

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SECOND SEMESTER M.TECH DEGREE EXAMINATION, APRIL 2018
IN COMMUNICATION ENGINEERING & SIGNAL PROCESSING

Sub:07EC6258 ANTENNA THEORY AND DESIGN

Max. marks: 60

Time: 3 hours

Answer all six questions. Part 'a' of each question is compulsory

Answer either part 'b' or part 'c' of each question

Q.no.	Module 1	Marks
1a	Define radiation pattern, directivity, gain and efficiency of an antenna.	4
	Answer b or c	
b	Write expressions for the magnetic vector potential (i) for static case and (ii) for dynamic case of finding the fields from Hertz dipole.	5
c	List the major steps to calculate electric field from a current element starting from Maxwells equations.	5
Q.no.	Module 2	Marks
2a	Compare the non resonant and resonant long wire antennas of same length in terms of construction and radiation patterns.	4
	Answer b or c	
b	How does the conductivity property of the earth affect the field of an antenna near the earth?	5
c	Assuming sinusoidal current distribution over a dipole and considering it as an array of elementary dipoles, write down expressions for (i) the current distribution (ii) the element factor and (iii) the space factor in integral form.	5
Q.no.	Module 3	Marks
3a	What are the important features and applications of planar arrays?	4
	Answer b or c	
b	Find the array factor for linear uniformly spaced N element array of isotropic elements. How to find the radiation pattern of the array if the isotropic elements are replaced by dipole elements?	5
c	Derive the array factor for rectangular planar arrays?	5

Q.no.	Module 4	Marks
4a	What is Babinet's principle?	4

Answer b or c

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| b | How is Babinet's principle used in analysing a slot antenna? | 5 |
| c | Define the original and equivalent problems using this method of equivalence for analysis of aperture antennas. | 5 |

Q.no.	Module 5	Marks
5a	What are the applications of horn antenna? Distinguish between sectoral and pyramidal horns? What are E-plane and H-plane sectoral horns?	5

Answer b or c

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| b | Derive an expression for antenna surface having frequency independence property. | 7 |
| c | What is the method of analysing the radiation from a horn antenna? | 7 |

Q.no.	Module 6	Marks
6a	What are the basic features and applications of microstrip antennas?	5

Answer b or c

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| b | What are the important feeding methods for microstrip antennas? | 7 |
| c | Distinguish the methods of switched beam adaptive array and space division multiple access for improving the cell usage. | 7 |