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Code No. : 16415

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD**B.E. (E.C.E. : CBCS) VI-Semester Main Examinations, January-2021****Transmission Lines and Antennas**

Time: 2 hours

Max. Marks: 60

*Note: Answer any NINE questions from Part-A and any THREE from Part-B***Part-A (9 × 2 = 18 Marks)**

Q. No.	Stem of the question	M	L	CO	PO
1.	Draw the Equivalent circuit of the transmission line and give the Primary constants along with its units.	2	1	1	1
2.	Compute the Characteristic Impedance of the line given open circuit and short circuit input impedances of a transmission line are 100 Ω and 25 Ω respectively.	2	3	1	2
3.	Calculate the value of Voltage Standing Wave Ratio (S) for a given Reflection Coefficient of K=0.3	2	1	2	3
4.	Write the principle behind the Stub matching technique.	2	2	2	1
5.	Differentiate between Antenna Gain and Directivity?	2	1	3	2
6.	If the radiation resistance of an Antenna is 65 Ω and loss resistance is 10 Ω, Find its Efficiency.	2	3	3	2
7.	Write any one advantage and disadvantage of Binomial array	2	1	4	1
8.	State the principle of pattern multiplication.	2	4	4	2
9.	Define normal mode of operation of Helical antenna along with necessary condition	2	4	5	4
10.	Give the working principle of Lens antenna	2	3	5	3
11.	Write the significance of loss less condition of a Transmission	2	2	1	1
12.	Discuss the use of UHF lines as circuit elements.	2	2	2	2
Part-B (3 × 14 = 42 Marks)					
13. a)	Derive the expression for characteristic Impedance Z_0 and Propagation Constant γ of a Transmission Line	7	4	1	1
b)	Find the primary constants of a transmission line at a frequency of 8 MHz, the characteristic impedance Z_0 of transmission line is $(40 - j2) \Omega$ and the propagation constant is $(0.01 + j0.18)$ per meter.	7	3	1	1
14. a)	Formulate the equation of input impedance for open circuit and short circuit lines?	7	2	2	2
b)	A Radio frequency line of characteristic impedance 600 Ω is terminated in an impedance of $400 + j200 \Omega$. Find its a) Reflection coefficient b) VSWR	7	3	2	2

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15. a)	Show that the radiation resistance of a Half wave dipole antenna is 73 ohms?	7	2	3	4
b)	Calculate the power received of a radio link with 15 w transmitted power connected to an antenna of 2.5 m ² , effective aperture at 5GHz. The receiving antenna has an effective aperture of 0.5 m ² and is located at a 15 Km line of sight distance from the transmitting antenna. Assume that antennas are lossless and matched.	7	3	3	4
16. a)	Compute graphically, the field radiation pattern of four isotropic elements fed in phase spaced by half wavelength using pattern multiplication	7	2	4	3
b)	Design a Yagi-Uda antenna at a centre frequency of 177.5 MHz with a Driven element, Reflector, Director and with spacing between the elements	7	3	4	3
17. a)	Explain the radiation mechanism of a Parabolic antenna system	7	2	5	1
b)	What are the differences between the construction of E Plane and H plane sectorial horn antennas? Explain with necessary diagrams of the same	7	2	5	2
18. a)	Derive the condition for minimum Attenuation for a Transmission Line	7	2	1	2
b)	Draw the basic structure of Smith chart. Label the important parts of Smith chart. Write the applications of Smith chart	7	2	2	2
19.	Answer any <i>two</i> of the following:				
a)	Explain the significance of loop antenna in direction finding. Find the radiation resistance of the loop antenna with diameter 0.5m operating at 1 MHz.	7	4	3	1
b)	Describe the construction and working of a Rhombic Antenna	7	2	4	1
c)	Explain the structure and radiation mechanism of Microstrip antenna	7	2	5	2

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	60
2	Knowledge on application and analysis (Level-3 & 4)	40
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable,)	-
