. When the maximum electron density of ionized layer corresponds to refractive index of **0.92** at the frequency of **10MHz**,What is the value of critical frequency? [6]

:27/11/2019:E